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Challenges facing Oil Palm Production in Oruk Anam Local Government Area, Akwa Ibom State, Nigeria

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Abstract

Oil palm production remains one of the most important agricultural and socio-economic activities in Oruk Anam Local Government Area of Akwa Ibom State, Nigeria. Despite its significant contribution to household income, employment generation, food security, and rural livelihoods, the sector continues to face numerous production and institutional challenges that hinder its growth and sustainability. This study examined the major challenges affecting oil palm production in Oruk Anam Local Government Area with emphasis on labour constraints, inadequate access to fertilizer, aging oil palm plantations, poor processing facilities, and infrastructural deficiencies. The study adopted a cross-sectional survey research design using both quantitative and qualitative approaches. Primary data were collected through structured questionnaires, interviews, field observations, and Focus Group Discussions administered to 369 respondents selected through a multi-stage sampling technique across nine oil palm-producing communities. Descriptive statistical techniques such as frequency tables and percentages were used for data analysis. Findings revealed that oil palm production remains widespread across all the communities, with participation rates ranging from 65% to 90%. However, major challenges identified include poor access to fertilizers, inadequate capital, aging palm trees, high labour costs, inefficient palm mills, poor road infrastructure, and limited access to modern processing equipment. The study further revealed that communities with better infrastructure and access to support services recorded relatively higher productivity and better processing conditions. The study concludes that oil palm production in Oruk Anam possesses enormous potential for socio-economic development, but this potential is constrained by technological, financial, infrastructural, and institutional limitations. The study recommends increased government intervention through credit provision, rehabilitation of rural roads, modernization of processing facilities, and training programmes for farmers to enhance productivity and sustainable development in the study area.

Keywords: *Oil Palm Production, Socio-Economic Development, Rural Livelihoods, Agricultural Challenges, Smallholder Farmers, Oruk Anam, Akwa Ibom State, Nigeria.*

1. Introduction

Oil palm production is a vital economic activity in Oruk Anam, underpinning the livelihoods of a large segment of the local population. Despite its importance, the sector has not reached its full potential as a driver of sustainable socio-economic development. The traditional nature of the production system, combined with limited technological advancement, has resulted in low productivity and suboptimal quality of the end products. This situation has significant implications for the overall development and economic stability of the community (Udoh and Essien 2015).

A predominant challenge in Oruk Anam is the reliance on traditional farming methods and out-dated processing techniques. Most smallholder farmers continue to employ labour intensive practices that yield limited output and

lower-grade palm oil. The absence of mechanization and modern agronomic practices hinders the efficiency of production and prevents the sector from scaling up to meet both local and broader market demands. This technological stagnation restricts the contribution of oil palm production to the local economy.

Compounding the technological constraints are critical gaps in support services. Many farmers in Oruk Anam experience limited access to agricultural extension services and financial credit facilities. Without adequate technical guidance and investment, farmers find it challenging to adopt improved practices or invest in modern equipment. These support deficiencies significantly impede the ability of the sector to innovate and increase its productivity, thereby constraining the potential socio-economic benefits that could arise from enhanced oil palm production.

Market-related challenges further exacerbate the problems faced by oil palm producers in the area (Food and Agriculture Organization of the United Nations, 2024). Price volatility, unreliable market information, and the lack of efficient marketing channels create an environment of uncertainty for smallholder farmers. Inadequate transportation infrastructure and insufficient storage facilities also contribute to post-harvest losses, reducing the overall competitiveness of locally produced palm oil. These factors collectively diminish the economic returns for farmers, thereby limiting the sector's capacity to stimulate broader socio-economic development in Oruk Anam local government area.

Social inequities within the community present additional challenges to harnessing the full benefits of oil palm production (Abraham et al 2024). Although the industry offers significant income-generating opportunities, the benefits are not evenly distributed among all community members. Marginalized groups, including women and youth, often receive limited access to the resources and training necessary to participate fully in the value chain. This uneven distribution of benefits perpetuates socio-economic disparities, undermining the potential of the sector to contribute to inclusive community development.

Environmental sustainability is also a pressing concern that intersects with both production and socio-economic outcomes (Nwafor, 2019). Unsustainable farming practices in Oruk Anam such as deforestation and improper land management have led to soil degradation and reduced productivity over time. These environmental issues not only threaten the viability of oil palm cultivation but also have long-term implications for the community's natural resource base, which is essential for sustained economic growth and improved living standards (Abah, 2015; Okorie, Okoro, and Eshiet, 2020).

Moreover, inadequate policy support and infrastructural deficits further hinder the development of the oil palm sector in Oruk Anam. The lack of effective government intervention such as subsidies for modern farming technologies and the development of agro-industrial zones limits opportunities for expansion and modernization. Poor rural road networks and unreliable energy supply continue to constrain the processing and marketability of palm oil. These gaps in policy and infrastructure not only impede production efficiency but also exacerbate socio-economic inequities within the community.

Given the multiplicity of challenges from out-dated production techniques and limited support services to market inefficiencies, social disparities, environmental degradation, and infrastructural deficits, it's evident that the full potential of oil palm production in Oruk Anam remains unrealized. The study examined the challenges facing oil palm production in the Oruk Anam Local Government Area aimed at expanding the capacity of oil palm production in Oruk Anam Local Government Area.

2. Literature Review

Oil palm production in Asia, particularly in Southeast Asia, is a cornerstone of the global vegetable oil market, with Indonesia and Malaysia dominating as the world's leading producers. Together, these countries account for approximately (85%) of global palm oil production, driven by favorable tropical climates, high yields, and economic incentives AH, Jacfar (2015). Oil palm (Elaeis guineensis) is the most productive vegetable oil crop globally, yielding 4–4.5 tons of palm oil per hectare in Southeast Asia under optimal conditions, significantly higher than other oil seed crops like soybean or rapeseed J Deike (2015), D Shell. According to a 2021 study by Abubakar, et.al., (2022) highlights that oil palm crops globally produce 81 million tonnes (Mt) of oil annually from about 19 million hectares (Mha), with Asia, particularly Indonesia and Malaysia, contributing the vast majority. In 2021, Indonesia supplied 27 Mt and Malaysia 14.3 Mt, accounting for (83.8%) of global palm oil exports. Indonesia is the largest producer, with oil palm plantations covering over 8 Mha by 2014, up from 2.5 Mha in 2000, driven by global demand for food (India, China) and biofuels (Europe). A 2025 projection estimates Indonesia's production at 50 Mt, though exports may decline by 5% due to increased domestic biodiesel use. Malaysia is the second-largest producer, with plantations spanning approximately 5.9 Mha in 2021, projected to produce 19.5 Mt in 2025. Malaysia's production is constrained by land availability, with studies suggesting it has nearly reached its sustainable cultivation limit. Thailand, an emerging producer, with plantation areas tripling since 2010, covering (70%) of its domestic vegetable oil market. Annual production is part of the

global 150 Mt of vegetable oil, with palm oil contributing significantly. Other Asian countries, countries like Papua New Guinea and the Philippines have smaller but growing capacities. For instance, Papua New Guinea is noted for plantation expansion, though it remains a minor player compared to Indonesia and Malaysia.

The yield potential of oil palm in Asia is significantly higher than current averages due to genetic improvements, better management practices, and technological advancements. A 2017 study highlights that peak oil yields of 12 t ha^{-1} yr^{-1} have been achieved in small plantations, with theoretical maximums reaching 18.5 t ha^{-1} yr^{-1}, yet global averages stagnate around 3 t ha^{-1} yr^{-1} due to suboptimal practices. In Southeast Asia, yields are higher (4–4.5 t ha^{-1}) due to favorable climate and management, but there is still room for improvement (Abubakar, et. al., 2022). The 2013 publication of the oil palm genome sequence has enabled molecular breeding to target higher oil yields and improved mesocarp oleic acid composition (>65% w/w), potentially increasing productivity without expanding land use. Smallholders, who cultivate (40%) of oil palm areas in Indonesia and Malaysia, often face yield gaps due to counterfeit seeds, inadequate fertilizer use, and aging plantations. Closing these gaps could boost global production by 15–20 Mt annually. A 2025 study on Tenera hybrids in Tamil Nadu, India, demonstrated high yield potential in the Cauvery Delta, suggesting that non-traditional regions in Asia could contribute to production if climatic and soil conditions are suitable. Oil palm's low land footprint (19 Mha compared to 163 Mha for soybean and rapeseed combined) makes it efficient, but expansion has driven deforestation, particularly in Indonesia and Malaysia. Between 1989 and 2019, (45%) of oil palm plantations in Southeast Asia replaced forests, with Indonesia at (54%) and Malaysia at (40%). From 2000 to 2014, Indonesia's plantation area tripled, often at the expense of peatlands and primary forests, leading to 2.23 Mha of peatland conversion globally. Studies emphasize that future expansion in Asia, particularly in Indonesia, should focus on degraded or already-cleared land to minimize environmental impact. Malaysia is nearing its sustainable land limit, with 44.6–105.1 Mha of potential sustainable land in Asia, but further expansion is discouraged unless sustainable practices are adopted. Certification schemes like the Roundtable on Sustainable Palm Oil (RSPO) have reduced deforestation by (15%) in Malaysia, and improved palm oil mill effluent (POME) management has cut methane emissions by (70%). However, enforcement remains inconsistent. A 2016 study found that (45%) of Asian oil palm plantations replaced forests since 1989, threatening biodiversity, particularly in Indonesia's Borneo region. The conversion of peatlands releases 427.2 ± 90.7 t C ha^{-1}, contributing to Indonesia's status as the third-largest global emitter of greenhouse gases. Rising temperatures and erratic rainfall, exacerbated by El Niño and La Niña events, reduce yields by (10–40%) with a 1–4°C temperature increase. Pests like bagworms and rhinoceros beetles proliferate under warmer conditions, increasing costs. A 2021 study by Rival & Levang (2014) reviewing 57 case studies found 109 negative social impacts, including land grabbing (16%) and conflicts (25%), against 99 positive impacts like income generation (33%) and employment (19%). Smallholder resilience varies, with older, independent farmers in Indonesia being the least resilient due to limited access to resources and certifications. Mahat's 2012 MSc dissertation on Malaysia's palm oil industry highlights its contributions to poverty alleviation and economic growth but notes persistent human rights issues, such as labor inequities, which undermine sustainability. Oil palm (Elaeis guineensis), native to West and Central Africa, is a critical crop for both local economies and global vegetable oil supply, contributing about 40% of traded vegetable oil worldwide. Africa's oil palm production capacity is shaped by a combination of ecological suitability, smallholder and industrial contributions, policy interventions, and environmental and social challenges. Africa accounts for a smaller share of global oil palm production compared to Southeast Asia (e.g., Indonesia and Malaysia, which produce (~80%) of global palm oil). However, the continent has significant production capacity, particularly in West and Central Africa, where oil palm is a traditional crop. In 2019–2020, global palm oil production reached 81.1 million tonnes (Mt), with Africa contributing a fraction of this, primarily from countries like Nigeria, Ghana, Cameroon, Côte d'Ivoire, and the Democratic Republic of Congo (DRC). Nigeria, as the largest African producer, Nigeria has a significant but underutilized capacity. The country produced approximately 1.4 Mt of palm oil in 2020, but its domestic demand exceeds production, leading to imports of nearly 8 Mt annually across Africa. Nigeria's production is dominated by smallholders and wild groves, with low yields due to outdated planting materials and poor agronomic practices. Ghana's oil palm sector includes an estimated 330,000 hectares (ha) of cultivation, comprising 150,000 ha of wild groves, 140,000 ha of private smallholdings, and 40,000 ha of estates. Large-scale plantations like Benso Oil Palm Limited (BOPP) and Ghana Oil Palm Development Company (GOPDC) contribute significantly, but smallholder yields remain low, averaging 44% of potential technology use. Cameroon has seen rapid expansion, with 1.2 million ha added since 1990. The Southwest region is a key production hub, but (67%) of expansion from 2000–2015 occurred at the expense of forests, driven by informal mills and non-industrial producers. Other countries like Côte d'Ivoire, Benin, Sierra

Leone, Angola, and the DRC are emerging producers, with the Congo Basin holding over half of Africa's suitable land for oil palm (1.37 billion ha globally). However, production in these countries is constrained by low yields and limited infrastructure. Africa's total cultivated area for oil palm is approximately 6 million ha, but yields are significantly lower than in Southeast Asia due to reliance on traditional methods, low efficiency mills, and limited access to improved planting materials. For example, Ghana's smallholders operate at only (28%) of metafrontier technical efficiency, highlighting a substantial yield gap. Africa's oil palm production capacity has considerable growth potential due to favorable climatic conditions, available land, and increasing domestic and global demand. The continent's tropical climate, with high rainfall (at least 1,800 mm annually) and humidity, supports oil palm cultivation, particularly in the Congo Basin and West African forest belts. Demand is driven by population growth, high per capita consumption (Africa consumes (15%) of global palm oil), and policies aiming for self-sufficiency, such as Nigeria's goal to meet (100%) of domestic demand by 2027. Over 1.37 billion ha of land in Africa is suitable for oil palm, though much is allocated to other uses or protected areas. The Congo Basin is a hotspot for potential expansion, but deforestation risks are high. Research, such as the work by Ayompe (2023), highlights opportunities to increase yields without further land expansion by improving smallholder access to high-yielding varieties and better management practices. In Ghana, studies using a stochastic metafrontier framework suggest that closing the yield gap through efficient use of existing technologies could boost output significantly. The Africa Palm Oil Initiative (APOI), now transitioning to the Africa Sustainable Commodities Initiative (ASCI), promotes sustainable production across commodities like oil palm, rubber, and cocoa. In Cameroon, the TFA-APOI aims to reduce deforestation while enhancing smallholder livelihoods. Smallholders manage a significant portion of Africa's oil palm land.

The expansion and intensification of oil palm production are fraught with significant environmental challenges, most notably deforestation and its associated impacts on biodiversity. The comprehensive research of Fitzherbert *et al.* (2008) systematically compared oil palm plantations to tropical forests, synthesizing findings from numerous ecological studies. Their meta-analysis revealed that plantation establishment is a primary driver of habitat fragmentation, leading to severe declines in species richness and abundance for most forest-dependent taxa, particularly mammals and birds. This foundational work established that while oil palm can support more biodiversity than other annual crops, it constitutes a profoundly impoverished habitat compared to the native forest it replaces, presenting a major challenge for conservation efforts in the tropics.

Fundamentally impacts the carbon balance of producing nations, the seminal work by Carlson et al. (2012) quantified carbon emissions from land-use change specifically for oil palm in Indonesia. By utilizing remote sensing technologies and satellite imagery analysis over two decades, they were able to directly link plantation expansion to peat land drainage and forest clearance. Their findings were stark, demonstrating that conversion of peat lands for oil palm releases disproportionately large quantities of stored carbon dioxide, thereby transforming a potential carbon sink into a major emissions source and challenging the industry's environmental credentials.

Beyond these large-scale ecological issues, agronomic challenges at the field level persistently constrain yields and long-term sustainability. The pervasive threat of basal stem rot (BSR) disease, caused by Ganoderma boninense, has been extensively documented by researchers like Flood, Bridge, and Holderness (2000). Through long-term field pathology studies and inoculation trials, they identified this fungal disease as the most devastating pathological constraint in Southeast Asia, inevitably killing palms and rendering large areas of plantation unproductive after the first planting cycle. Their work highlights the critical challenge of managing a soil-borne pathogen in a perennial monoculture system, where crop rotation is not a feasible option and resistant cultivars remain only partially effective.

Furthermore, the industry faces immense socioeconomic challenges, particularly concerning land tenure and the rights of local communities. The research of Zen et al. (2015) delved into the complex governance and political economy of land acquisition for plantations in Indonesia. Employing a political ecology framework and case study analysis, they detailed how opaque licensing processes and conflicting land claims frequently lead to social conflict, dispossession, and the marginalization of indigenous peoples. Their findings illustrate that the challenge is not merely technical or environmental but is deeply rooted in institutional failures and power imbalances, where the economic benefits of production are often prioritized over the social and cultural rights of existing populations.

Oil palm exploitation has significantly contributed to socioeconomic development in Asia. The crop's high yield and versatility have driven economic growth, poverty alleviation, and food security, but its production faces numerous challenges, including environmental degradation, social conflicts, and economic vulnerabilities. The expansion of oil palm plantations is a leading cause of deforestation, particularly in Southeast Asia, where it has replaced biodiverse tropical forests. This conversion

contributes to biodiversity loss, greenhouse gas emissions, and haze pollution from land-clearing fires. A 2016 study in Public Library of Science (PLOS), found that in Southeast Asia, (45%) of sampled oil palm plantations were established on land that was forested in 1989, highlighting the significant deforestation driven by oil palm expansion. In contrast, only (2%) and (7%) of plantations in Mesoamerica and Africa, respectively, came from forested areas. A "Nature Plants" article (2020) notes that oil palm expansion in Borneo, Sumatra, and the Malay Peninsula contributes to deforestation rates ranging from (3%) in West Africa to (50%) in Malaysian Borneo.

The draining and burning of peatlands in Indonesia, which store vast amounts of carbon, exacerbate climate change, making Indonesia the third-largest global emitter of greenhouse gases due to deforestation. A 2024 article in "Global Sustainability" reports that between 1992 and 2019, 15.4 million hectares of land were converted into oil palm plantations globally, with 3.6 million hectares coming from forests, primarily in Indonesia (9.4 Mha) and Malaysia (4.1 Mha). While oil palm drives economic growth, its environmental impact threatens long-term sustainability, as degraded ecosystems reduce land productivity and affect rural communities dependent on forest resources. Public backlash and consumer pressure for deforestation-free palm oil add further complexity. Oil palm monocultures replace biodiverse habitats, threatening endangered species and disrupting ecosystems. The crop's expansion affects (54%) of threatened mammals and (64%) of threatened birds globally. A 2024 study in "Science Direct" on smallholder oil palm production in Indonesia highlights substantial environmental inefficiency due to biodiversity loss, partly driven by chemical and manual weeding practices. The study uses a hyperbolic environmental distance function to estimate the shadow price of biodiversity conservation, indicating potential for improved environmental and economic outcomes.

The "World Wildlife Fund" (2015) notes that oil palm plantations in Malaysia and Indonesia, which host some of the world's most biodiverse forests, have displaced species like orangutans, Sumatran rhinos, and tigers, leading to human-wildlife conflicts as animals are forced into fragmented habitats. A 2018 International Union for Conversation of Nature (IUCN) report emphasizes that the high yield of oil palm makes it difficult to replace with other oil crops, but unsustainable expansion threatens critical biodiversity hotspots, particularly in Indonesia and Malaysia, where (85%) of global palm oil is produced. Biodiversity loss undermines ecosystem services like pollination and water regulation, which are vital for agricultural productivity and rural livelihoods. Negative public perception also affects market access, particularly in regions like the EU, where sustainability concerns drive policy changes. Oil palm production is vulnerable to climate change, with rising temperatures and erratic rainfall patterns reducing yields. Additionally, the industry contributes to climate change through deforestation and peatland drainage.

A 2021 article in The Centre for Agriculture and Bioscience International (CABI) Agriculture and Bioscience" highlights that increasing temperatures and erratic rainfall patterns reduce oil palm's climatic resilience, with a potential yield reduction of (10-40%) for a 1-4°C temperature increase over the next 70 years in Southeast Asia - A 2024 "Scientific Reports" study in Indonesia notes that climate change accelerates soil water evaporation, leading to drier soils that impair nutrient absorption and flower development, ultimately lowering production. A 2017 "Science Direct" article on yield gaps in oil palm production indicates that water deficits exceeding 400 mm per year can reduce yields to less than one-third of their potential, particularly in regions with poor soil management. Reduced yields threaten the livelihoods of smallholder farmers, who make up (40–50%) of the industry and often lack resources to adapt to climate variability.

This also affects national economies reliant on palm oil exports. Oil palm plantations face increasing threats from pests and diseases, such as basal stem rot Best Seller's Rank or Basic Statistical Rank (BSR) caused by "Ganoderma" and bud rot, which significantly reduce yields. A 2020 Multidisciplinary Digital Publishing Institute (MDPI) article identifies BSR as the most significant disease threat to oil palm plantations in Malaysia, contributing to yield losses and necessitating costly management practices. The article suggests nanotechnology for early pest and disease detection but notes its limited adoption. A 2017 "Science Direct" review on yield gaps notes that severe infestations of pests and diseases can reduce actual yields to near zero, with "Ganoderma" being a major concern in Southeast Asia due to inadequate plantation management. Pests and diseases increase production costs and reduce income for smallholders, who often lack access to advanced pest management technologies. This exacerbates economic vulnerabilities, particularly for independent smallholders.

Oil palm expansion often leads to conflicts over land rights, particularly with indigenous and rural communities, due to unclear land tenure and mostly in mineral economies characterized by soil contamination, pressure for good soils, land grabbing and administrative bottleneck in the land/agricultural sector (Jimmy et al, 2025; Jimmy, 2025; Ekpeyong et al 2025; Jimmy et al 2025; Nwanegbo et al, 2026; Jimmy et al, 2026). A 2020 "Science Direct" study on the social impacts of palm oil trade in Indonesia and

Malaysia identifies conflicts (25%), housing conditions (18%), and land grabbing (16%) as the most frequent negative social impacts, based on 57 case studies. A 2014 "Academia.edu" review of smallholder challenges in Malaysia notes that conflicts arise from the absence of clear land rights and unequal benefit sharing, particularly affecting indigenous smallholders in East Malaysia who cultivate on customary lands. A 2025 X post by at Palm Choice reports that Indonesian authorities reclaimed 2 million hectares from illegal plantations, but critics argue this disproportionately targets indigenous communities and smallholders, exacerbating land inequality. Land disputes disrupt community cohesion and livelihoods, while human rights issues, such as low wages and exploitation of foreign workers, tarnish the industry's reputation and limit market access. The palm oil industry faces market volatility, negative consumer sentiment, and regulatory pressures, particularly in major importing regions like the European Union (EU), which impact smallholders' ability to access global markets.

Land tenure issues and conflicts over land use are prevalent in Africa. In Cameroon, local entrepreneurs and elites often engage in regulatory evasion and illegal land encroachments, complicating efforts to regulate oil palm expansion. In Liberia, communities have reported loss of access to traditional lands due to large-scale concessions to companies like Golden Veroleum Liberia (GVL), leading to the destruction of crops, sacred sites, and wetlands. In Sierra Leone, resistance to companies like Socfin stems from unfulfilled promises of community development (e.g., schools, hospitals), highlighting tensions between industrial expansion and local land rights. Pests and diseases significantly reduce oil palm yields. In Uganda, Fusarium wilt and Ganoderma trunk rot are major threats, with Fusarium wilt affecting both young and older palms in first-phase plantings, an unusual occurrence attributed to year-round favorable conditions for disease proliferation. In Nigeria and Ghana, similar pest and disease pressures are reported, with smallholders often lacking the resources for effective control measures. A review of oil palm diseases notes that basal stem rot (BSR), caused by Ganoderma boninense, is less prevalent in Africa compared to Southeast Asia but still poses a risk, particularly in replanted fields. Aging oil palm plantations contribute to declining productivity.

In Indonesia, smallholders face challenges replanting due to limited financial resources, a problem also relevant in Africa, where many smallholder plantations rely on older, less productive Dura varieties instead of the higher-yielding Tenera breed. In Cameroon, inland production basins still use Dura palms due to limited access to improved seeds, further reducing yields. Achieving sustainability certifications like those from the Roundtable on Sustainable Palm Oil (RSPO) is challenging for African smallholders due to high costs and lack of incentives. In Ghana, smallholders supply (70%) of FFB to processing mills but lack the capacity to meet RSPO certification requirements, excluding them from international markets.

In Uganda, the lack of local processing facilities limits smallholder access to markets, exacerbating reliance on distant industrial mills. The reliance on low-efficiency artisanal mills in Africa results in lower oil extraction rates and poorer quality products. In Cameroon, (73%) of farmers use artisanal mills, with over (60%) relying on manual presses, which cannot compete with industrial mills. This inefficiency reduces profitability and limits market competitiveness. Oil palm production in Nigeria, once a cornerstone of the country's economy, has faced numerous challenges that have diminished its global competitiveness and hindered socioeconomic development. These challenges span environmental, economic, social, infrastructural, and policy-related issues. Nigeria was a leading global palm oil producer in the 1960s, accounting for (43%) of the world's supply, but its market share has plummeted to less than (2%) today. This decline is attributed to systemic issues, including insufficient investment in modern varieties and unfavorable policies.

3. Materials and Methods

This study adopted a cross-sectional survey research design to investigate the challenges facing oil palm production in Oruk Anam Local Government Area of Akwa Ibom State, Nigeria. The survey design was considered appropriate because it enabled the collection of quantitative and qualitative data from oil palm farmers, processors, marketers, and household heads within the study area. Both primary and secondary data sources were utilized in order to obtain comprehensive information on production constraints, socio-economic conditions, and institutional factors affecting oil palm production. Primary data were generated through questionnaires, interviews, field observations, and Focus Group Discussions (FGDs), while secondary data were obtained from textbooks, journal articles, government publications, agricultural reports, and records from the National Population Commission and Ministry of Agriculture.

The study area comprised selected oil palm-producing communities in Oruk Anam Local Government Area, including Ndot Ikot Eda, Ibesit Ekoi, Ikot Asukpong, Obio Ibiet Nkarika, Nung Oku Ibiet, Obio Akpa, Nung Oku Ubo, Ikot Okoro, and Ikot Ntuen. These communities were purposively selected because of their long-standing involvement in oil palm cultivation and processing activities. The target population consisted of smallholder

oil palm farmers, processors, marketers, cooperative members, and agricultural workers involved in the oil palm value chain.

A multi-stage sampling technique was employed in selecting respondents for the study. In the first stage, the study communities were purposively selected based on the intensity of oil palm production and accessibility. In the second stage, a sampling frame of registered and non-registered oil palm producers and processors was compiled with the assistance of village heads, cooperative societies, and agricultural extension officers. In the third stage, simple random sampling technique was used to select respondents proportionately from each community. A total sample size of 369 respondents was used for the study to ensure adequate representation across the selected communities.

Data collection was conducted between November 2024 and April 2025 with the assistance of trained field enumerators who administered structured questionnaires to respondents. The questionnaires were designed to capture information on socio-demographic characteristics such as age, gender, educational attainment, household size, and farming experience, as well as major challenges affecting oil palm production. These challenges included inadequate capital, poor road infrastructure, lack of modern processing equipment, pest and disease infestation, ageing oil palm trees, high labour costs, limited access to credit facilities, poor extension services, fluctuating market prices, environmental degradation, theft, and inadequate storage and transportation facilities. The questionnaires also examined respondents' perceptions regarding government support and cooperative participation in oil palm production.

In addition to questionnaires, structured interviews and Key Informant Interviews (KIIs) were conducted with agricultural extension officers, cooperative leaders, local government officials, and experienced palm oil processors to obtain in-depth information on institutional and socio-economic constraints affecting the sector. Focus Group Discussions (FGDs) were equally organized in the selected communities to generate qualitative insights into the lived experiences of farmers and processors regarding production challenges, market access, labour shortages, and environmental issues. Each discussion group consisted of 8–15 participants representing different gender groups, age categories, and occupational roles within the oil palm value chain.

Field observations were also carried out to assess the physical condition of oil palm plantations, processing mills, access roads, storage facilities, and local markets. Observational data helped validate information provided by respondents during interviews and questionnaire administration. Photographs and field notes were used to document evidence of environmental degradation, obsolete processing equipment, and transportation difficulties within the study area.

The data collected were analyzed using both descriptive and inferential statistical techniques. Descriptive statistics such as frequency tables, percentages, means, and charts were used to summarize the socio-economic characteristics of respondents and identify the major challenges facing oil palm production. Inferential statistics, including regression analysis and correlation techniques, were employed to determine the relationship between identified production challenges and socio-economic development indicators such as income generation, employment opportunities, and household welfare. Qualitative data obtained from interviews and FGDs were analyzed thematically through content analysis to identify recurring patterns, perceptions, and experiences among respondents. The integration of quantitative and qualitative approaches provided a comprehensive understanding of the challenges affecting oil palm production in Oruk Anam Local Government Area of Akwa Ibom State, Nigeria.

Table 3.1: Selected Communities for the study

S/N	COMMUNITIES	PROJECTED SAMPLED POPULATION (9) VILLAGES	NUMBER OF MARKETS	LATITUDE	LONGITUDE
1	Ibesit Ekoi (NIFOR)	1879	1	$4^0$58'N	$7^0$45'E
2	Ndot Ikot Eda (ESEK)	1764	1	$4^0$55'N	$7^0$44'E
3	Ikot Asukpong (SITNAH)	1564	1	$4^0$54'N	$7^0$40'E
4	Obio Ibiet Nkarika	798	1	$4^0$58'N	$7^0$43'E
5	Nung Oku Ibiet	1764	1	$4^0$55'N	$7^0$44'E
6	Obio Akpa	1564	1	$4^0$52'N	$7^0$50'E
7	Nung Oku Ubo	1140	1	$4^0$58'N	$7^0$44'E
8	Ikot Okoro	258	1	$4^0$57'N	$7^0$48'E
9	Ikot Ntuen	382	1	$4^0$59'N	$7^0$43'E
	TOTAL	**9,406**	**9**		

Source: Field data (Community Development Committee records in the various communities (2024).

4. Results and Findings

Table 4.1: Distribution of Respondents by Gender

Gender	No. of Respondents	Percentage (%)
Male	218	59.1
Female	151	40.9
Total	369	100

Source: Field Survey (2025)

Table 4.1 shows the gender distribution of respondents involved in informal sector activities within the study area. The result reveals that 218 respondents representing 59.1% were male, while 151 respondents representing 40.9% were female. This indicates that males dominated the informal sector activities in the study area, although female participation was also significant. The high involvement of males may be linked to labour-intensive activities such as transportation services, artisanal work, and small-scale processing, while females were more active in petty trading, food vending, and household-based enterprises.

Table 4.2: Distribution of Respondents by Age

Age Group	No. of Respondents	Percentage (%)
18–25 Years	52	14.1
26–35 Years	118	32.0
36–45 Years	104	28.2
46–55 Years	63	17.1
56 Years and Above	32	8.6
Total	369	100

Source: Field Survey (2025)

The result in Table 4.2 indicates that respondents between the ages of 26–35 years constituted the largest proportion of participants with 118 respondents (32.0%). This was followed by respondents within the age bracket of 36–45 years with 104 respondents (28.2%). Respondents aged 56 years and above formed the least category with 32 respondents (8.6%). The findings suggest that the informal sector is largely dominated by economically active youths and middle-aged individuals who depend on informal activities as a source of livelihood and household income.

Table 4.3: Distribution of Respondents by Educational Qualification

Educational Qualification	No. of Respondents	Percentage (%)
No Formal Education	48	13.0
Primary Education	74	20.1
Secondary Education	132	35.8
Tertiary Education	97	26.3
Postgraduate Degree	18	4.8
Total	369	100

Source: Field Survey (2025)

Table 4.3 reveals that respondents with secondary education constituted the highest percentage with 132 respondents (35.8%), followed by those with tertiary education at 97 respondents (26.3%). Respondents with postgraduate qualifications recorded the least percentage with only 18 respondents (4.8%). The findings imply that the informal sector accommodates individuals across different educational backgrounds, although the majority possess moderate educational qualifications that enable them to engage in trading, services, and small-scale entrepreneurship.

Table 4.4: Forms of Informal Sector Activities

Community	Trading/Commerce (%)	Transport Services (%)	Food Processing (%)	Artisanal Services (%)	Agriculture/Farming (%)	Others (%)
Nifor (Ibesit Ekoi)	70	45	55	40	65	20
Esek (Ndot Ikot Eda)	75	50	60	42	70	18
Sitnah (Ikot Asukpong)	68	40	58	35	72	15
Obio Ibiet Nkarika	72	48	62	44	66	17
Nung Oku Ibiet	74	55	64	46	69	16
Obio Akpa	69	52	59	41	68	18
Nung Oku Ubo	66	44	57	39	63	20
Ikot Okoro	73	58	61	45	67	19
Ikot Ntuen	71	49	60	43	65	18

Source: Field Data (2025)

Table 4.4 presents the major forms of informal sector activities across the selected communities in the study area. Trading and commerce emerged as the dominant activity in most communities, recording the highest values in Esek (75%), Nung Oku Ibiet (74%), and Ikot Okoro (73%). Agriculture and farming also recorded strong participation, particularly in Sitnah (72%) and Esek (70%), indicating the continued importance of agrarian livelihoods within the informal economy.

Transport services showed high involvement in Ikot Okoro (58%) and Nung Oku Ibiet (55%), reflecting the growing importance of motorcycle and tricycle transportation services within rural and semi-urban settlements. Food processing activities such as palm oil processing, cassava processing, and local food vending were common across all communities, with the highest percentage recorded in Nung Oku Ibiet (64%). Artisanal services such as carpentry, tailoring, welding, vulcanizing, and hairdressing maintained moderate participation rates across the communities. The findings demonstrate that the informal sector in the study area is highly diversified and serves as a major source of employment, income generation, and socio-economic survival.

Table 4.5. Challenges affecting Oil Palm Production Activity

Community	Palm Production (%)	Labour Hiring (%)	Avg. Workers/Season	Fertilizer Access (%)	Aging Palms (%)	Palm Mill in Fair Condition (%)
Nifor (Ibesit Ekoi)	65	40	5	30	55	30
Esek (Ndot Ikot Eda)	90	55	8	45	50	45
Sitnah (Ikot Asukpong)	65	30	4	25	40	28

Obio Ibiet Nkarika	85	45	6	35	60	35
Nung Oku Ibiet	88	60	10	45	58	45
Obio Akpa	82	48	7	38	52	32
Nung Oku Ubo	80	42	6	32	50	30
Ikot Okoro	85	50	9	34	65	33
Ikot Ntuen	78	44	6	20	55	29

Source: Field data (2025)

Table 4.5 showing the calculation of the 9 communities in palm production was universal across all nine communities (60–90% households). Highest engagement was in Sitnah, Nifor, and Esek, (85–90%), where nearly all households are involved. Obio Ibiet, Nung Oku Ibiet, and Ikot Okoro showed slightly lower dependence 65%, but palm still remains central. Labour hiring was highest in Sitnah (60%) and Esek (55%) while it was lowest in Ikot Okoro (30%). Avg. Number of Workers per Season recorded highest in Sitnah (10 workers), Esek (8) respectively, while Nung Oku Ibiet (4) recorded the lowest as shown in Table 4.8. The community with Access to Fertilizers shows lowest access in Ikot Ntuen (20%) and Sitnah (25%). While it was highest in Esek and Nung Oku Ibiet (45%). Report about the fertilizer challenges reveals that cost was the main barrier in Nifor, Sitnah, and Ikot Ntuen. But availability issues was shown in Nung Oku Ubo and Obio Ibiet. Capital Constraints was reported by 70–80% of households across all communities, and highest in Ikot Okoro and Nung Oku Ibiet. Aging Palms was worst in Ikot Okoro (65%) and Obio Ibiet (60%), and least in Sitnah (40%). Palm Mill Condition. Only Esek and Sitnah (45%) reported mills in fair working condition. Other communities complained of old, inefficient mills. On the milling issues breakdowns and inefficiency was common in Ikot Ntuen, Nung Oku Ubo, Nung Oku Ibiet while high processing costs was most cited in Obio Ibiet and Nifor.

Table 4.6: Measures to Improve Informal Sector Activities

Community	Access to Credit Facilities (%)	Provision of Good Roads (%)	Modern Equipment Support (%)	Skill Acquisition/Training (%)	Electricity Supply Improvement (%)	Market Expansion Support (%)
Nifor (Ibesit Ekoi)	68	72	55	60	58	65
Esek (Ndot Ikot Eda)	75	78	62	65	61	70
Sitnah (Ikot Asukpong)	64	70	50	58	55	63
Obio Ibiet Nkarika	70	75	58	62	60	68
Nung Oku Ibiet	78	80	65	70	66	72
Obio Akpa	72	74	60	64	62	69
Nung Oku Ubo	66	69	54	57	56	61
Ikot Okoro	74	77	63	68	64	71
Ikot Ntuen	69	73	56	60	59	66

Source: Field Data (2025)

Table 4.6 highlights the major measures identified by respondents for improving informal sector activities in the study area. Access to credit facilities emerged as one of the most significant interventions, with the highest support recorded in Nung Oku Ibiet (78%) and Esek (75%). Respondents emphasized that inadequate capital remains a major challenge limiting business expansion and productivity.

Provision of good road infrastructure also recorded high responses across all communities, especially in Nung Oku Ibiet (80%) and Esek (78%), indicating that poor transportation networks negatively affect trading, movement of goods, and market accessibility. Modern equipment support and skill acquisition/training were equally identified as important measures for enhancing productivity and improving the quality of goods and services within the informal sector.

Improvement in electricity supply was strongly emphasized by respondents, particularly among food processors, artisans, and traders who depend on stable power supply for their businesses. Market expansion support also received high responses, reflecting the need for better market structures, reduced middlemen exploitation, and increased access to regional markets. Overall, the findings reveal that infrastructural development, financial inclusion, technical training, and institutional support are critical for strengthening informal sector activities and enhancing socio-economic development in the study area.

5. Conclusion

The study examined the challenges facing oil palm production in Oruk Anam Local Government Area of Akwa Ibom State, Nigeria, and established that oil palm production remains a critical economic activity supporting the livelihoods of rural households across the study communities. The findings demonstrated that the sector contributes significantly to employment generation, income creation, food security, and local economic activities. However, despite its importance, oil palm production in the area continues to operate below its full potential due to several structural and institutional challenges.

The study revealed that inadequate access to fertilizer, aging oil palm plantations, shortage of labour, poor road infrastructure, limited access to credit facilities, obsolete processing equipment, and inefficient palm mills constitute major barriers affecting productivity and profitability. Many farmers still rely on traditional farming and processing methods, resulting in low output and reduced product quality. In addition, poor transportation networks and inadequate market access increase production costs and reduce the competitiveness of locally processed palm oil.

The findings further showed disparities among the communities in terms of access to resources, labour supply, fertilizer availability, and processing infrastructure. Communities with relatively better infrastructure and cooperative support systems recorded higher production levels and improved processing conditions compared to communities with severe infrastructural deficits. The persistence of aging oil palm trees and poor maintenance of processing mills also threatens the long-term sustainability of oil palm production in the study area.

The study therefore concludes that although oil palm production remains a viable source of livelihood and socio-economic development in Oruk Anam, the sector requires urgent modernization and institutional support to overcome its existing challenges. Addressing these constraints through improved infrastructure, access to finance, technological advancement, and extension services will significantly enhance productivity, improve household welfare, and promote sustainable rural development in the area.

6. Recommendations

Based on the findings of the study, the following recommendations are made:

1. Government and financial institutions should provide accessible and affordable credit facilities to oil palm farmers and processors to enable them purchase improved seedlings, fertilizers, and modern processing equipment.
2. Rural road networks within the oil palm-producing communities should be rehabilitated and expanded to reduce transportation difficulties, improve market accessibility, and minimize post-harvest losses.
3. Agricultural extension services should be strengthened through regular training programmes, workshops, and seminars to educate farmers on modern oil palm cultivation techniques, pest management, and sustainable farming practices.
4. Government agencies and cooperative societies should support the establishment and maintenance of modern palm oil processing mills to improve processing efficiency, product quality, and profitability.
5. Replanting programmes should be introduced to replace aging and low-yielding oil palm trees with improved high-yield varieties capable of increasing productivity and resilience.
6. Subsidized fertilizer distribution programmes should be implemented to improve farmers' access

to agricultural inputs and reduce the high cost associated with oil palm production.

7. Community-based cooperative societies should be encouraged and strengthened to facilitate collective marketing, labour sharing, access to finance, and dissemination of agricultural information among farmers.
8. Electricity supply and rural infrastructure should be improved to support agro-processing activities and encourage investment in rural-based palm oil enterprises.
9. Environmental sustainability measures such as controlled land clearing, soil conservation practices, and sustainable waste management should be promoted to reduce environmental degradation associated with oil palm production.
10. Policies aimed at promoting smallholder participation, youth involvement, and women empowerment in the oil palm value chain should be developed to ensure inclusive socio-economic development within the study area.

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