Effects of Raw Materials Sourcing and Processing Activities on Food (Palm Oil) Security in Akwa Ibom State, Nigeria

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ABSTRACT

The recent activities of palm oil scavengers (middlemen) who drop palm oil rubbers (package materials) around mills and markets have called for a deep concern. This is because the quantity of palm oil sent out of the State has caused high level of palm oil insecurity. Thus, this study examined the effect of value chain management activities on food (palm oil) security in Akwa Ibom State. Raw material sourcing, and processing activities were used as proxies for value chain management activities. Descriptive survey research design was adopted for the study. The population of the study comprised all palm oil producers/ processors, distributors and consumers in Akwa Ibom State. The sample size of the study was determined with Trenund and William's model to select 324 respondents (162 palm oil producers/ processors, distributors and 162 consumers). Primary data obtained directly from administration of structured questionnaire to respondents were used for the study. The data were tested with simple linear regression analysis model. The result revealed that, there is a positive and significant effect of raw material sourcing on availability of palm oil to households. And, there is significant effect of processing activities on the affordability of palm oil by households. In conclusion, value chain management activities play an important role in determining the availability and affordability of palm oil by households. The researcher recommended that palm oil producers and processors should strengthen their sourcing systems by establishing reliable relationships with oil palm farmers and ensuring timely procurement of fresh fruit bunches.

Keywords: value chain management, food, security, palm oil, Akwa Ibom State

1. INTRODUCTION

Nigeria is blessed with numerous natural and human resources such as crude oil, natural gas, water resources, good climate, fertile soil, good vegetation, agricultural produce, rocks, gravels, sand as well as palm trees which are found everywhere in the South-West, South-East and South-South part of the country (Federal Ministry of Agriculture, 2025). Despite its

considerable natural and agricultural resources, Nigeria continues to face food security challenges, including inadequate food supplies and rising food prices. Although several intervention strategies by the Federal Government such as, Operation Feed the Nation (OFN), Green Revolution (GR), Directorate of Food, Roads and Rural infrastructure (DFRRI), Better Life for Rural Dwellers (BLRD) and the National Poverty Eradication Programme (NAPEP) and many others have been developed to solve the problem of food insecurity, but the situation continue to pose serious challenges to the people in the country (NBS, 2024). It is therefore important for an oil-rich economy like Nigeria with a vast reservoir of untapped potentials, to diversify its economy promptly and sustainably into high level agricultural activities especially palm oil production through proper value chain management (World Bank, 2025).

Conceptually, value chain management involves coordinating all activities from the point of production to the final consumption, including input supply, processing, storage, marketing, and distribution (Etuk et al. 2016). Poor value chain management may result in post-harvest losses, limited market access, inefficient distribution, and supply bottlenecks all of which could contribute to scarcity and rising costs of palm oil (Adewale et al. 2024). Value addition processes in oil palm production are essential for enhancing the economic value of palm oil and its derivatives, improving product quality, and increasing market competitiveness. These processes encompass various activities, from cultivation and harvesting to processing, warehousing, marketing and disposal (Worlu et al. 2023). Harnessing the value addition processes of palm oil in the country will help to develop a market-centered, export-led economy that will foster food sustainability, job creation, inclusive development, diversified and sustainable industrialization. This is because, as the world experiences a shift in the economic landscape, the need for a monolithic economy like Nigeria to passionately and aggressively diversify cannot be overemphasized. The value chain is a concept from business management that was first described and popularized by Michael Porter in his 1985 best-seller, Competitive Advantage: Creating and Sustaining Superior Performance. The study of value chains comprises two key concepts: value and chain. The term value is synonym with value added in the value chain analysis (VCA) as it characterizes the incremental value of a resultant product produced from processing of a product (World Bank, 2026).

Food security and value chain are deeply intertwined, particularly in agrarian economies where the majority of the population relies on agriculture for their livelihoods. The Food and Agriculture Organization (FAO, 2022) defines food security as a condition where all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Food security encompasses four interrelated dimensions: availability, accessibility, affordability and stability. Each plays a crucial role in determining whether individuals and communities can consistently secure adequate, nutritious food for an active and healthy life (Adedapo, 2025). Availability refers to the physical presence of sufficient food, often driven by production levels, imports, and food stocks. Accessibility includes both economic and physical elements individuals and firms can reach at the right place and time when needed. Affordability is the measure of how easily consumers can buy products without facing money problems, based on their income and purchasing power. The relevance of value chain in achieving food security lies in their ability to align supply with demand, increase the availability and affordability of food, and stimulate innovation in food systems.

Akwa Ibom State ranks among the largest producers of oil palm in Nigeria, accounting for over 168,000 hectares of wild grooves/plantations distributed over 31 LGAs of the State. Palm produce business first started in the riverine communities of Eket and Ikot Abasi Local

Government Areas, attention for palm and kernel oil later shifted to Abak, Ikot Ekpene and Ikono Local Government Areas due to high demand of palm oil at the international markets. Palm oil production (*éyõp*) is a major economic activity of the people of the State and is mostly carried out by rural dwellers both men and women using traditional techniques (Jonah et al., 2025).

Statement of the Problem

Within Akwa Ibom State, there are thousands of mills ranging from the most common purely artisanal mills (women with dugout logs which are gradually being phased out due to availability of partly mechanised processing machines) to very few large industrial mills. Akwa Ibom State has the highest concentration of mills as information gathered from the state revealed that there are about 50,000 small scale palm oil mills (95% of which are mostly managed by women) and about 10,000 small/medium scale registered plantations owners (95% of which are owned by males). Traders within the State and around the region Port Harcourt, Aba, Umuahia and the western and northern parts of the country purchase oil from Akwa Ibom due to the large volumes available there. The high volume of palm oil trading in the State has resulted in a large number of actors like palm oil scavengers, future agreement contractors, harvesters (palm fruit cutters) performing supporting services, including, harvesters of oil palm bunches, fabricators of processing equipment, and cooperative societies in charge of registering palm fruit cutters, palm oil dealers which has caused significant scarcity in the availability and affordability of palm for household. The recent activities of palm oil scavengers (middlemen) who drops palm oil rubbers/package material around mills and markets has called for a deep concern (Jonah et al., 2025). In Akwa Ibom State, circumstantial and preliminary reports (Edet et al., 2024; Jonah et al., 2025) suggest that smallholder palm oil producers often sell at farm-gate prices considerably lower than what could be achieved if better value chain management practices were in place due to futures contract agreement and scavengers. Furthermore, many are excluded from large formal markets, both domestically and across borders, due to none-membership in cooperative society certification (Umana et al., 2020). Lastly, Despite the palm oil production potential in Akwa Ibom, the State has recently experienced a surge in the price of palm oil and a significant decline in its availability to household. These developments have triggered concerns among consumers and raised critical questions about the efficiency of the palm oil value chain. Thus, understanding the operations in the palm oil value chain and identifying existing gaps or inefficiencies is essential to developing policies and strategies that improve the availability, affordability and accessibility to household consumers in Akwa Ibom State.

Objectives of the Study

The main objective of the study was to examine the effect of value chain management activities (raw material sourcing and processing) on food (palm oil) security in Akwa Ibom State, Nigeria. However, the specific objectives were to:

1. examine the effect of raw material sourcing on availability of palm oil to household consumers in Akwa Ibom State
2. determine the effect of processing activities on affordability of palm oil by household consumers in Akwa Ibom State.

Significance of the Study

The palm oil plays a critical role in the agricultural economy of Akwa Ibom State, Nigeria, serving as a major source of livelihood for rural households, especially women and farmers. The palm oil is a fundamental part of food systems in Akwa Ibom State, Nigeria, where palm oil serves as a staple cooking ingredient and a key input in household and commercial food

preparation. While much attention has been given to production-side issues in palm oil agriculture, less is known about how value chain management activities affect food security for consumers particularly in terms of availability, accessibility and affordability. These could be as a result of unnecessary hoarding, inadequate storage and processing facilities, and a heavy reliance on middlemen. As a result, the full economic potential of palm oil is yet to be realized, limiting the sector's ability to contribute meaningfully to food security.

2. REVIEW OF RELATED LITERATURE

Concept of Value Chain Management

The concept of value chain introduced by Porter (1985) cited in Uche et al. (2017) describe the full range of activities, which are required to bring a product or service from conception, through the different phases of production, distribution to consumers, and final disposal after use. As the product moves from one player in the chain to another, it is assumed to gain value (Oyebode et al., 2025). As such, the value chain can be used as a tool to disaggregate a business into major activities, thereby allowing the identification of sources of competitive advantage. This concept has, over the years, been the object of a fast-growing literature in economics and management. Value chain analysis has been employed to examine and evaluate entire industries and industry clusters, as well as specific systems within firms. It has likewise been employed to examine activities that are increasingly spread over several countries or the so-called global value chain (GVC) (Uche et al., 2017). Value addition refers to the process of increasing the economic value of a commodity by transforming raw materials into processed goods or adding value to semi-processed products. This is crucial for increasing the competitiveness of Akwa Ibom State's exports as it enables the state to capture a larger share of the value chain and enhance its export earnings. It also helps in reducing the vulnerability to commodity price fluctuations by diversifying the range of exportable products.

Bello (2018) defines value chain management (VCA) as study of the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use. World Bank (2026) defines value chain as the value added to the movement of a product from one stage to another and identification of the actors, firms and their services, also adds analysis of the institutional support to production at various stages to value chain analysis. Value-chain analysis includes the whole cycle of the organization, production, and delivery of products from inception to use and recycling (Uche et al., 2017). It provides a tool for mapping these crucial domains of private and public policy. But, more than that, by focusing on the dynamic shifting of producer rents through the chain, on the processes whereby key actors provide governance to production that occurs on a global basis, value-chain analysis provides important insights into the policy challenges confronting both private and public actors. The following are the dimensions of value chain management activities used for this study:

Raw Material Sourcing

Raw material sourcing is the process of finding, vetting, and purchasing the basic inputs such as minerals, crops, chemicals, or metals needed to manufacture finished goods (Nguyen et al., 2022). Raw material sourcing refers to the process of identifying, selecting, acquiring, and obtaining the basic materials required for production from reliable suppliers or producers at appropriate prices, quantities, and quality standards (Onwumere et al., 2014). It is securing primary commodities, unprocessed elements, or semi-processed components such as (metals, plastics, textiles, or agricultural goods) to feed into a production line. Raw materials have always been a key factor in supply chain management, diversifying products, and fostering the

company's advantages. Thus, raw materials are considered a core of sustainable economic development and the success of high-tech product lines and diversifications. The supply chain is increasingly becoming a critical factor in deciding the sustainable growth of a country and the success of an enterprise due to the importance of SMEs in facilitating development (Uford, 2017; Japhet, et al., 2025). Ramachandra and Rohinth (2025) argued that the source of raw materials has a positive and significant relationship with the performance of enterprises.

Processing Activities

Processing activities refers to the series of operations undertaken to transform raw materials into finished or semi-finished products suitable for consumption, storage, or further commercial use (Nwankwo & Nwosu, 2019). Processing activities generally refer to the collection, manipulation, storage, or transformation of operational steps to convert inputs into meaningful outputs. For this study, processing activities involve converting fresh oil palm fruit bunches into palm oil through operations such as sterilization or boiling, threshing, fruit digestion, oil extraction, clarification, and storage. The effectiveness of these activities depends on the processing methods, equipment, labour, technical knowledge, and facilities available to producers and processors. Palm oil processing technologies may be grouped into four categories according to the degree of complexity of the operational machinery. These are the traditional methods, small- scale mechanical units, medium-scale mills and large industrial mills (Nwalieji & Ojike, 2018). Processing activities are important because they influence the quantity and quality of produced, production costs, post-harvest losses, and the availability of product for household consumption and commercial distribution (Ogunmola et al., 2023; Oyebode et al., 2025).

Concept of Food Security

World Bank (2024) defines food security as a situation where all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Food security is a flexible concept as reflected in the many attempts at definition in research and policy usage. securing access by vulnerable people to available supplies, implying that attention should be balanced between the demand and supply side of the food security equation. Food security is defined as a status or state in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food for their dietary needs and food preferences for an active and healthy life. The dimensions of food security (FAO, 2020) are:

Availability of food: Food availability refers to the sufficient and consistent supply of raw or processed food commodities through domestic production, stock levels, and net trade. Food availability means having food. This entails production and storage for off seasons. It means availability of food when there are adequate quantities of good foodstuffs so as to provide the nourishing elements and calories necessary. It implies also the availability of foods by households and supply of foods in a nation, region or locality. Food availability addresses the "supply side" of food security and is determined by the level of food production, stock levels and net trade. Availability of food may be affected by factors ranging from high import costs to poor transport links (FAO, 2022).

Food affordability: Food affordability refers to the extent to which individuals and households have sufficient financial resources to purchase adequate quantities of nutritious and safe food without sacrificing other essential needs. It reflects the relationship between food prices, household income, purchasing power, and the cost of meeting daily nutritional requirements (FAO, 2022). Food affordability refers to the ability of households to purchase sufficient

quantities of palm oil at prices consistent with their available income and expenditure priorities. It is influenced by palm oil market prices, household earnings, transportation costs, and the costs associated with production, processing, storage, and distribution. When palm oil prices are reasonable relative to household income, consumers may be better able to obtain it for regular household food preparation. Food security is the state of having reliable access to a sufficient quantity of affordable, healthy food. The availability of food for people of any class, gender, ethnicity, or religion is another element of food protection (Davies, 2019). Similarly, household food security is considered to exist when all the members of a family have consistent access to enough food for an active, healthy life. Food-secure individuals do not live in hunger or fear of starvation (FAO, 2020).

Value Chain Management and Food Security

Food security in Nigeria is challenged by poor inputs, obsolete technology, inefficient supply chains, weak market linkages, high food wastage, and inadequate infrastructure, while the agricultural value chain is dominated by smallholder farmers and hindered by insecure land tenure, broken research pipelines, and limited access to finance and mechanical tools (Idachaba, 2024). Key strategies for improving food security include investing in public-private partnerships to transform the value chain, enhancing value addition and increasing productivity through innovation and improved resource use (FAO, 2022). A food value chain (FVC) consists of all the stakeholders who participate in the coordinated production and value-adding activities that are needed to make food products. According to Stanislaus (2021), losses and wastes are common in all the phases of the FVCs (pre-harvest, harvesting and initial handling, storage, transport and logistics, processing and packaging, retailing and, finally, consumption activities). The agrifood value chain development in Nigeria is facing many barriers to fulfilling its potential including but not limited to capacity, enabling environment, governance, infrastructure, and policies conducive to sustainability and growth. Adding value post-production and minimizing losses with innovations in post-harvest and processing phases can have significant economic and environmental impacts, with input savings and carbon footprint reductions (Helmold & Terry, 2021).

A well-functioning agrifood system plays an important role in increasing food and nutrition security, reducing poverty, especially in low-income countries (LICs), and meeting climate and environment goals for sustainable development. Agrifood systems comprise three components: the actors involved in the agriculture sector, the activities that these actors engage in, and the larger enabling environment. The actors cover the full range from farmers, agribusiness firms, processors, and distributors to consumers (Uford & Etim, 2018). The enabling environment includes the policies, standards, and investments that affect sustainable production and market access. A sustainable food value chain is profitable throughout all its stages (economic sustainability); has broad-based benefits for society (social sustainability); and has a positive or neutral impact on the natural environment (environmental sustainability).

Furthermore, it is worthy to note the assertion of WFP (2022) that, food losses and waste are equal to 1/3 of produced food. At the same time, more than 815 million people all over the world do not have access to adequate food. Nigeria's value chain is characterized by 80% of smallholder farmers and a few commercial processors plagued by inadequate inputs, obsolete technology, lack of knowledge/information about high value/growth products, limited exposure to high productivity practices, weak market linkages, inefficient supply chains with high levels of food wastage. The core FVC comprises the value chain actors who produce or procure products from farmers, add value to these products and then sell them on to the next level. These actors carry out four functions: production (farming, fishing, forest harvesting or

agroforestry), aggregation, processing, and distribution (wholesale and retail) (Idachaba, 2024).

Theoretical Review

The study was anchored by Value Chain Theory by Michael Porter (1985), which describe the process by which businesses receive raw materials, add value to the raw materials through various processes to create a finished product, and then sell that end product to customers.

Value Chain Theory by Michael Porter (1985)

A value chain is a high-level model developed by Michael Porter used to describe the process by which businesses receive raw materials, add value to the raw materials through various processes to create a finished product, and then sell that end product to customers. Michael Porter's concept of value chains is found in the literature of strategic business management, under the umbrella of supply chain management (SCM). The concept was created to assist managers in determining the value embedded within their company's various supply and support operations, as well as ways to improve that value in order to gain a competitive advantage. According to Porter, value chain analysis is the ultimate technique for evaluating the profits generated at each point of production.

Porter distinguished various stages of the supply process (inbound logistics, operations, outbound logistics, marketing and sales, and after-sales service), the transformation of these inputs into outputs (production, logistics, quality, and continual improvement operations), and the support services the firm marshals to accomplish this task. SCM first appeared in the early 1980s as an approach to managing flow of products and enhancing efficiency within a single company. SCM’s boundaries grew to include all actions and actors engaged in delivering a product from raw material to consumer over time, and it now encompasses all activities and actors involved in the delivery of a product from raw material to consumer. The method strives to integrate and coordinate activities and stakeholders across the supply chain in a systemic and strategic manner in order to optimize the supply chain's performance in providing the product at the lowest possible cost. SCM does not have a unifying theory that underpins it. Instead, a variety of current theories from diverse domains have been employed to describe certain elements, meaning that no single theory can adequately cover the scope of SCM (Porter & Millar, 1985).

Review of Empirical Studies

Ogungbemi (2026) examined the entrepreneurial activities and value addition practices along the oil palm value chain in Osun State, the Southwestern zone of Nigeria. A multi-stage sampling method was used to choose the respondents. A validated interview schedule was used to collect quantitative data, which was then condensed using percentages, means, and standard deviation. The results indicated that among the entrepreneurial activities identified along the harvesting stage of the oil palm fruit value chain, the bunch collection constituted the highest (82.3%); clarification was done by 75.6 percent of processors; all the machine operators operated the digester and 90.0 percent of marketers were involved in palm oil marketing. Regarding the method of harvesting, results show that 13.7 percent of the harvesters still use the single rope and cutlass method. Among the processors, very few (9.0%) reported that they started processing after a week of harvesting and 70.0 per cent still used the wet decanting method of oil extraction. All (100%) of the respondents packaged the oil products in plastic containers of 20-25 litres. Among the machine operators, 61.5 percent cleaned their machine once in a while 90 percent of marketers, especially palm oil sellers, simply decant oil from the big plastic containers that were used for the purchase. The majority (71.2%) of the marketers

have storage facilities for their products. This study concludes that strengthening mechanization, technical training, product handling, storage infrastructure, and market-oriented innovations would significantly improve productivity, product quality, employment generation, and rural livelihoods in Osun State. This study was done in Osun State and not Akwa Ibom State, also, food security variables were not captured in the study.

Agbogo et al. (2026) investigated economic efficiency of oil palm processing in Enugu and Anambra States, Nigeria. A multi-stage sampling technique was used to select 152 low-technology and 312 high-technology oil palm fruits processors. Primary data were used based on a well-structured questionnaire. The data were analysed using descriptive statistics, stochastic frontier model and Probit Regression model. The results show that the years of experience, household size, years of education, age of processors, income of the processors, and access to credit facilities were the significant factors influencing the economic efficiency of low-technology and high-technology of oil palm fruit processors. The Pseudo R square value is 0.2441 and 0.1790 for low-technology and high technology. This suggests that the model is well fitted for the two groups, however the model is well fitted of predicting the behaviour or choices within the low-technology group than the high-technology group. The average economic efficiency value obtained by the oil palm processors using low-technology was 63.8% while that of processors using high-technology was 93.6%. This implies that, on average, an individual processor using low-technology to process oil palm was able to obtain an economic efficiency of about 63.8% leaving an inefficiency gap of 36.2% that need to be filled using the existing low-technology. The processors using high-technology were able to obtain 93.6% level of economic efficiency on average basis with an inefficiency gap of 6.4% that needed to be filled using the existing available high- technology to reach the maximum level of economic efficiency in the study area. The study recommended that government should establish specialized technology upgrade credit window at low interest that will assist oil palm fruit processors transit from manual mortar and pestle methods to mechanized digesters and hydraulic presses. Modern machines can recover up to 75% of available oil, compared to only 25% - 35% with low-technology methods.

Ramachandra and Rohinth (2025) investigated the sourcing strategies and procurement processes of raw materials at KP Industry, located in Thanjavur, India. As a manufacturing unit heavily dependent on the timely and cost-effective supply of raw materials, KP Industry faces several challenges in maintaining a steady flow of inputs. The research aims to identify the key sources of raw materials, assess supplier reliability, and analyze the criteria used in selecting vendors. Both primary and secondary data were collected through structured questionnaires and organizational records. The study reveals critical factors affecting raw material sourcing such as price fluctuations, transportation logistics, and supplier consistency. Recommendations have been made to streamline procurement practices, enhance supplier relationships, and implement better inventory management techniques to reduce operational disruptions. This research is valuable for improving sourcing efficiency and contributing to overall productivity in similar manufacturing settings.

Ejike et al. (2025) focused on the economic analysis of palm fruit processing among rural farmers in Ezeagu local government area of Enugu State, Nigeria. A multi-stage stratified random sampling technique was used to select 60 respondents. Data were analyzed using descriptive statistics, and inferential tools. The results show that 35% of producers used mechanized technologies, while 65% used traditional methods. The regression result indicated that age (-0.773), education (1.149), household size (0.068), farming experience (0.089), income (0.113) and access to credit (0.228) significantly influenced palm oil processing.

Despite the vital role of the oil palm industry in the livelihoods of rural households in Enugu and Anambra States, a significant research gap exists regarding the comprehensive economic efficiency (technical, allocative, and profit) of modern versus traditional processing methods in the face of rising operational costs.

3. METHODOLOGY

Descriptive survey research design was adopted for the study. The study was conducted in Akwa Ibom State. Akwa Ibom State is located in the coastal South-South region of Nigeria and the capital city is Uyo. The population of the study comprised all palm oil producers/ processors, distributors and consumers in Akwa Ibom State. However, for the purpose of this study, the population of producers/ processors, distributors and consumers in Akwa Ibom State was considered infinite, since the population of palm oil producers/ processors, distributors and consumers are infinite, the sample size of 324 were the study was determined with Trenund and William's model. In this study, purposive and multi-stage sampling techniques were adopted for this study. Purposive sampling is a non-probability sampling technique used in quantitative research to select a specific group of individuals or units for analysis based on the researcher(s)' judgement. This study was carried out in six local government areas, of which two were selected from the three senatorial districts in Akwa Ibom State (Nsit Ibom, Nsit Atai, Etim Ekpo, Ukanafun, Mkpat Enin and Onna). Furthermore, primary data were obtained directly from respondents through the administration of structured questionnaire to respondents who are of 18 years of age and above. Structured questionnaire was the only instrument of data collection because it aided the researcher to gather first-hand data from the respondents. The demographic characteristics of the respondents were analysed with descriptive statistics such as percentage, frequency, and the mean. Objective i, and ii were analysed with the simple descriptive statistics such as the mean, percentage and frequency distribution. Hypotheses 1 and 2 were tested with simple linear regression analysis model.

4. DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

Table 1: Questionnaire Administration

Respondents	No. of copies administered	%	No. of copies retrieved	%
Producers/processors/distributors	162	50.0	151	46.6
Household consumers	162	50.0	151	46.6
Total	**324**	**100**	**302**	**93.2**

Source: Field Survey (2025)

The questionnaire administration details as explained in Table 4.1 revealed that, a total of three hundred and twenty-four (324) copies of the questionnaire were administered to palm oil producers/ processors, palm oil distributors and consumers in Akwa Ibom State to examine the effect of value chain management activities on food (palm oil) security. From the 324 administered copies of questionnaire, 302 copies were properly filled and retrieved by the researcher, implying that twenty-two (22) copies of the questionnaire lost in the process. Hence, 302 respondents became the valid sample size of the study, since it is unethical and highly prohibited for researchers to manipulate data for a particular study in order to avoid uncertainty, porous and unreliable results. Thus, 93.2% (302) copies of the administered questionnaire were retrieved and confirmed.

Table 2: Effect of raw material sourcing on availability of palm oil

Statements	SA(5)	A(4)	UN(3)	D(2)	SD(1	Total	$\bar{x}$

1. The cultivation of Tenera seedling (70/30) increases the availability of palm oil.	56 37.1%	34 22.5%	15 9.9%	22 14.6%	24 15.9%	151 100	3.50
2. The harvest from Dura seedling variety (30/70) reduces the availability of palm oil.	33 21.9%	61 40.4%	13 8.6%	21 13.9%	23 15.2%	151 100	3.39
3. Pisifera -sterile variety (50/50) produces more palm oil	60 39.7%	41 27.2%	11 7.3%	20 13.2%	19 12.6%	151 100	3.68
4. Supergene premium dwarf hybrid increases palm oil availability	19 12.6%	24 15.9%	59 39.1%	29 19.2%	20 13.2%	151 100	2.95
5. Seasonality in palm fruit raw material supply affect palm oil availability	72 47.7%	34 22.5%	12 8.0%	18 11.9%	15 9.9%	151 100	3.86
6. Frequency of harvest boost palm oil availability.	33 21.9%	51 33.8%	22 14.6%	24 15.9%	21 13.9%	151 100	3.33
7. Quantities of harvested fresh palm fruit bunches enhances continuous palm oil production.	64 42.4%	40 26.5%	18 11.9%	14 9.3%	15 9.9%	151 100	3.82
8. Palm fruit union band on harvest of palm fruits affects level of production	48 31.8%	31 20.5%	21 13.9%	25 16.6%	26 17.2%	151 100	3.33
Aggregate	373 (30.9)	323 (26.7)	170 (14.1)	175 (14.5)	167 (13.8)	1208 (100)	3.48
Proportional ratio	46.6	40.4	21.2	21.9	20.9	151	

Source: Field Survey (2025) mean value > 3.0 accepted otherwise rejected

Table 2 shows the responses of the respondents on the raw material sourcing on availability of palm oil in Akwa Ibom State. The result revealed that the respondents strongly agreed (SA) responses had an aggregate of 373 representing 30.9% and aggregate proportion ratio of 46.6 out of 151 respondents. This was followed by respondents who agreed with aggregate of 323 representing 26.7% and a proportion ratio of 40.4 out of 151 respondents. In the same premise, respondents who disagreed had 175 aggregates representing 14.5% with and a proportional ratio of 21.9 out of 151 respondents. Uncertain response had an aggregate of 170 representing 14.1% and a proportional ratio of 21.2 out of 151 respondents. Lastly, aggregate of 167 respondents strongly disagreed representing 13.8% of the total sample size with a proportional ratio of 20.9. From the result, the aggregate response percentage of strongly agree and agree were 30.9 and 26.7 respectively. Also, the average mean of 3.48 was obtained which is greater than 3.0 benchmark. This implies that imply that adequate and regular sourcing of suitable palm fruit varieties and sufficient harvested quantities are essential for improving the availability and continuity of palm oil production in Akwa Ibom State. Among the indicators, seasonality of palm fruit supply recorded the highest mean of 3.86. This suggests that changes in the availability of palm fruits across seasons constitute a major challenge to continuous palm oil production. When fresh palm fruits are readily available, processors can maintain production, whereas reduced availability during off-seasons may limit processing activities and consequently affect the quantity of palm oil available in the market. From the percentage aggregate value and mean value, majority of the respondents agreed that raw material sourcing significantly affect availability of palm oil in Akwa Ibom State.

Table 3: Effect of processing activities on the affordability of palm oil

Statements	SA(5)	A(4)	UN(3)	D(2)	SD(1)	Total	$\bar{x}$
1. Efficient sterilization process activities reduce the cost of palm oil.	21 13.9%	25 16.6%	39 25.8%	31 20.5%	35 23.2%	151 100	2.77
2. The act of threshing (separating fruit from bunches) affects price of palm oil	26 17.2%	29 19.2%	32 21.2%	36 23.8%	28 18.5%	151 100	2.92
3. Digestion (pounding/mashing) of fruit to release oil is costly	19 12.6%	34 22.5%	37 24.5%	32 21.2%	29 19.2%	151 100	2.88
4. The use of hydraulic pressing system increases the price of palm oil	63 41.7%	35 23.2%	12 7.9%	25 16.6%	16 10.6%	151 100	3.68
5. Use of modern separation equipment improves palm oil affordability	52 34.4%	34 22.5%	19 12.6%	22 14.6%	24 15.9%	151 100	3.45
6. Settling, filtering, and boiling the extracted liquid to separate pure palm oil contribute to higher palm oil prices.	26 17.2%	34 22.5%	22 14.6%	36 23.8%	33 21.9%	151 100	2.89
7. Processing losses increase the cost of palm oil in local market.	62 41.1%	39 25.8%	17 11.3%	20 13.2%	13 8.6%	151 100	3.77
8. Labor costs in palm oil processing influence its market price.	63 41.7%	47 31.1%	19 12.6%	13 8.6%	9 6.0%	151 100	3.94
Aggregate	332 (27.5)	277 (22.9)	197 (16.3)	215 (17.8)	187 (15.5)	1208 (100)	3.28
Proportional ratio	41.5	34.6	24.6	26.9	24.4	151	

Source: Field Survey (2025) mean value > 3.0 accepted otherwise rejected

Table 3 addressed the effect of processing activities on the affordability of palm oil in Akwa Ibom State. From the result, majority of the respondents strongly agreed (SA) with an aggregate of 332 representing 27.5% with an aggregate proportion ratio of 41.5 respondents out of 151. This was seconded by 277 aggregate respondents with 22.9% and a proportional ratio of 34.6 whose option was agreed. In a sequential order, this was followed by aggregate of 215 (17.8%) respondents whose option was disagreed with a proportional ratio of 26.9. Also, respondents who were uncertain in their decision had an aggregate score of 197 representing 16.3% with and a proportional ratio of 24.6. More so, aggregate of 187 respondents strongly disagreed representing 15.5% of the total sample size with a proportional ratio of 24.4. From the result, the aggregate response percentage of strongly agree and agree were 27.5 and 22.9 respectively. Also, the average mean of 3.28 was obtained which is greater than 3.0 benchmark. The highest mean was recorded for labour costs in palm oil processing (3.94), indicating that rising labour expenses are perceived to increase the market price of palm oil. Similarly, processing losses (3.77) and hydraulic pressing systems (3.68) were identified as important factors influencing palm oil prices. The use of modern separation equipment also recorded a mean of 3.45, suggesting that processing technology can influence affordability. However, threshing (2.92), sterilization (2.77), settling/ filtering /boiling (2.89) and digestion (2.88) recorded means below 3.0, indicating that respondents did not generally consider these activities to have a strong direct effect on palm oil affordability. Thus, major processing costs, particularly labour expenses, processing losses and pressing systems, are more influential in determining the

affordability of palm oil in the study area. From the percentage aggregate value and average mean value, majority of the respondents moderately agreed that processing activities significantly affect affordability of palm oil in Akwa Ibom State.

Table 4: Responses on availability of palm oil to household

Statements	SA(5)	A(4)	UN(3)	D(2)	SD(1	Total	$\bar{x}$
1. There is a reliable supply of palm oil to meet household consumption needs.	25 16.6%	35 23.1%	27 17.9%	34 22.5%	30 19.9%	151 100	2.94
2. Palm oil is available for homes to buy in the local market in Akwa Ibom State.	40 26.5%	54 35.8%	23 15.2%	16 10.6%	18 11.9%	151 100	3.54
3. There is excess quality / first grade palm oil in the market	21 13.9%	36 23.8%	32 21.2%	29 19.2%	33 21.9%	151 100	2.88
4. Households can easily obtain palm oil from nearby markets and retail outlets.	68 45.0%	54 35.8%	13 8.6%	9 6.0%	7 4.6%	151 100	4.10
Aggregate	154 (25.5)	179 (29.6)	95 (15.7)	88 (14.6)	88 (14.6)	604 (100)	**3.36**
Proportional ratio	38.50	44.75	23.75	22.0	22.0	151	

Source: Field Survey (2025) mean value > 3.0 accepted otherwise rejected

The rate of availability of palm oil to households was analysis in table 4.10. The result revealed that most of the respondents agreed (A) that there is high level of availability of palm oil in Akwa Ibom State as their response had the highest aggregate of 179 representing 29.6% and proportional ratio of 44.75. The result was followed by aggregate of 154 respondents representing 25.5% and a proportional ratio of 38.50 who opted for strongly agreed option. In the same premise, uncertain option had an aggregate of 95 representing 15.7% and a proportional ratio of 23.75 of the respondents. Invariably, strongly disagreed option and disagree option had an aggregate of 88 representing 14.6% with proportional ratio of 22.0. The result shows that palm oil is generally available to households in Akwa Ibom State, although the level of availability is not completely consistent. The overall mean of 3.36, which is above the 3.0 benchmark, indicates that respondents generally agreed that households have access to palm oil. The aggregate responses further show that 29.6% agreed and 25.5% strongly agreed, giving a combined positive response of 55.1%. Among the indicators, the highest mean of 4.10 was recorded for the statement that households can easily obtain palm oil from nearby markets and retail outlets. This suggests that physical access to palm oil is relatively good. Similarly, the availability of palm oil for purchase in local markets recorded a mean of 3.54, indicating that palm oil is generally obtainable within the local market. However, the statement on reliable supply to meet household consumption needs recorded a mean of 2.94, which is slightly below the benchmark. Also, the mean of 2.88 for excess first-grade palm oil indicates that there may not be sufficient quantities of high-quality palm oil consistently available in the market. The findings signify that households can generally obtain palm oil from local markets and retail outlets, but the reliability of supply and availability of high-quality palm oil remain areas of concern. This implies that improving the consistency and quality of supply could further strengthen household access to palm oil in Akwa Ibom State.

Test of hypothesis 1: Ho_1: there is no significant effect of raw material sourcing on availability of palm oil to households

Table 5: Simple linear regression analysis result of the effect of raw material sourcing on availability of palm oil to households

Variable	Parameters	Coefficient	Std error	Tcal – value
Constant	β_0	1.912	0.282	6.773***
Raw material sourcing (X_1)	β_1	0.426	0.080	5.327***
R-Square (R^2)		0.160		
Adjusted R-Square (R^{-2})		0.154		
F – Statistics		28.377		
F – Probability		0.000		
Durbin-Watson stat		2.058		

Decision Rule: If T-cal>T-tab accept the alternate and reject Null hypothesis. Otherwise accept the null hypothesis. (*** = 1%), (** = 5%), and (* =10%) denotes significance of coefficient at level respectively. T-tab value = 1.976, df = 149 Dependent Variable: availabilityofpalmoil, Predictors: (Constant), rawmaterial

Source: Field Survey (2025) **(SPSS Version 23)**

Simple linear regression analysis was used to test hypothesis 1 and the result is as follows: the coefficient of raw material sourcing (X_1) was statistically significant and positively related to availability of palm oil to households in Akwa Ibom State, Nigeria at 1% level. Implying that a unit increase in raw materials sourced, holding other variables constant, will lead to increase in availability of palm oil to households by 0.426unit. From the result, the t-calculated value of raw material sourcing was 5.327; and the t-tabulated value of 1.976 at 0.5 degree of freedom, since the t-calculated value is greater than t-tabulated value in absolute terms, the researcher upheld alternative hypothesis which states that, there is a significant effect of raw material sourcing on availability of palm oil to households in Akwa Ibom State, Nigeria. The coefficient of multiple determination (R^2) was 0.160, which implies that 16.0% changes in the dependent variable are explained by changes in the independent variable, while 84.0% was unexplained by the stochastic (error) terms in the model. Thus, the independent variable (raw material sourcing) can only explain 16.0 percent of changes in availability of palm oil to households, leaving 84.0% unexplained. More so, the f-statistical (calculated) value of 28.377 which is greater than 1.976 t-table value; and f-probability value of 0.000 was observed from the analysis which is less than 0.05 (95% degree of freedom), indicating that estimated regression model adopted in this study is statistically significant at 5% level. With this, the researcher upheld alternative hypothesis, thus there is significant effect of raw material sourcing on availability of palm oil to households in Akwa Ibom State.

Test of hypothesis 2: Ho_2: there is no significant effect of processing activities on the affordability of palm oil by households

Table 6: Simple linear regression analysis result of the effect of processing activities on the affordability of palm oil by households

Variable	Parameters	Coefficient	Std error	Tcal – value
Constant	β_0	4.261	0.294	14.491***
Processing activities (X_1)	β_1	-0.225	0.082	-2.756***
R-Square (R^2)		0.049		
Adjusted R – Square (R^{-2})		0.042		
F – Statistics		7.596		
F – Probability		0.007		
Durbin-Watson stat		1.861		

Decision Rule: If T-cal>T-tab accept the alternate and reject Null hypothesis. Otherwise accept the null hypothesis.

(*** = 1%), (** = 5%), and (* =10%) denotes significance of coefficient at level respectively. T-tab value = 1.976, df = 149 Dependent Variable: affordabilitypalmoil, Predictors: (Constant), processingactivity

Source: Field Survey (2025) **(SPSS Version 23)**

The estimated value of processing activities (X_1) was statistically significant but negatively related to affordability of palm oil by households. The coefficient value signifies that, a unit increase in processing activities will lead to -0.225 unit decrease in affordability of palm oil by households. From the result, the t-cal value of processing activities was -2.756 while the T-table value was 1.976, since the T-table value is less than T-cal value in absolute terms, the researcher confirmed that, there is significant and negative effect of processing activities on the affordability of palm oil by households. The coefficient of multiple determination (R^2) was 0.049, which implies that 4.9% changes in the dependent variable was explained by changes in the independent variable, while 95.1% was unexplained by stochastic terms in the model. Thus, the independent variable (processing activities) can only explain 4.9 percent of changes in affordability of palm oil by households, leaving 95.1% unexplained. The R^{-2} adjusted was 4.2% indicating a goodness of fit of the regression model adopted in this study which is statistically significant at 5% probability level. The Durbin-Watson statistical value of 1.861 was observed which falls within 1.8 to 2.5, implying that there is no evidence of autocorrelation in the data analysis. More so, the f-statistical (calculated) value of 7.596 was observed in the analysis which is greater than t-critical (t-table) value of 1.976; and probability value of 0.007 was observed from the analysis which is less than 0.05 (95% of freedom), indicating that estimated regression model adopted in this study is statistically significant at 5% probability level. With this, the researcher confirmed that there is significant and negative effect of processing activities on the affordability of palm oil by households.

5. CONCLUDING REMARKS

Conclusion

The study examined the effect of value chain management activities on food (palm oil) security in Akwa Ibom State, Nigeria. Based on the findings, it is concluded that value chain management activities play an important role in determining the availability, affordability and accessibility of palm oil to households. Specifically, raw material sourcing has a positive and significant effect on the availability of palm oil, indicating that efficient sourcing of palm fruits and effective distribution systems enhance the regular supply of palm oil to households. And processing activities significantly influence affordability, suggesting that improved processing practices can contribute to reducing the financial burden on consumers. Thus, strengthening value chain management remains necessary for improving sustainable household access to palm oil in Akwa Ibom State.

Recommendations

The following policy recommendations were made on the basis of findings of the study:

1. Palm oil producers and processors should strengthen their sourcing systems by establishing reliable relationships with oil palm farmers and ensuring timely procurement of fresh fruit bunches. This will help maintain a steady supply of raw materials and improve household availability of palm oil.
2. Stakeholders should develop efficient and cost-effective distribution networks that reduce unnecessary intermediaries and transportation delays. This will enhance the availability of palm oil across different communities in Akwa Ibom State.

REFERENCES

Adedapo, A. (2025). The role of agricultural value chains in enhancing food security and economic development. *International Research Journal of Modernization in Engineering Technology and Science*, 7 (5), 1930 -1948.

Adewale, E.T., Belewu, K. Y., Alabi, E. T. & Ayinde, O. E. (2024). Seasonal price variation analysis of palm oil: Case study of Nigeria (2016–2022). *Discover Food*, 4, 116 - 130

Agbogo, R.N., Alabi, O.O., Haruna, O.E., Lawal, A.F., Danbaki, C.A. (2026). Economic efficiency of oil palm fruit processing in Enugu and Anambra States, Nigeria. *Journal of Agriculture, Food and Ecology*, 4(1), 23-32.

Bello, M. A. (2018). Supply chain disruptions and food security in Nigeria. *Journal of Food Security Studies*, 6(2), 45–54.

Davies, A.E. (2019). *Food security initiatives in Nigeria*: Prospects and Challenges, Monograph, Department of Political Science, University of Ilorin, Nigeria.

Edet, G. E., Akpan, S. B., & Patrick, I. M. V. (2024). Marketing channel choice and its determinants among small-scale oil palm fruit farmers in Akwa Ibom State, the southern region of Nigeria. Asian Journal of Agriculture and Rural Development, 14(2), 322 – 329.

Ejike, O. S., Victor, A. E and Okorokwo, F. C. (2025). Economic analysis of palm fruit processing among rural farmers in Ezeagu Local Government Area of Enugu State, Nigeria. *Agricultural Science and Processing*, 2 (3), 133-141.

Etuk, A. Basil, G. and Bassey, I. (2016). Supply and demand chain management and operational efficiencies of breweries firms in Nigeria: A study of Champion Breweries, Uyo, Nigeria. *AKSU journal of management sciences*, 2 (1), 12 – 18.

FAO (2020). *World Agriculture towards 2025/2030*: Summary Report. Food and Agricultural Organization of United Nations publications, Rome.

FAO (2022). The State of Food Security and Nutrition in the World 2022, [internet] available at: https://www.fao.org/3/cc0639en/cc0639en.pdf . accessed on 28th November 2022.

Federal Ministry of Agriculture and Food Security. (2025). *Nigeria Agricultural Growth Strategy (NAGS) 2.0: Environmental and social assessment.* Federal Ministry of Agriculture and Food Security.

Helmold, M., & Terry, B. (2021). *Operations and supply management* 4.0: Industry insights, case studies and best practices. Springer.

Idachaba, F. (2024). *Food Security in Nigeria Challenges under Democratic Dispensation*. paper presented at ARMTI, Ilorin, Kwara State. Newswatch, Lagos, Special Colloquium Edition.

Japhet, M. M., & Uford, I. C. (2025). Social Media Marketing and Customer Patronage of Small and Medium Scale Enterprises in Uyo Metropolis, Akwa Ibom State. *AKSU Journal of Management Sciences*, 10(2), 133-140

Jonah, P. E., Udoh, U. S., & Atairet, A. C. (2025). Agriculture promotion policy and income generation by small-scale palm oil producers in Akwa Ibom North West Senatorial District, Akwa Ibom State. *AKSU Journal of Administration and Corporate Governance*, 5(3), 68-83.

Nguyen, P. H., Hsu-Hao, L., Pham, H.A., Thi, H.L., Do, Q. M., Nguyen, D. H. & Nguyen, T. H. (2022). Material sourcing characteristics and firm performance: An Empirical Study in Vietnam. *Mathematics*, 1691 (10), 2 - 16.

Nwalieji, H. U. & Ojike, H. U. (2018). Characteristics of small-scale palm oil production enterprise in Anambra State. *Journal of Agricultural Extension*, 22(1), 22-34.

Nwankwo, O. O., & Nwosu, U. L. (2019). Marketing cost and value chain analysis of oil palm fruit processing in Imo State, Nigeria. *Journal of Agriculture and Food Sciences*, 16(1), 107–125.

Ogunmola, O. O., Oyawole, F. P., & Oladele, B. O. (2023). Evaluating the effects of adoption of improved processing technologies on technical efficiency of palm oil processors in Ogun State, Nigeria. *FUDMA Journal of Sciences*, *3*(4), 190-200.

Onwumere, J., Onwusiribe, N. C., & Iheanatu, C. (2014). Value chain analysis of palm fruit production and processing in Abia State, Nigeria. Asian Journal of Agricultural Extension, Economics & Sociology, 3(3), 243–256.

Oyebode, L. A., Oyesola O.B. & Fadairo O. A. (2025). Disruptions along the oil Palm value chain among processors in Ondo State, Nigeria. *Journal of Agricultural Extension*, 29(2), 11-19.

Porter, M. E. (1985). *Competitive Advantage*: Creating and Sustaining Superior Performance. New York: Free Press; 1985.

Ramachandra, Y. and Rohinth, V. U. K. (2025). The sourcing strategies and procurement processes of raw materials at KP Industry, located in Thanjavur. *International Journal of Research Publication and Reviews*, 6 (5), 9591 – 9598.

Stanislaus, A. U. (2021). Transforming the agricultural value chain for food security in Nigeria: any role for public-private partnership? *Economic and Financial Review*. 59(4), 131-157.

Uche, C., Etowa, E.B. & Anele, P. C. (2017). Economic analysis of palm oil processing in Ikwerre and Etche Local Government Areas of Rivers State, Nigeria. *Applied Tropical Agriculture* 22 (1), 5-8.

Uford, I. C. (2017). Customer and Employee-based Brand Equity Driving United Bank for Africa's Market Performance (Doctoral dissertation, University of the Witwatersrand, Faculty of Commerce, Law and Management, School of Economic & Business Sciences).

Uford, I. C. & Etim, G. S. (2018). The effect of product attributes on consumers' attitude towards made-in-Nigeria textiles in South-South Zone of Nigeria. *Journal of Marketing Management and Consumer Behavior*, 3 (2), 36-52.

Umana, S. U., Ebong, M. S., & Godwin, E. O. (2020). Biomass production from oil palm and its value chain in Nsit Ibom Local Government Area, Akwa Ibom State, Nigeria. *Journal of Human, Earth, and Future*, 1(1), 29 – 41.

WFP (2022). *Global Food Crisis Summary*, [internet] available at: https://www.wfp.org/publications/global-report-foodcrises-2022 accessed on 28th

World Bank (2025). *Nigeria development update: Building trust for investment and growth*. World Bank.

World Bank. (2026). *Nigeria Sustainable Agriculture Value Chains for Growth (AGROW) Project*. World Bank.

Worlu, A. A., Morris, R. E., & Nyejiwu, I. T. (2023). Analysis of palm oil marketing in Ikwerre Local Government Area, Rivers State. *Nigeria Agricultural Journal*, *54*(1), 493–499.