NIGERIA PALM OIL PROFITABILITY ANALYSIS

Investment Analysis for ₦1 Billion Annual Profit Target

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EXECUTIVE SUMMARY

This report analyzes the feasibility of establishing a commercial palm oil plantation in Nigeria capable of generating ₦1 billion in annual profit. The study addresses the question: **at what scale and in which states will this be profitable?**

After analyzing seven major palm oil-producing states using data from FAOSTAT, company reports, and Nigerian research institutions, It was found that **Edo State** offers the best investment opportunity. The plantation would need **8,559 hectares** of land with a total investment of **₦20.77 billion**.

The investment generates a Net Present Value (NPV) of ₦65.58 billion and an Internal Rate of Return (IRR) of 17.26%, which is well above the 12% minimum return investors typically require. Even under conservative assumptions with lower yields and prices, the project still shows positive returns with an NPV of ₦18.66 billion.

Top Three States by Profitability:

1. **Edo State:** ₦12.1 million profit per hectare annually
2. **Akwa Ibom State:** ₦11.4 million per hectare
3. **Cross River State:** ₦11.4 million per hectare

Based on this analysis, It would be best to recommend proceeding with investment in Edo State. The project requires ₦20.77 billion upfront but will pay back within approximately 4 years after production begins, with the plantation generating consistent profits for the remaining years of its 15-year productive lifespan.

INTRODUCTION

Nigeria is currently the fifth-largest palm oil producer globally, yet the country still imports about 600,000 tonnes of Crude Palm Oil (CPO) every year. This creates an interesting investment opportunity, there's clear demand but not enough local supply to meet it.

A Nigerian-German investor approached me wanting to understand whether it makes financial sense to establish a large-scale palm oil plantation targeting ₦1 billion in annual profit. My job is to

figure out where this plantation should be located, how big it needs to be, and whether the investment would generate acceptable returns.

This isn't just about crunching numbers. The investor needs to know the real-world viability of this project, including what could go wrong and how sensitive the returns are to changes in prices, yields, or costs.

OBJECTIVES

The main objectives of this study were:

1. Identify the most profitable states for palm oil investment in Nigeria
2. Determine the plantation size (in hectares) needed to achieve ₦1 billion annual profit
3. Calculate total investment requirements including land, planting costs, and processing equipment
4. Assess financial viability through NPV, IRR, ROI, and payback period calculations
5. Evaluate risk by testing Conservative, Base, and Optimistic scenarios
6. Provide clear recommendations on where to invest and at what scale

DATA PREPARATION AND METHODOLOGY

Tools Used: *Excel, Python, and Powerbi*

Data Collection

Data was gathered from multiple sources to build a comprehensive picture:

International Agricultural Data:

- **FAOSTAT:** Downloaded 33 years of Nigerian palm oil production data (1990-2023) covering area harvested, yields, and total production. This gave me the national baseline and historical trends.

Nigerian Company Benchmarks:

- **Presco PLC Annual Report (2024):** Extracted financial data showing revenue of ₦207.5 billion and net profit of ₦77.8 billion from their 43,457-hectare plantation
- **Okomu Oil Palm Annual Report (2024):** Revenue of ₦130.2 billion from 19,071 hectares with detailed cost breakdowns

Research Institutions:

- **Nigerian Institute for Oil Palm Research (NIFOR):** Data on improved variety yields (20-25 tonnes per hectare) and seedling costs
- **PIND Foundation:** State-level yield variations across the Niger Delta

Market and Pricing:

- Tracked CPO prices from multiple Nigerian market sources showing prices ranging from ₦1.23 million per tonne in January 2024 to ₦2.47 million by December 2024

Land Costs:

- **PropertyPro Nigeria:** Surveyed agricultural land prices across different states (ranging from ₦120,000/ha in Cross River to ₦600,000/ha in Edo)

Climate Data:

- **World Bank Climate Knowledge Portal:** Annual rainfall data and climate suitability scores for each state

Data Cleaning Process

The FAOSTAT data came in a format that needed significant cleaning. The original file had 102 rows where each year appeared three times - once for area harvested, once for yield, and once for production. I used Python (pandas library) to reshape this data so each year appeared only once with all metrics in separate columns.

I also had to standardize units across all data sources. Some sources reported yields in kilograms per hectare while others used tonnes. Land areas came in acres, hectares, and square meters. I converted everything to consistent units: hectares for area, tonnes for production, and Nigerian Naira for all financial values.

For the company data, I manually extracted key figures from their annual reports since the information was scattered across different sections. I then calculated averages between Presco and Okomu to establish realistic benchmarks for commercial plantation performance.

Modeling Approach

Revenue Calculation:

Palm oil revenue starts with Fresh Fruit Bunches (FFB), the raw fruits harvested from the palm trees. These bunches are processed to extract Crude Palm Oil (CPO), which is what gets sold.

The calculation flow is:

FFB Yield per hectare (varies by state: 15-19 tonnes)

× CPO Extraction Rate (21% - industry standard)

= CPO Output per hectare

CPO Output × CPO Price (₦1.5 million/tonne in base case)

= Revenue per hectare

For example, in Edo State:

- FFB Yield: 19 tonnes/ha
- CPO Output: 19 × 0.21 = 3.99 tonnes/ha
- Revenue: 3.99 × ₦1,500,000 = ₦5,985,000 per hectare per year

Cost Structure:

Operating costs (OPEX) include annual recurring expenses:

- Fertilizer: ₦280,000/ha/year (40% of operating costs)
- Labor: ₦220,000/ha/year (31%)
- Pesticides: ₦80,000/ha/year (11%)
- Maintenance: ₦70,000/ha/year (10%)
- Overhead: ₦50,000/ha/year (8%)

Total annual operating cost: ₦700,000 per hectare

Capital costs (CAPEX) are one-time establishment expenses:

- Land preparation: ₦301,000/ha
- Seedlings: ₦375,000/ha (150 improved seedlings at ₦2,500 each)
- Planting labor: ₦150,000/ha

Total establishment cost: ₦826,000 per hectare

Plus processing mill: ₦447 million (one-time cost for the entire plantation)

Profitability Calculation:

Gross Profit = Revenue - Operating Costs

Tax (30%) = Gross Profit × 0.30

Net Profit per hectare = Gross Profit - Tax

Profit Margin (%) = (Net Profit / Revenue) × 100

Determining Plantation Size:

To hit ₦1 billion annual profit:

Required Hectares = ₦1,000,000,000 ÷ Net Profit per hectare

Total Investment = [(Land Cost + Establishment Cost) × Hectares] + Mill Cost

Investment Metrics:

Calculated four key financial metrics:

1. **Net Present Value (NPV):** This shows what the future cash flows are worth in today's money.

2. **Internal Rate of Return (IRR):** This is the actual return percentage the investment generates.

3. **Return on Investment (ROI):** Simply the total profit over 15 years divided by the initial investment, expressed as a percentage. This tells investors how many times over they'll earn back their money.

Payback Period: The number of years it takes to recover the initial investment. Oil palms don't produce immediately after planting.

SCENARIO DESIGN

To assess risk,three different scenarios were modeled:

Conservative (Worst Case):

- FFB Yield: 12 tonnes/ha (lower than expected)
- CPO Price: ₦1.2 million/tonne (depressed market)
- Operating Costs: 15% higher than base case

Base Case (Most Likely):

- FFB Yield: 18 tonnes/ha (proven commercial level)
- CPO Price: ₦1.5 million/tonne (realistic average)
- Operating Costs: Standard benchmark

Optimistic (Best Case):

- FFB Yield: 23 tonnes/ha (NIFOR improved varieties)
- CPO Price: ₦2.0 million/tonne (strong market)
- Operating Costs: 10% lower (efficiency gains)

KEY ASSUMPTIONS

Production Assumptions:

- CPO extraction rate stays constant at 21% (industry standard)
- Yields follow the standard maturity curve without major disease outbreaks
- Processing happens within 24 hours of harvest to maintain quality
- Weather patterns remain within historical norms

Financial Assumptions:

- Discount rate of 12% reflects Nigeria's investment risk environment
- Corporate tax rate remains at 30%
- No major currency devaluation affecting input costs
- Land titles are clear with no ownership disputes

Market Assumptions:

- Nigeria continues to import CPO, ensuring demand
- No drastic changes in government import policies
- Domestic CPO prices maintain reasonable premium over international prices
- Major buyers (Nestlé, Unilever, etc.) continue operations in Nigeria

Operational Assumptions:

- Experienced management team can be recruited
- Skilled agricultural labor is available in the region
- Fertilizer and other inputs remain accessible
- Infrastructure (roads, electricity) doesn't deteriorate significantly

KEY VARIABLES

Variable Name	Description	Unit	Source
State	Nigerian state name	Text	Multiple
Scenario	Conservative/Base/Optimistic	Text	Analysis
FFB_Yield_tonnes_per_ha	Fresh Fruit Bunch yield	tonnes/ha	NIFOR, Companies
CPO_Price_NGN_per_tonne	Crude Palm Oil price	₦/tonne	Market data
Revenue_per_ha_NGN	Annual revenue per hectare	₦	Calculated
OPEX_per_ha_NGN	Operating expenses	₦/ha/year	Company reports
Net_Profit_per_ha_NGN	Net profit per hectare	₦/ha	Calculated
Total_Investment_NGN	Total capital required	₦	Calculated
NPV_Billions	Net Present Value	₦ Billions	Calculated
IRR_%	Internal Rate of Return	%	Calculated
ROI_%	Return on Investment	%	Calculated
Payback_Years	Years to recover investment	Years	Calculated

KEY FINDINGS AND INSIGHTS

State Rankings and Profitability

- Edo State leads overall profitability, generating about ₦12.1 million/ha, roughly 30% higher than the lowest performer.

- High yield drives Edo's success, 19 tonnes FFB/ha offsets higher land costs (₦600k/ha vs ₦300k in Cross River).
- Cross River offers the lowest entry cost, making it ideal for investors with limited capital despite slightly lower per-hectare profit.

Investment Requirements

- To reach ₦1 billion annual profit in Edo, the project needs 8,559 ha and about ₦20.77 billion total investment.
- Land and establishment costs take up the bulk of spending (≈60% of total), while the mill costs just 2%.
- Scenario size varies widely, 16,129 ha (conservative) vs 5,107 ha (optimistic), highlighting how yield performance shapes capital needs.

Financial Performance

- Base case delivers strong results: NPV ₦65.6B, IRR 17.3%, ROI 107.6%, payback 4.2 years.
- Even in the worst case, returns stay solid (IRR 14.1%), still above the 12% hurdle rate.
- CPO price is the biggest risk, with ±20% price shifts changing NPV by nearly 47%, more than yield or cost changes.

Scenario Risk Analysis

- All scenarios beat the 12% hurdle rate, proving strong project resilience.
- Optimistic case doubles base NPV (₦112.8B) through higher yields (23 t/ha) and stronger CPO prices (₦2M/tonne).
- Higher productivity slashes investment needs, ₦7.7B vs ₦20.8B base, showing efficiency gains from better agronomy.

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CONCLUSIONS

The analysis confirms that establishing a palm oil plantation capable of generating ₦1 billion in annual profit is both financially viable and strategically sound. Edo State stands out as the most attractive location, offering the highest profitability with an NPV of ₦65.6 billion, an IRR of 17.3%, and a payback period of about four years on an initial investment of ₦20.8 billion. Even under conservative assumptions, the project remains profitable, with ₦18.7 billion in NPV and 14.1% IRR, underscoring its resilience to less favorable conditions. The main risk lies in crude palm oil price fluctuations, but this can be mitigated through long-term supply contracts with major buyers, ensuring revenue stability. Nigeria's strong market fundamentals, rising demand, government

support, and an existing import gap, provide a solid foundation for sustainable growth. However, operational excellence remains critical; achieving consistent yields and returns will depend on experienced management, adherence to best agronomic practices, and disciplined execution throughout the project's lifecycle.

RECOMMENDATIONS

Proceed with investment in Edo State, developing an 8,559-hectare plantation with a total investment of ₦20.77 billion. The project promises strong financial returns and manageable risk.

Expected Returns:

- **NPV:** ₦65.58 billion
- **IRR:** 17.26%
- **ROI:** 107.57%
- **Payback:** 4.17 years

Implementation Approach:

- Adopt a phased development plan:
    - **Year 1:** 3,000 ha
    - **Year 2:** 3,000 ha
    - **Year 3:** 2,559 ha
- This reduces upfront capital pressure, allows operational learning, and smooths long-term revenue flow.

Risk Management Priorities:

1. Price Risk: Secure long-term supply contracts for 60–70% of production at ₦1.4–₦1.5M/tonne; keep the rest for spot market flexibility.
2. Yield Assurance: Use NIFOR-certified seedlings, employ experienced managers, and maintain strong agronomic standards.
3. Community Engagement: Build local partnerships and consider outgrower programs to strengthen supply and social goodwill.

Alternative Option:

If capital is limited, Cross River State offers a viable alternative, requiring only ₦12.48 billion (40% less). Though slightly less profitable (₦11.4M vs ₦12.1M per ha), it remains financially attractive.

Critical Success Factors:

- Achieving target yields through best agronomic practices.
- Maintaining cost discipline and efficient operations.
- Securing reliable market access and stable CPO pricing agreements.

Timeline Overview:

- **Year 0:** Land acquisition and setup
- **Years 1–3:** Phased planting and infrastructure
- **Years 4–7:** Production ramp-up, reaching breakeven
- **Years 8–15**: Full production and sustained profit

By **Year 7,** the project should recover all investment, generating over ₦100 billion in total profit by the end of its 15-year cycle.