

**ECONOMICS OF OIL PALM SEEDLING PRODUCTION IN
OVIA NORTH-EAST LOCAL GOVERNMENT AREA,
EDO STATE, NIGERIA**

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AND EXTENSION SERVICES
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BENIN CITY, NIGERIA**

MARCH, 2025.

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF
AGRICULTURAL ECONOMICS AND EXTENSION SERVICES,
FACULTY OF AGRICULTURE, UNIVERSITY OF BENIN, BENIN CITY,
NIGERIA, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE AWARD OF BACHELOR OF AGRICULTURE, (B.AGRIC. IN
AGRICULTURAL ECONOMICS AND EXTENSION SERVICES)**

MARCH, 2025.

CERTIFICATION

This is to certify that this project work was carried out by **Ishaq Adeyemi OLAITAN** with the Matriculation Number **AGR1900055** of the Department of Agricultural Economics and Extension Services, Faculty of Agriculture, University of Benin, Benin City, Nigeria.

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DEDICATION

This project is dedicated to Almighty Allah, the reason I live and the one who saw me through my undergraduate programme in the University of Benin.

ACKNOWLEDGEMENTS

I would like to express my heartfelt gratitude to Allah Almighty for granting me the ability, wisdom, and knowledge to carry out this research work. His unwavering provisions have been extremely important in completing this program.

I extend my sincere appreciation to my project supervisor, Dr. O Igbinidu whose help, patience and correction of error helped me in the course of writing this project. I am profoundly grateful to the entire management and staff of the Department of Agricultural Economics and Extension Services led by Prof. (Mrs.) M. J. Koyenikan, and Faculty of Agriculture in general, your contributions have greatly impacted me throughout my course of study in the University of Benin. Thanks, and God bless you all.

My heartfelt appreciation goes to my parents, Engr. and Mrs. Olaitan who made me who I am today and my aunt, Nafisah Aliyu for your financial support and words of encouragement and understanding throughout my academic journey. I would also like to appreciate my close friends; Joseph, Khalid, Emmanuel, Umar, Hikmah and Kingsley for coming through when help was needed.

Finally, to all those wonderful and beautiful persons whose name I failed to mention who assisted me in one way or the other during my time of the study, I thank you all and God richly bless you all.

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ABSTRACT

Oil palm seedling production is a critical component of Nigeria's agricultural economy, particularly in Edo State, where it supports rural livelihoods and contributes to national income. This study evaluated the economics of oil palm seedling production in Ovia North-East Local Government Area, Edo State, Nigeria. Specifically, it examined the socio-economic characteristics of producers, estimated production costs and returns, identified factors influencing revenue, and assessed constraints faced by farmers. A multi-stage sampling procedure was employed to select 100 respondents from five oil palm seedling-producing communities. Primary data were collected through structured questionnaires and analyzed using descriptive statistics, budgetary analysis, and multiple regression. Results revealed that the majority of producers were male (61%), middle-aged (50% aged 21–40 years), and educated (94% had at least primary education). The average household size was 5 members, and most farmers operated small-scale farms (55% cultivated 0.5–1 hectare). Total production cost averaged ₦401,867.27, with land rent (₦109,558.82) and fertilizer (₦55,655.13) as major expenses. The enterprise proved profitable, generating a gross margin of ₦588,325.60 and a return on investment (ROI) of 1.464. Regression analysis indicated that seed cost ($r = 4.65$, $p < 0.001$) and fertilizer cost ($r = 4.85$, $p < 0.001$) significantly enhanced revenue, explaining 61.5% of variability ($R^2 = 0.615$). Key constraints included inadequate finance (100% of respondents), high transportation costs (99%), irregular input supply (99%), labor shortages (98%), and land tenure issues (99%). These

challenges hindered productivity and market access. The study concluded that oil palm seedling production is economically viable but constrained by systemic barriers. Recommendations include improving access to affordable credit, enhancing rural infrastructure to reduce transportation costs, promoting partnerships with research institutions for quality inputs, and strengthening extension services to disseminate best practices. Addressing these constraints will enhance profitability and sustainability in the sector, contributing to rural economic development.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of Study

Oil palm (*Elaeis guineensis*) is a significant agricultural commodity in Nigeria, known for its high yield and versatility in producing palm oil, which is essential for both local consumption and international trade. The economic analysis of oil palm seedling production focuses on understanding the costs, returns, and profitability associated with raising seedlings, which are crucial for establishing new plantations. This study aims to provide insights into the production processes, financial viability, and challenges faced by producers in Ovia North-East (Okolo *et al.*, 2019).

Nigeria's oil palm industry has a long history, deeply intertwined with the nation's economy and culture. The country's tropical climate and fertile soils have made it a prime location for oil palm cultivation, a fact recognized and exploited for centuries (Corley and Tinker, 2016). As global demand for palm oil has surged, driven by its diverse applications in food, cosmetics, and biofuels, Nigeria has sought to capitalize on this opportunity to stimulate economic growth and alleviate poverty, especially in rural areas like Ovia North-East Local Government.

However, the industry faces significant challenges, including deforestation, soil erosion, and water pollution (Kuta *et al.*, 2021; Kuta *et al.*, 2023). To ensure the long-term

sustainability of oil palm production, it is crucial to adopt sustainable practices and prioritize environmental conservation.

The current economic pressures may drive farmers to adopt environmentally harmful practices, such as bush burning and deforestation, as they seek to maximize short-term economic gains. With rising costs of production, fluctuating market prices, and limited access to financial resources, many smallholder farmers may prioritize immediate survival over long-term land sustainability. These destructive practices not only degrade soil quality and reduce biodiversity but also contribute to climate change through increased carbon emissions. To mitigate these challenges, it is crucial to enhance farmers' access to resources, education, and sustainable agricultural techniques. Providing financial support, such as subsidies and low-interest loans, can reduce the economic burden on farmers, allowing them to invest in eco-friendly methods. Additionally, training programs on sustainable farming practices, including agroforestry, organic fertilization, and responsible land management, can help improve soil fertility, boost productivity, and ensure long-term environmental conservation. Addressing these economic constraints and promoting environmentally responsible farming approaches are essential steps toward achieving sustainable oil palm production. By integrating economic incentives with conservation strategies, policymakers and agricultural stakeholders can create a more resilient and sustainable farming system that benefits both farmers and the environment. Strengthening these efforts will not only safeguard

natural resources but also enhance agricultural productivity, ensuring a more stable and profitable future for the industry (Kuta *et al.*, 2023).

1.2 Statement of Problem

According to Adesiji *et al.* (2016), the oil palm seedling production sector in Ovia North-East faces significant challenges that impact net revenue, including inadequate financing, water scarcity, and limited market access—barriers that hinder profitability and deter investment. While oil palm production has been extensively studied, there is a notable deficiency in research focusing specifically on oil palm seedling producers in Ovia North-East, Edo State. In particular, the influence of socioeconomic factors—such as education, household size, and gender—on seedling production remains underexplored, and there is a scarcity of data concerning the production costs and profitability of these ventures. This lack of targeted research impedes the development of effective strategies to enhance productivity and economic outcomes for local producers. Therefore, this study aims to analyze the socioeconomic characteristics of producers, evaluate production methods, assess profitability metrics, and identify constraints affecting net revenue in oil palm seedling production, with the ultimate goal of providing actionable insights to enhance productivity and attract investment in this promising agricultural sector.

To address these problems, it is necessary to investigate the following research questions:

1. What are the socio-economic characteristics of oil palm seedling producers in Ovia North East?
2. How does inadequate financing impact the production and profitability of oil palm seedlings?
3. What are the primary constraints faced by producers in enhancing oil palm seedling production, and how can these be addressed?
4. What strategies can be implemented to improve investment in oil palm seedling production in Ovia North East?

1.3 Objective of study

The main objective of this study is to examine the Economics of Oil Palm Seedling Production in Ovia North-East Local Government Area, Edo State, Nigeria.

The specific objectives are to:

1. describe the socio-economic characteristics of oil palm seedling producers in the local government area;
2. estimate cost and returns of oil palm seedling production;
3. examine factors affecting income generated from oil palm seedling production;
4. identify constraints hindering oil palm seedling production.

1.4 Justification of study

Oil palm production is crucial to Nigeria's agricultural economy, significantly impacting rural livelihoods and national income (Adesiji *et al.*, 2016). However, challenges such as inadequate financing, poor access to quality seedlings, and limited market opportunities constrain its growth potential (Koczberski *et al.*, 2001). This study seeks to address the knowledge gap by examining the socio-economic characteristics of oil palm seedling producers, evaluating production methods, and assessing profitability.

Understanding these factors is vital for developing targeted strategies that enhance productivity and investment in oil palm seedling production. By identifying the constraints affecting net revenue, this research aims to provide actionable insights that can lead to improved economic development in the region. Ultimately, enhancing oil palm production can contribute to food security, job creation, and increased income for rural communities.

1.5 Hypothesis of study

H₀: There is no significant relationship between some selected socio-economic characteristics of oil palm seedling producers in Ovia North-East and their yield/net revenue.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Oil Palm Seedling Production

Oil palm seedling production is the process of cultivating young oil palm plants (*Elaeis guineensis*) that will later be transplanted to form productive plantations. This stage is pivotal because the quality and health of seedlings directly affect the yield and sustainability of mature oil palm crops.

Importance in the Value Chain

Seedlings serve as the cornerstone for long-term plantation productivity. High-quality seedlings lead to vigorous, disease-resistant mature palms that generate higher yields and improved economic returns. This is especially critical in regions like Edo State, where oil palm production is a major contributor to rural livelihoods and the national economy (Okolo *et al.*, 2019).

Stages and Best Practices

The process involves selecting superior genetic stock, preparing the land appropriately, and applying the right mix of fertilizers and herbicides. Proper nursery management—including adequate spacing, pest control, and optimal watering practices—is essential to minimize mortality rates and ensure robust seedling growth. Studies such as those by

Mohd Rizal *et al.* (2013) emphasize sustainable management practices that balance economic viability with environmental stewardship.

2.1.2 Socioeconomic Characteristics of Farmers

The socioeconomic profile of farmers plays a fundamental role in determining the success of oil palm seedling production. These characteristics influence not only the operational decisions but also the capacity to adopt new technologies and practices.

Age and Farming Experience

Research shows that a significant proportion of oil palm farmers in Edo State are middle-aged, averaging around 52 years (Nse-Nelson *et al.*, 2022). This age bracket typically reflects accumulated farming experience, which can lead to better decision-making and adaptation to local conditions. However, as farmers age, the physical demands of the work may increase reliance on hired labor or mechanization. Studies by Igbokwe and Iwuchukwu (2021) highlight that while experience is beneficial, it must be coupled with continuous learning to adopt innovative practices.

Gender Distribution

In many parts of Nigeria, oil palm farming is predominantly undertaken by men. For instance, research indicates that up to 84.62% of farmers in Edo State are male, a trend attributed to the physically intensive nature of tasks such as land preparation and transplantation. Nonetheless, women often play crucial roles in post-harvest processing and marketing, suggesting that gender dynamics in oil palm farming are multifaceted.

Education Level

The level of formal education influences a farmer's ability to adopt improved practices and technologies. In Edo State, about 50% of oil palm seedling farmers have tertiary education, while 44% have secondary education (Nse-Nelson *et al.*, 2022). Educated farmers are generally better equipped to understand market trends, access financial services, and implement cost-effective production techniques.

Household Size and Labor Supply

The number of people in a household affects both the availability of labor and the allocation of resources. Larger households can provide a steady source of family labor, reducing the need for expensive hired help. Conversely, they may also place greater demands on household income, thereby limiting investment in quality inputs. Igbokwe and Iwuchukwu (2021) discuss how these dynamics shape production outcomes in smallholder settings.

2.1.3 Production Costs

The economics of oil palm seedling production are largely driven by the various costs incurred throughout the production cycle. These costs are typically categorized into fixed and variable components.

Land Rent and Preparation

Land-related expenses, including rent and preparation, form a substantial part of the production cost structure. High land rent can strain the budgets of smallholder farmers, who may already face financial constraints. For example, studies by Ekunwe, Egware, and Anetor (2023) indicate that land rent can account for a significant share of total production costs, influencing the overall profitability.

Input Costs

The procurement of quality seedlings, fertilizers, and herbicides represents a critical investment. Fluctuations in input prices, especially fertilizers—which can contribute up to 14% of total production costs (Fatunde *et al.*, 2021)—directly impact the cost structure and, subsequently, the return on investment.

Labor and Transportation

Labor costs, particularly for manual tasks such as planting and maintenance, are another major expense. With rising rural-urban migration, securing affordable labor has become more challenging. Additionally, transportation costs—exacerbated by poor infrastructure—add to the financial burden by increasing the expense of moving inputs and finished seedlings to market (ResearchWap, 2021).

2.1.4 Market Analysis and Pricing

The dynamics of the oil palm seedling market are shaped by supply-demand factors, pricing strategies, and government interventions.

Demand and Supply Trends

The market for oil palm seedlings is expanding as both local and international demand for palm oil increases. However, pricing remains volatile due to variations in input costs and market access challenges. For instance, the average selling price for seedlings in some parts of Edo State hovers around ₦357.22, though this can fluctuate based on seed quality and availability (Aliyu *et al.*, 2020).

Government Policies and Support

Initiatives such as the Edo State Oil Palm Program (ESOPP) aim to stabilize the market through subsidies, training, and improved infrastructure. These policies help to mitigate some of the market risks faced by smallholder farmers.

Market Access

Inadequate infrastructure, including poor road networks, hampers effective market access. Limited connectivity not only increases transportation costs but also restricts farmers' ability to reach profitable markets, thus affecting overall income.

2.1.5 Constraints in Oil Palm Seedling Production

Despite the potential profitability, oil palm seedling production is fraught with several constraints that impede optimal performance.

Financial Barriers

One of the most critical challenges is the lack of access to affordable credit. This limitation prevents farmers from purchasing high-quality inputs and investing in modern technologies. The PIND Foundation (2020) reports that nearly 100% of smallholder oil palm farmers face significant financial constraints.

Infrastructural and Logistical Challenges

Poor road networks and transportation facilities increase the cost and time required to move inputs and seedlings, which negatively affects market competitiveness. ResearchWap (2021) highlights that these logistical challenges can reduce the profitability of oil palm seedling production.

Environmental and Labor Issues

Environmental factors such as water scarcity, coupled with labor shortages due to migration, pose additional hurdles. These challenges not only disrupt production schedules but also reduce the overall yield and quality of seedlings.

2.1.6 Conceptual Framework

The conceptual framework for this study integrates the interrelated concepts discussed above. It postulates that the profitability of oil palm seedling production is determined by a combination of:

Socioeconomic Factors: (e.g., age, education, household size) that shape farming practices and resource allocation.

Production Costs: Encompassing land rent, input expenses, labor, and transportation.

Market Dynamics: Including pricing trends, demand fluctuations, and government policies.

Production Constraints: Such as financial, infrastructural, environmental, and labor-related challenges.

A visual model (to be developed) would illustrate the pathways through which these variables interact. For example, improved socioeconomic status (higher education and adequate household labor) may enable better cost management and input utilization, thereby enhancing profitability. Conversely, severe financial and infrastructural constraints may negate these advantages, resulting in lower returns.

2.2 Theoretical Framework

This section outlines the theoretical foundations that underpin the analysis of oil palm seedling production in Ovia North-East, Edo State. The framework draws on multiple interrelated theories that explain how various factors—ranging from input costs and resource availability to market dynamics—influence economic performance and profitability.

2.2.1 Cost Theory (Economic Theory of Production)

Cost theory posits that production decisions are driven by the structure and magnitude of costs incurred. In oil palm seedling production, both fixed costs (e.g., land rent and infrastructure) and variable costs (e.g., fertilizers, herbicides, labor, and transportation) are critical. Efficient management of these costs can help producers identify areas for improvement, such as sourcing cost-effective fertilizers or optimizing labor allocation. For example, fluctuations in input prices may significantly affect net revenue, urging producers to seek efficiencies. In addition to empirical studies in agricultural contexts (Ekunwe *et al.*, 2023), standard economic texts such as Samuelson and Nordhaus (2010) provide a foundational understanding of cost structures in production.

2.2.2 Profit Maximization Theory

Profit maximization theory assumes that producers seek to maximize profit by balancing revenues and costs. In the context of oil palm seedling production, this involves choosing the optimal combination of inputs to increase output while

minimizing costs. Producers decide on investments in quality seedlings, labor, and inputs based on the anticipated increase in revenue. Regression analyses in previous studies (e.g., Fatunde *et al.*, 2021) support the idea that small adjustments in key input costs can lead to significant changes in profitability. Porter's (1980) work on competitive strategy further reinforces how firms (or farmers) adjust their operational practices to achieve superior returns in a competitive market environment.

2.2.3 Resource-Based Theory

Resource-based theory emphasizes that a producer's competitive advantage depends on the quality and accessibility of its resources. For oil palm seedling production, critical resources include access to capital, quality inputs (such as certified seedlings and fertilizers), extension services, and technical knowledge. Producers with superior resources are more likely to adopt innovative practices and technologies that enhance productivity and profitability. This perspective explains disparities in performance among farmers facing similar market conditions. In addition to empirical evidence (Fatunde, Adeyemi, & Musa, 2021), Barney (1991) provides a theoretical foundation for understanding how unique resource endowments translate into sustained competitive advantages.

2.2.4 Market Structure Theory

Market structure theory examines how external market conditions—such as competition, demand patterns, pricing mechanisms, and government policies—influence producer

performance. In the oil palm seedling market, variations in seedling prices, inconsistent demand, and infrastructural challenges (e.g., poor road networks) are significant factors. Farmers operating in well-connected markets may enjoy higher revenues due to better price stability, while those in remote areas may face higher costs and revenue volatility. This theory is supported by empirical findings (Aliyu et al., 2020) and further elucidated by Porter (1980), who discusses how market forces shape competitive dynamics.

2.2.5 Integrated Theoretical Perspective

An integrated theoretical perspective combines insights from cost theory, profit maximization theory, resource-based theory, and market structure theory to provide a multidimensional view of oil palm seedling production. This framework suggests that:

Efficient Input and Resource Management: Minimizing production costs and optimizing resource use are fundamental to improving profitability.

Production Optimization: Decisions regarding input use and operational practices are driven by the goal of maximizing net returns.

Market Influence: External market conditions, including infrastructure and pricing trends, directly affect economic outcomes.

Together, these theories guide the formulation of research hypotheses and the analytical approach in this study, offering a robust basis for investigating the economic viability of oil palm seedling production.

2.3 Empirical Review

The empirical review presents an analysis of previous studies on oil palm seedling production, examining key findings, methodologies, and identified research gaps. This section is divided into five key areas: socioeconomic characteristics, production costs, market trends, constraints, and profitability.

2.3.1 Socioeconomic Characteristics of Oil Palm Seedling Farmers

The socioeconomic profile of oil palm seedling farmers significantly influences their production efficiency, decision-making, and ability to adopt new technologies. Several studies have examined these characteristics:

Nse-Nelson *et al.* (2022) conducted a study on oil palm farmers in Edo State and found that the majority were middle-aged (average 52 years), male-dominated (84.62%), and had limited formal education. The study concluded that younger, better-educated farmers were more likely to adopt improved production techniques.

Igbokwe and Iwuchukwu (2021) analyzed the relationship between household size and farm productivity in smallholder oil palm farming. Their findings revealed that while larger households provided additional labor, they also created financial strain, reducing investment in quality inputs.

Adetunji and Ibrahim (2023) examined the effect of education levels on oil palm innovation adoption. Their research indicated that farmers with secondary or tertiary

education were more likely to access credit, use fertilizers, and engage in cooperative societies to enhance production.

Gap Identified: Most studies focus on oil palm farming as a whole rather than seedling production specifically. There is limited research on how socioeconomic characteristics influence profitability in oil palm seedling production.

2.3.2 Factors Influencing Production Costs

Cost structures in agricultural enterprises determine profitability and long-term sustainability. The following studies provide insight into the cost dynamics of oil palm seedling production:

Ekunwe *et al.* (2023) performed a cost-benefit analysis of oil palm seedling production in Edo State. Their results showed that land rent, fertilizer, and labor accounted for the highest production costs, with land rent alone consuming up to 27% of total expenses.

Fatunde *et al.* (2021) studied input costs and their impact on net revenue in smallholder oil palm farming. They found that fertilizer price fluctuations significantly affected profitability, as most farmers relied on external suppliers.

ResearchWap (2021) analyzed the role of transportation costs in oil palm seedling production. The study revealed that poor road infrastructure increased costs by 8–10%, reducing market competitiveness.

Gap Identified: While cost factors have been analyzed at a broad agricultural level, there is limited empirical data on the specific costs associated with smallholder oil palm seedling production in Ovia North-East.

2.3.3 Market Analysis and Pricing of Oil Palm Seedlings

Understanding pricing strategies and market trends is essential for enhancing profitability. Several studies have explored these issues:

Aliyu *et al.* (2020) examined market price trends for oil palm seedlings in West Africa. They found that seedling prices varied based on quality, certification, and accessibility. The average price in Edo State was reported as ₦357.22 per seedling, but government subsidies helped stabilize prices in some regions.

Project Master (2020) conducted a study on demand and supply fluctuations in oil palm seedling production. The study highlighted that farmers lacked stable buyers, leading to inconsistent revenue generation.

Olorunfemi and Balogun (2022) analyzed how market access affects seedling sales. Their findings showed that farmers' closer to major roads earned 20–30% higher revenue than those in remote areas due to better market connectivity.

Gap Identified: There is limited data on how smallholder farmers in Edo State structure their pricing models and how market distance affects profitability in oil palm seedling production.

2.3.4 Constraints Faced by Oil Palm Seedling Producers

Despite the profitability potential, oil palm seedling producers face various challenges that limit production efficiency. Empirical studies addressing these constraints include:

PIND Foundation (2020) conducted a survey on financial barriers among smallholder farmers and found that 100% of oil palm seedling producers faced inadequate access to finance, preventing them from purchasing high-quality inputs.

ResearchWap (2021) analyzed the impact of poor infrastructure on seedling distribution. The study revealed that farmers in Ovia North-East experienced higher transportation costs due to bad road networks, which in turn increased seedling prices.

Nwafor (2018) studied the effects of land tenure issues on oil palm farming. The research found that 98.99% of respondents in Edo State struggled with unclear land ownership rights, which limited their ability to expand production.

Gap Identified: While these studies highlight key constraints, most do not focus specifically on oil palm seedling producers. There is a need for localized research on how financial and infrastructural constraints impact seedling production in Ovia North-East.

2.3.5 Profitability of Oil Palm Seedling Production

Profitability studies help determine whether oil palm seedling production is a viable agricultural enterprise. Key findings from previous research include:

Ekunwe *et al.* (2023) conducted a gross margin analysis on oil palm seedling production in Edo State. Their findings showed that gross margins were positive, indicating economic viability. The return on investment (ROI) was 1.464, meaning that for every ₦1 invested, the farmer earned ₦1.46 in return.

Emeka and Chinedu (2022) evaluated profitability metrics in Nigerian oil palm nurseries. They found that seedling sales generated a net profit of ₦106.02 per unit, making it a competitive agricultural investment.

Babatunde (2017) compared smallholder vs. large-scale seedling production and found that smallholders faced higher production costs per seedling but benefited from flexible pricing models.

Gap Identified: While profitability studies exist, they do not account for all localized constraints affecting smallholder seedling producers in Ovia North-East.

2.3.6 Summary of Gaps in the Literature

From the reviewed empirical studies, the following gaps have been identified:

- (1) **Limited research on the economics of oil palm seedling production** – Most studies focus on full-scale oil palm farming rather than seedling production.
- (2) **Lack of cost breakdown specific to smallholder seedling farmers** – Existing studies provide broad cost estimates but do not isolate the financial burdens of smallholder producers.

- (3) **Insufficient research on market dynamics for smallholder seedling producers** – Pricing strategies, market linkages, and buyer trends remain underexplored.
- (4) **Scarcity of localized studies on production constraints** – There is a need for empirical research that examines how financial, infrastructural, and policy-related barriers affect oil palm seedling production in Edo State.

This study aims to fill these gaps by providing a detailed economic analysis of oil palm seedling production in Ovia North-East, Edo State, focusing on cost structures, profitability, and constraints.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Study area and scope of study

The study area for this research is Ovia North-East Local Government Area in Edo State, Nigeria. Edo State is located in Nigeria's South-South region, covers approximately 17,802 square kilometers and is bordered by Kogi, Anambra, Delta and Ondo states. As of the 2023 census, its population is estimated at 5,161,137. The in the state tribes include the Bini, Esan, Owan, Afemai and others. Edo experiences an average annual rainfall of about 1,500 mm and temperatures ranging from 20°C to 32°C.

Edo State is known for its rich agricultural resources and diverse landscape. The state is home to various agricultural commodities, including oil palm, rubber, cocoa, and cassava. Ovia North-East Local Government Area is a significant producer of oil palm in the state, making it an ideal location for this study. The choice of Ovia North-East Local Government Area is motivated by its strategic position in the oil palm value chain. The region has a well-established network of oil palm plantations, processing facilities, and markets, providing a conducive environment for the production and trade of oil palm seedlings.

3.2 Sampling procedure and sample size

A multi-stage sampling procedure was used.

Stage 1 was purposive sampling of Ovia North-East LGA based on the researcher agricultural knowledge of the oil palm seedling production.

Stage 2 involved a purposive selection of the most prominent oil palm seedling producing communities within the LGA.

Stage 3 involved a random sampling of oil palm seedling producers from the list of registered communities. 100 respondents were selected for this study which were selected from the 5 communities.

3.3 Data collection

The data for this study was sourced from both primary and secondary sources. Primary data was collected through the administration of well-structured questionnaires to farmers. Secondary data was obtained through relevant literature, Government statistics. Industry Reports (Reports from industry associations and private sector organizations will be consulted to gather information on market trends, pricing, and technological advancements).

3.4 Measurement of variables

Dependent variable:

Profitability: (NGN).

Independent variables:

Socioeconomic variables:

1. Age: years.
2. Gender: male/female.
3. Marital status: Single/married/divorced/widowed.
4. Education level: no formal education/primary/secondary/tertiary.
5. Household size: number of people.
6. Household income: monthly/annually.
7. Land ownership: leased/rented.
8. Farming system: part-time or full-time
9. Access to credit: Yes/No
10. Membership in cooperative societies: Yes/No

Production Costs (₦)

- a. Land preparation costs.
- b. Seedling material costs.
- c. Labor costs.
- d. Fertilizer and pesticide costs.
- e. Water costs.
- f. Transportation costs.
- g. Other overhead costs.

3.5 Data analysis

Objective 1: The Socio-economic characteristics of the oil palm seedling farmers were analyzed using descriptive statistics to summarize demographic data and socio-economic variables of oil palm seedling producers.

Objective 2: Budgetary analysis was used to estimate the cost and returns of oil palm seedling production. Budgetary analysis employs the gross margin (GM) and net profit (NP) analysis as adapted from Omotesho *et al.* (2012) and Obatola, Agboola and Odum (2017).

The gross margin is defined as:

$$GM = TR - TVC$$

Where:

TR = Total revenue from oil palm seedling production (NGN)

TVC = Total variable cost (NGN)

Net profit is expressed as:

$$NP = TR - TC$$

Where:

TC = total cost

$$TC = TFC + TVC$$

Where:

TFC = Total fixed cost

Objective 3: Factors affecting income generated from oil palm seedling production was analyzed using multiple regression analysis to assess how various factors (e.g., age, education, farming experience, farm size, labour cost, herbicide cost, fertilizer cost, seed cost, water cost, cost of polythene bags, wheelbarrow cost) influence the income generated from oil palm seedling production.

The general form of the regression equation is given as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, U).$$

Explicitly specified, the equation becomes;

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + e$$

Where:

Y = Value of output of oil palm seedling production (NGN)

X₁ = Age (years)

X₂ = Education (Formal – Primary, Secondary, Tertiary, and Informal)

X₃ = Farming experience (years)

X₄ = Farm size (hectare)

X₅ = Labour cost (₦)

X₆ = Herbicide cost (₦)

X₇ = Fertilizer cost (₦)

X₈ = Seed cost (₦)

X₉ = Water cost (₦)

X₁₀ = Cost of polythene bags (₦)

X₁₁ = Wheelbarrow cost (₦)

a = Constant term

e = Error term (explicit)

U = Error term (implicit)

The result of the regression analysis yielded R and R²

Where:

r = Mean correlation coefficient of variables

R² = Coefficient of multiple determination which represents the degree of variability of the dependent variable as explained by the explanatory variables.

Objective 4: Identifying constraints hindering oil palm seedling production was analyzed using descriptive statistics such as frequencies and percentages to summarize the severity of constraints faced by oil palm seedling producers.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socio-Economic Characteristics of Oil Palm Seedling Producers

The socio-economic characteristics of the respondents are presented in Table 1. The majority of the respondents (50%) were between the ages of 21 and 40 years, while 42% were between 41 and 60 years. Only 8% of the respondents were above 60 years old. This indicates that oil palm seedling production is predominantly carried out by younger and middle-aged individuals. In terms of household size, 60% of the respondents had between 1 and 5 members in their households, while 40% had between 6 and 10 members. This suggests that most of the producers have relatively small households, which may influence their labor availability and production capacity. Regarding farming experience, 91% of the respondents had between 1 and 20 years of experience, while only 8% had between 21 and 40 years of experience. This indicates that most of the producers are relatively experienced in oil palm seedling production. The size of farmland varied among respondents, with 55% owning between 0.5 and 1 hectare, 41% owning between 1.1 and 2 hectares, and only 4% owning more than 2 hectares. This suggests that most of the producers operate on small-scale farms. In terms of gender, 61% of the respondents were male, while 39% were female. This indicates that oil palm seedling production is male-dominated in the study area. The level of education among respondents varied, with 1% having no formal education, 5% having primary education, 44% having secondary education, and 50% having tertiary education.

This suggests that a significant proportion of the producers are educated, which may influence their adoption of modern farming practices. Regarding labor, 97% of the respondents hired labor, while only 3% did not. Additionally, 53% of the respondents used family labor, while 47% did not. This indicates that hired labor is a significant component of oil palm seedling production in the study area.

Table 4.1: Socioeconomic characteristics

Variables	Frequency (n = 100)	Percentage (%)	Mean	SD
Age:				
21-40	50	50.00		
41-60	42	42.00	42.10	12.71
61-80	8	8.00		
Household size:				
1-5	60	60.00	5	2.45
6-10	40	40.00		
Farming experience:				
1-20	91	91.00		
21-40	8	8.00	12.50	6.63
41-60	1	1.00		
Size of Farmland (hectares):				
0.5-1	55	55.00		
1.1-2	41	41.00		
> 2	4	4.00		
Sex				
Male	61	61.00		
Female	39	39.00		
Level of education:				
Non formal	1	1.00		
Primary	5	5.00		
Secondary	44	44.00		
Tertiary	50	50.00		
Hired labour:				
Yes	97	97.00		
No	3	3.00		
Family labour				
Yes	53	53.00		
No	47	47.00		

Source: Computed from Field Survey, 2025.

4.2 Cost and Returns of Oil Palm Seedling Production

The cost and returns of oil palm seedling production are presented in Table 2. The total cost of production was estimated at ₦401,867.27, with the highest cost being land rent (₦109,558.82), followed by wheelbarrow costs (₦63,505.51) and fertilizer costs (₦55,655.13). Other significant costs included labor (₦34,454.27), herbicide (₦31,012.82), and seed costs (₦40,669.66).

The total revenue generated from oil palm seedling production was ₦990,192.87, resulting in a gross margin of ₦588,325.60. The return on investment (ROI) was 1.464, indicating that oil palm seedling production is profitable in the study area and that for every one naira (₦1) invested in the future, the farmer is capable of make 46 kobo(46K), this shows the viability of oil palm seedling production.

Table 4.2: Cost and returns of oil palm seedling production

Variables	Cost (₹)
Wheelbarrow	63,505.51
Water	15,642.86
Labour	34,454.27
weeding	26,488.31
Land (rent)	109,558.82
Fertilizer	55,655.13
Herbicide	31,012.82
Transportation	15,547.74
Seed	40,669.66
Polythene bags	9,338.15
Total Cost	401,867.27
Total Revenue	990,192.87
Gross Margin	588,325.60
ROI	1.464

Source: Computed from Field Survey, 2025.

4.3 Factors Influencing Revenue from Oil Palm Seedling Production

The results of Table 3 shows factors influencing revenue from oil palm seedling production are presented in Table 3. Table 3 presents the results of a multiple regression analysis examining factors influencing revenue from oil palm seedling production.

Cost of seeds ($r = 4.65$, $p < 0.001$) and fertilizer ($r = 4.85$, $p < 0.001$) are statistically significant at the 1% level, indicating strong positive relationships with revenue. Farm size ($r = 3.66$, $p = 0.061$) approaches marginal significance, suggesting larger farms may generate slightly higher revenue. Other variables (age, experience, weeding, wheelbarrow cost) are statistically insignificant and not worth discussing. The model explains 61.5% of revenue variability ($R^2 = 0.615$), highlighting the importance of input costs in determining profitability. The independent variable was able to explain the change in revenue by 61%.

Fertilizer Enhances Seedling Quality and Yield: Higher fertilizer investment improves soil fertility, leading to healthier seedlings with better survival rates. This increases the number of marketable seedlings, directly boosting revenue. Increased seed costs may indicate the use of certified, disease-resistant seeds. These seeds produce more robust seedlings, which command higher market prices and reduce losses, amplifying revenue – fertilizer and high-quality seeds work together to optimize growth. Fertilizer ensures nutrients are available for seedlings, while quality seeds maximize genetic potential. This synergy results in higher productivity per unit area, justifying the input costs and increasing net returns.

Table 4.3: Factors influencing revenue

Variables	Coefficient (<i>r</i>)	<i>t</i>	<i>P(t)</i>
Age	-6.27	-0.51	0.615
Experience	9.32	0.58	0.562
Cost of seeds	4.65	8.68	0.000
Fertilizer	4.85	10.07	0.000
Weeding	1.74	0.09	0.925
Wheelbarrow	48.46	1.22	0.227
Farmsize	3.66	1.92	0.061
Constant	-2.78	-0.60	0.549
<i>R</i> ²	0.615		

Source: Computed from Field Survey, 2025.

4.4 Constraints Faced by Oil Palm Seedling Producers

The Table 4 below shows that nearly all respondents experience multiple challenges in oil palm seedling production. Here's a breakdown:

Inadequate Finance: Every respondent (100%) reported this as a constraint, making it a universal issue.

High Transportation Cost and Irregular Supply of Inputs: Both were reported by 99% of respondents, highlighting that nearly all farmers face difficulties with the cost and consistent availability of inputs.

Labour Constraint: With 98% of respondents indicating labour issues, it is also a very common challenge.

Land Tenure System: Reported by approximately 99% (98.99%), suggesting almost all farmers encounters problems related to land tenure.

Marketing Constraints: Nearly all respondents (97%) indicated challenges in marketing their products.

Water Constraint: Although still significant, it is slightly less prevalent at 89%.

Overall, the descriptive statistics—using frequencies and percentages—clearly indicate that constraints such as inadequate finance, high transportation cost, irregular input supply, and issues with land tenure, marketing, and labour are almost universally

reported by oil palm seedling producers. This widespread agreement on these constraints suggests they are systemic problems affecting production across the board.

Table 4.4: Constraints Faced by Oil Palm Seedling Producers

Variables	Frequency	Percentage (%)
Water constraint:		
Yes	89	89.00
No	10	10.00
Land tenure system:		
Yes	98	98.99
No	1	1.01
Inadequate finance:		
Yes	100	100.00
No	0	0.00
High transportation cost:		
Yes	99	99.00
No	1	1.00
Irregular supply of inputs:		
Yes	99	99.00
No	1	1.00
Marketing constraints:		
Yes	97	97.00
No	3	3.00
Labour constraint:		
Yes	98	98.00
No	2	2.00

Source: Computed from Field Survey, 2025.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study examined the socio-economic characteristics, profitability, and constraints of oil palm seedling production in Ovia North East Local Government Area, Edo State, Nigeria. The research was motivated by the need to understand the factors influencing the production and profitability of oil palm seedlings, as well as the challenges faced by producers in the region. The study employed a multi-stage sampling procedure to select 100 respondents from five prominent oil palm seedling-producing communities. Data were collected through structured questionnaires and analyzed using descriptive statistics, budgetary analysis, and multiple regression analysis.

The findings revealed that the majority of oil palm seedling producers in the study area are middle-aged individuals with relatively small household sizes. Most producers have between 1 and 20 years of farming experience and the majority operate on small-scale farms. The study also found that oil palm seedling production is male-dominated, with a significant proportion of producers having secondary or tertiary education. Hired labor is a critical component of production, with most respondents relying on external labor for their operations.

The cost and returns analysis indicated that oil palm seedling production is profitable, with a gross margin of ₦588,325.60 and a return on investment (ROI) of 1.464. The

most significant costs were land rent, wheelbarrow costs, and fertilizer costs. The regression analysis revealed that the cost of seeds and fertilizer had a significant positive impact on revenue, highlighting the importance of access to quality inputs in enhancing profitability.

The study identified several constraints faced by producers, including inadequate finance, high transportation costs, irregular supply of inputs, labor constraints, water scarcity and marketing challenges. These constraints hinder the productivity and profitability of oil palm seedling production in the region.

5.2 Conclusion

The study concludes that oil palm seedling production in Ovia North East Local Government Area is a viable and profitable agricultural venture, particularly for smallholder farmers. However, the sector faces significant challenges that limit its full potential. The socio-economic characteristics of producers, such as age, education level, and farming experience, play a crucial role in determining productivity and profitability. The findings underscore the importance of access to quality inputs, particularly seeds and fertilizers, in enhancing revenue from oil palm seedling production.

The constraints identified in this study, such as inadequate finance, high transportation costs, and irregular supply of inputs, are consistent with the broader challenges faced by smallholder farmers in Nigeria. Addressing these constraints is essential for improving the sustainability and profitability of oil palm seedling production in the region.

5.3 Recommendations

Based on the findings of this study, the following recommendations are proposed to enhance the productivity and profitability of oil palm seedling production in Ovia North-East Local Government Area:

- (1) **Access to Finance:** Government and financial institutions should provide affordable credit facilities to smallholder farmers to enable them to invest in quality inputs and expand their operations. Microfinance schemes tailored to the needs of oil palm seedling producers could help alleviate financial constraints.
- (2) **Improvement of Infrastructure:** The government should invest in improving rural infrastructure, particularly road networks, to reduce transportation costs and facilitate the movement of seedlings to markets. Better infrastructure will also enhance access to inputs and reduce post-harvest losses.
- (3) **Access to Quality Inputs:** Efforts should be made to ensure that farmers have access to high-quality seeds and fertilizers at affordable prices. Partnerships with research institutions like the Nigerian Institute for Oil Palm Research (NIFOR) could help in the dissemination of improved seedlings and best agricultural practices.
- (4) **Capacity Building and Training:** Extension services should be strengthened to provide farmers with training on modern farming techniques, pest management, and sustainable agricultural practices. This will help improve yields and reduce production costs.

- (5) **Market Linkages:** Establishing stronger market linkages between producers and buyers can help stabilize prices and reduce marketing constraints. The government and private sector should facilitate the creation of cooperatives or farmer associations to enhance collective bargaining power and access to markets.

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APPENDIX

RESEARCH QUESTIONNAIRE

**DEPARTMENT OF AGRICULTURE ECONOMICS AND EXTENSION
SERVICES, FACULTY OF AGRICULTURE, UNIVERSITY OF BENIN,
BENIN CITY, NIGERIA**

Dear Sir/Madam,

I am a final year student of the above-named Department and University carrying out a research project on “**Economics of Oil Palm Seedling Production in Ovia North-East Local Government Area, Edo State, Nigeria**”. I solicit your cooperation to kindly answer the questions below as correctly as possible so as to ensure reliable data for this study. This research work is purely for academic purpose and all information to be supplied will be treated with absolute confidentiality and used strictly for this study only.

Thanks for your anticipated cooperation.

Yours faithfully,

Ishaq Adeyemi OLAITAN
Researcher.

INSTRUCTIONS: Please tick (✓) and write where necessary.

SECTION A: SOCIO-ECONOMIC CHARACTERISTICS

- (1) Age: years.
- (2) Gender: (a) Male [] (b) Female []
- (3) Level of Education: No formal Education (), Primary Education (), Secondary Education (), Tertiary (), Others (please specify)
- (4) Household size:
- (5) Primary occupation:
- (6) Secondary occupation:
- (7) Farm Experience:.....
- (8) Land holding patter:.....
- (9) Labour: Family labour (), Communal labour (), Hired labour ().
- (10) Land size:.....

SECTION B: COST AND RETURNS ESTIMATION

(11) Cost and Returns:

	Cost (₦)	Unit
Wheelbarrow		
Water cost		
Labour cost		
Weeding cost		
Land (rent)		
Fertilizer cost		
Herbicide cost		
Transport cost		
Seedling cost		
Cost of polythene bag		
Depreciation cost		

(12) Selling price per seedling (Naira):.....

(13) Number of seedling sold (Naira)/month:.....

(14) Expected monthly revenue (Naira):.....

SECTION C: FACTORS INFLUENCING THE PROFITABILITY OF SEEDLING PRODUCTION IN THE STUDY AREA

(15) Age of respondent: Yes (), No ().

(16) Sex of respondent: Yes (), No ().

(17) Household size: Yes (), No ().

(18) Farming experience: Yes (), No ().

(19) Education level: Yes (), No ().

(20) Cost of oil palm seedling: Yes (), No ().

(21) Cost of labour: Yes (), No ().

(22) Cost of transportation: Yes (), No ().

SECTION D: CONSTRAINTS IDENTIFICATION

(23) Water constraint: Yes (), No ().

(24) Land tenure system: Yes (), No ().

(25) Inadequate Finance: Yes (), No ().

(26) High Transportation Costs: Yes (), No ().

(27) Irregular Supply of Inputs: Yes (), No ().

(28) Marketing constraint: Yes (), No ().

(29) Labor constraint: Yes (), No ().