ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

# Constraints and Perceived Drivers to Innovative Capabilities of Oil Palm Farmers in Edo State, Nigeria

**[*1]Ikuobase, E. I., [2]Alakpa, S. O. E. and [2]Ejuetueyin, J. O**

**[1]Nigeria Institute for Oil Palm Research, Edo State, Nigeria**

**[2]Department of Agricultural Economics and Extension Services, Benson Idahosa University, P. M. B. 1100, Benin City**

***Corresponding Author**

**DOI: https://doi.org/10.51244/IJRSI.2025.120500149**

**Received: 08 May 2025; Accepted: 14 May 2025; Published: 18 June 2025**

## ABSTRACT

Innovation in oil palm production is essential for increasing productivity, enhancing sustainability, and ensuring economic growth in Nigeria's agricultural sector. However, oil palm producers in Edo State face both enabling and limiting factors that influence their innovative capabilities. This study investigates the key drivers and constraints to innovations among oil palm farmers in Edo State. A multi-stage sampling technique was adopted to select 293 oil palm producers comprising of farmers and processors within five oil palm-producing Local Government Areas (LGAs). Structured and validated questionnaire was used to collect data. Frequency counts, percentages, mean, and a 5-pontt Likert scale were used to analyze the data. The findings reveal that multiple income streams (mean = 4.69), financial stability (mean = 4.62) and poverty alleviation (mean = 4.60) among others were the significant perceived drivers of oil palm producers' innovative capabilities. Conversely, major constraints to innovation use were high cost of input costs (mean = 4.49), insufficient funding, labor shortages, and market price fluctuations. The study concludes that significant constraints to innovation usage among oil palm producers in the study area were education and access to credit as well as extension contacts. Government should critically consider these if farmers' production status in oil palm production in Nigeria is a target in generating revenue as it used to be in the past.

**Keywords:** Oil palm innovation, drivers, constraints, Nigeria, Edo State, innovation adoption

## INTRODUCTION

Agriculture remains a cornerstone of Nigeria's economy, employing more than 60% of the population and serving as a major contributor to national GDP (IFAD, 2024). Within this sector, the oil palm industry occupies a prominent role, historically placing Nigeria among the top global producers of palm oil. Although Nigeria has lost its former dominance due to inadequate investment, poor infrastructure, and limited innovation uptake, the oil palm industry still offers considerable potential for economic transformation (Shehu, Salleh, & Ahmad, 2021).

Edo State, in particular, has emerged as a pivotal region for oil palm cultivation. The presence of the Nigerian Institute for Oil Palm Research (NIFOR) in the state provides a strategic advantage in terms of access to research, improved seedlings, and training opportunities (Ikuenobe, Okoye, & Joshi, 2021). Yet, despite these benefits, the majority of oil palm farmers and processors in the state continue to rely on traditional, low-efficiency methods, facing significant constraints that limit their innovative capabilities. These include lack of access to credit, high cost of inputs, and market instability (Aina & Odebode, 2021).

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

Innovation in agriculture refers to the adoption of new ideas, technologies, or practices that improve productivity, sustainability, and market efficiency. For oil palm farmers, innovations may range from the use of mechanical harvesters and improved processing machines to precision farming, digital platforms, and biochar technologies (Owutuamor, Iruo, & Ologidi, 2021). Such innovations are essential not only for improving yield and profitability but also for fostering resilience in the face of climate change and global market volatility (Murphy, Goggin, & Paterson, 2021).

The relevance of innovation in the oil palm sector is underscored by the increasing demand for palm oil locally and globally. Nigeria remains a net importer of palm oil despite its natural endowments, largely due to productivity challenges at the farm level (Olatunji, Anyanwu, & Ekwe, 2015). Addressing this productivity gap through innovation is thus a national priority, with direct implications for food security, export competitiveness, and rural development.

However, innovation is not solely a function of technology availability. It is a socially and economically mediated process influenced by a range of enablers and barriers. Key drivers of innovation adoption include financial stability, access to credit, education, and frequent contact with agricultural extension agents (Adekunle, Okoye, & Adetunji, 2022). These factors empower farmers with the resources and knowledge needed to adopt new methods, experiment with ideas, and implement changes in their operations.

Conversely, constraints such as high input costs, labor shortages, fluctuating market prices, and limited institutional support continue to hinder innovation among oil palm farmers (Adetunji et al., 2021). Age is another critical factor; older farmers are generally less likely to adopt new technologies due to risk aversion or reduced physical capacity (Okoroafor et al., 2023). Financial challenges, particularly lack of collateral for loans, also limit farmers' ability to invest in innovative solutions.

In Edo State, these dynamics are further complicated by the dual structure of the industry, where both smallholder and large-scale operators coexist. While large plantations often have better access to resources and technologies, smallholder farmers—who constitute the majority—face structural barriers that limit their innovative potential (Olagunju, Adebayo, & Almodóvar-González, 2023). These include inadequate extension services, poor access to formal credit, and fragmented market linkages.

Several studies have attempted to address these issues. Ariyanto et al. (2020) highlight the role of technology adoption in improving processing efficiency in Indonesia and Nigeria, emphasizing the potential of mechanical harvesters and small-scale hydraulic presses. Similarly, Krishna, Kubitza, and Qaim (2017) discuss the socio-economic impacts of oil palm expansion and the need for inclusive innovation strategies. In Nigeria, however, there is still limited empirical research that specifically examines the innovative capabilities of oil palm farmers in Edo State, despite the region's importance in national oil palm policy and investment frameworks. The revitalization of Nigeria's oil palm industry requires a deliberate focus on enhancing the innovative capabilities of its farmers. The future of oil palm production in Nigeria depends not only on technological advances but also on the institutional, social, and economic systems that support or constrain innovation.

Nigeria's oil palm industry, once a global leader, has suffered a marked decline in productivity and competitiveness due to structural and institutional deficiencies (Shehu, Salleh, & Ahmad, 2021). In Edo State—home to the Nigerian Institute for Oil Palm Research (NIFOR)—oil palm farming remains an important livelihood, yet many farmers rely on traditional, low-efficiency practices despite access to technological advancements. These limitations, including poor access to finance, weak extension services, and market volatility, significantly hamper innovation adoption (Ikuenobe, Okoye, & Joshi, 2021; Aina & Odebode, 2021).

Innovation is essential to revitalizing oil palm production, enabling increased yield, enhanced sustainability, and economic resilience (Ariyanto, Hidayat, & Nugroho, 2020). However, empirical data on the factors influencing innovative capabilities among oil palm farmers—especially in Edo State—remains limited. Without such data, interventions risk being ineffective or poorly targeted.

Therefore, the main aim of the study is to identify the drivers and constraints to innovative capabilities of oil palm farmers in Edo State, while the specific objectives are to determine the drivers influencing innovative capabilities; and identify constraints limiting farmers; innovativeness.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

# METHODOLOGY

This study was conducted in Edo State, Nigeria, a region recognized for its significant contribution to oil palm cultivation and processing. Situated in the South-South geopolitical zone, Edo State occupies an area of approximately 19,383.93 square kilometers and is bounded by Delta State to the south, Kogi State to the north, and Ondo State to the west. The state comprises 18 Local Government Areas (LGAs), with diverse agroecological zones, ranging from the rainforest belt in the south to the Guinea savannah in the north. Edo State is home to the Nigerian Institute for Oil Palm Research (NIFOR), a federal institution that plays a central role in promoting research, innovation, and development in the oil palm industry across Nigeria. The state's favorable climatic conditions, combined with the institutional presence of NIFOR, make it a strategic location for studying innovation in oil palm production.

The target population for this study included oil palm farmers and processors who operate within the state and are registered members of the Oil Palm Growers Association of Nigeria (OPGAN). These individuals were selected because they are actively involved in the cultivation and processing of oil palm and represent a cross-section of both smallholder and semi-commercial producers. A multi-stage sampling procedure was employed to select participants. First, five LGAs—Ovia North-East, Orhionmwon, Owan East, Esan Central, and Ovia South-West—were purposively selected based on their high concentration of oil palm producers, as identified through preliminary investigations and data obtained from NIFOR. In the second stage, four communities with high oil palm activity were purposively selected within each of the five LGAs, resulting in a total of 20 communities.

In the final stage, a random sampling technique was used to select 293 oil palm producers from a sampling frame of 1,096 registered farmers and processors within the selected communities. The sample size was determined using the Krejcie and Morgan formula for finite population sampling, ensuring statistical representativeness at a 5% margin of error. The final sample size of 293 respondents provided robust data for meaningful analysis and inference.

Data for the study were collected using a structured questionnaire and interview schedules. The questionnaire, which was pre-tested and validated by agricultural extension experts at Benson Idahosa University and technical staff at NIFOR, consisted of both open-ended and closed-ended items aligned with the research objectives. The data generated were analyzed using descriptive statistics such as frequency counts, percentages, and means as well as a 5-point Likert scale.

# RESULTS AND DISCUSSION

### Constraints to Innovativeness in Oil Palm Production and Processing

Table I shows the constraints to innovativeness in oil palm production and processing. Results reveal that the cost of inputs (Mean = 3.90, Std. Dev. = 0.38) was rated as one of the serious constraints to the innovativeness of farmers and processors in the oil palm production and processing in the study area. The high cost of essential farming inputs, such as fertilizers, machinery, and improved seedlings, limits the ability of farmers to adopt modern practices. This financial burden stifles innovation, leaving farmers dependent on less efficient traditional methods. As Ariyanto et al. (2020) noted, financial constraints are a critical barrier to the adoption of advanced technologies among smallholder farmers, which affects technical efficiency and productivity. To mitigate this, subsidized input costs and cooperative purchasing schemes could be implemented, enabling greater access to essential resources.

Also, high cost of labour (Mean = 3.89, Std. Dev. = 0.42) was found to be serious and significant to the respondents' ability to innovate in oil palm production and processing. Labor-intensive practices remain the norm for many oil palm farmers, and rising labor costs further reduce profitability and sustainability. This challenge is particularly pressing for small-scale farmers who struggle to afford skilled labor for modern practices. Ekine and Onu (2008) emphasized that high labor costs constrain small-scale processors, limiting their ability to engage in value-adding activities. The adoption of mechanized tools and farmer training programs can help optimize labor use and reduce costs over time.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

It was also found that insufficient fund (Mean = 3.88, Std. Dev. = 0.40) was indicated as significant. This implies that access to affordable credit is crucial for farmers and processors to invest in innovative technologies and infrastructure. However, insufficient funding remains a persistent issue. Aina and Odebode (2021) underscored the role of financial accessibility in enabling smallholder farmers to adopt sustainable practices. Without adequate funding, farmers remain trapped in a cycle of low productivity. Policies that streamline access to credit and provide low-interest loans are essential to bridge this gap.

In addition, inadequate labour (Mean = 3.85, Std. Dev. = 0.45) was rated as a significant constraint to oil palm production and processing. This means that labor shortages, especially in oil palm production and processing, exacerbate inefficiencies in oil palm production. Rural-to-urban migration has significantly reduced the availability of skilled labor for agricultural activities. Biodun et al. (2021) stated the need for localized training programs to equip rural laborers with the necessary skills for modern farming. Retaining talent through incentives and vocational programs can help address this issue.

It was also recorded that fluctuation in market prices of palm oil (Mean = 3.80, Std. Dev. = 0.46) was significantly serious. This means that one of the major constraints the respondents face in oil palm business is instability in market prices. Volatile market prices for palm oil and its derivatives discourage investments in innovation. Farmers face uncertainty about returns, which affects their willingness to adopt cost-intensive modern practices. Krishna et al. (2017) discussed similar issues in Indonesia, where market instability created economic disincentives for farmers. The establishment of price stabilization mechanisms and cooperative marketing strategies can shield farmers from market fluctuations and encourage innovation.

Moreso, poor government policy (Mean = 3.71, Std. Dev. = 0.64) was found to be high. This may be a discouraging factor to the oil palm farmers and processors in the study area. Inconsistent and inadequate government policies, such as unclear land tenure laws or insufficient funding for agricultural programs, stifle innovation. Ikuenobe et al. (2021) pointed out that unsupportive policies hinder sustainable oil palm production in Nigeria. To overcome this, governments need to create clear, farmer-friendly policies and ensure proper allocation of resources to incentivize innovation. Another significant constraint identified as serious is inadequate technical knowledge (Mean = 3.47, Std. Dev. = 0.79). Farmers' lack of technical expertise in adopting and maximizing advanced technologies, especially in Africa is a significant limitation. This knowledge gap often stems from insufficient extension services, as reflected by the low mean score of 2.01 for contact with extension agents. Aina and Odebode (2021) stressed that extension services play a critical role in bridging this gap by providing training and technical support. Expanding the reach and capacity of these services is essential for driving innovation.

Furthermore, bureaucracy in loan processing (Mean = 3.59, Std. Dev. = 0.82) and insecurity (Mean = 3.77, Std. Dev. = 0.56) were identified as serious constraints. This means that excessive red tape in accessing loans discourages farmers from seeking financial assistance, further perpetuating funding issues. Ekine and Onu (2008) noted similar challenges in small-scale processing, where complex loan procedures hinder financial accessibility. Streamlining loan application processes through digital platforms and reducing bureaucratic barriers can empower farmers to secure funding for innovative projects. Also, insecurity, including theft and conflict, poses significant risks to investments in innovative practices. Farmers operating in regions with weak security infrastructure are less likely to take on high-risk investments. Okolo et al. (2019) pointed out the economic vulnerabilities of oil palm farmers in such environments. Strengthening security measures and community-based interventions can create a conducive environment for innovation.

Table 1: Constraints to Innovativeness in Oil Palm Production and Processing

| Constraint | Mean | Std. Dev. |
|---|---|---|
| High cost of inputs | 3.90** | 0.38 |
| High cost of labour | 3.89** | 0.42 |
| Insufficient fund | 3.88** | 0.40 |
| Inadequate labour | 3.85** | 0.45 |
| Fluctuation in market prices | 3.80** | 0.46 |
| Insecurity | 3.77** | 0.56 |

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

| | | |
|---|---|---|
| Poor government policy | 3.71** | 0.64 |
| Bad road network | 3.69** | 0.62 |
| Lack of storage facilities | 3.64** | 0.64 |
| Inaccessibility of inputs | 3.61** | 0.57 |
| Bureaucracy in the processing of accessing loan | 3.59** | 0.82 |
| Inadequate technical knowledge | 3.47** | 0.79 |
| Unpredictable climate change | 3.29** | 1.15 |
| Low contact with extension agents | 2.01 | 0.84 |
| Theft | 1.94 | 1.10 |
| Lack of market | 1.88 | 0.93 |

Source: Field Survey, 2024.

**Mean = ≥3.0 = Serious and significant constraints

**Perceived Drivers of Innovativeness of the Oil Palm Farmers**

The perceived drivers of innovativeness of the oil palm farmers in the study area are presented in Table 2. Results show that multiple income streams (Mean = 4.69) were indicated as a very strong driver of farmers' innovativeness in oil palm production and processing. This means that diversification of income sources empowers farmers to invest in innovative practices without jeopardizing their financial stability. Financial Stability (Mean = 4.62) was also a very strong driver. This implies that financially stable farmers possess the capital necessary to invest in innovative tools and practices. Stability reduces the perceived risks of adopting new technologies, facilitating a more conducive environment for innovation. Furthermore, poverty alleviation potential (Mean = 4.60) was a very strong driver. The prospect of escaping poverty serves as a significant motivator for farmers to embrace innovative practices. Innovations that promise increased yields and income are particularly appealing to farmers seeking to improve their livelihoods.

In addition, access to extension services (Mean = 4.35) was a strong driver of innovativeness in oil palm production. This means that extension services play a crucial role in disseminating information about new technologies and practices. Farmers with access to such services are better equipped to implement innovations effectively. It was also observed that educational attainment (Mean = 4.30) was also documented as a strong driver. Education enhances a farmer's ability to comprehend and implement new technologies. Literate farmers are more likely to seek out information and apply innovative practices successfully. Furthermore, access to credit facilities (Mean = 4.28) was a strong driver. This implies that availability of credit enables farmers to invest in necessary inputs and technologies. Financial institutions that provide accessible credit options play a pivotal role in facilitating agricultural innovation.

Moreso, availability of ready markets (Mean = 4.25) was a strong driver. The presence of markets for agricultural produce incentivizes farmers to adopt innovations that enhance productivity. Assurance of market access reduces the risks associated with increased production. Land ownership security (Mean = 4.12) was a strong driver and this means that secure land tenure encourages farmers to invest in long-term innovations, as they are assured of reaping the benefits of their investments. Land security is a fundamental prerequisite for sustainable agricultural development. In another development, peer influence and farmer cooperatives (Mean = 3.85), access to agricultural inputs (Mean = 3.78) and use of digital tools and farm technologies (Mean = 3.60) were the moderate drivers of innovativeness of farmers in oil palm production and processing. This means that social networks and cooperatives facilitate the sharing of information and experiences related to innovation. Peer influence can encourage farmers to adopt new practices by observing the successes of others. Also, availability of quality inputs, such as seeds and tools, is essential for the successful implementation of innovations. Ensuring timely and affordable access to inputs supports farmers in adopting new technologies, while digital technologies offer significant potential for enhancing agricultural productivity. However, adoption remains moderate due to challenges such as limited digital literacy and infrastructure.

The findings show that multifaceted nature of drivers influencing the innovativeness of oil palm farmers. Economic factors, such as income diversification and financial stability (*Alene and Hassan, 2006)*, emerge as

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

primary motivators. Institutional support, including extension services and access to credit (*FAO (2013)*, also plays a critical role. Addressing barriers to digital technology adoption and ensuring secure land tenure are essential for fostering a conducive environment for innovation.

Table 2: Perceived Drivers of Innovativeness of Oil Palm Farmers

| **Driver of Innovativeness** | **Mean Score** | **Interpretation** |
|---|---|---|
| Multiple income streams | 4.69** | Very strong driver |
| Financial stability | 4.62** | Very strong driver |
| Poverty alleviation potential | 4.60** | Very strong driver |
| Access to extension services | 4.35** | Strong driver |
| Educational attainment | 4.30** | Strong driver |
| Access to credit facilities | 4.28** | Strong driver |
| Availability of ready markets | 4.25** | Strong driver |
| Land ownership security | 4.12** | Strong driver |
| Participation in training and workshops | 4.08** | Strong driver |
| Government subsidies or incentives | 4.00** | Strong driver |
| Peer influence and farmer cooperatives | 3.85** | Moderate driver |
| Access to agricultural inputs (tools, seeds) | 3.78** | Moderate driver |
| Use of digital tools and farm technologies | 3.60** | Moderate driver |

Source: Field survey, 2024.

**Mean ≥ 3.0 = Significant drivers

## CONCLUSION

This study analysed the duality of constraints and perceived drivers shaping the innovative capacities of oil palm farmers in Edo State, Nigeria. Economic enablers such as multiple income streams, financial stability, and poverty alleviation potentials are potent catalysts for innovation adoption among farmers. Additionally, institutional factors like access to credit facilities, extension services, and education significantly contribute to enhancing farmers' capacity to adopt and sustain innovative practices. Conversely, the study also reveals formidable constraints, including high input and labor costs, insufficient funding, inadequate technical knowledge, and poor policy support. These factors persistently hinder innovation uptake, especially among smallholder farmers who dominate the sector. Issues such as fluctuating market prices, bureaucratic bottlenecks in credit access, and insecurity further compound the challenges, deterring long-term investments in innovation. Given the strategic importance of the oil palm industry to Nigeria's economy, and Edo State's centrality to national palm oil production, urgent policy attention is warranted. Recommendations include the implementation of targeted subsidy programs, enhancement of rural extension services, simplification of credit access procedures, and the development of youth-inclusive innovation programs. Furthermore, improving digital literacy and rural infrastructure can unlock the full potential of precision agriculture and digital farming tools.

## REFERENCES

1. Alene, A. D., & Hassan, R. M. (2006). The efficiency of traditional maize seed production in Ethiopia. International Journal of Agricultural Economics.
2. Adekunle, A. O., Okoye, B. C., & Adetunji, M. O. (2022). Adoption of improved oil palm technologies in Nigeria: Factors, constraints and policy implications. Nigerian Journal of Agricultural Extension, 23(1), 56–69.
3. Aina, O. S., & Odebode, S. O. (2021). Agricultural extension strategies for promoting innovation adoption among Nigerian smallholder farmers. African Journal of Agricultural Research, 16(7), 928–935.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

4. Adetunji, M. O., Okoroafor, E. C., & Oyebanji, O. M. (2021). Influence of labor costs and input constraints on oil palm profitability in Nigeria. Journal of Agribusiness and Rural Development, 61(3), 233–245.
5. Ariyanto, E., Hidayat, A., & Nugroho, T. (2020). Mechanization and innovation in the oil palm processing chain. Asian Journal of Agriculture and Development, 17(2), 145–160.
6. FAO. (2013). Trends and impacts of foreign investment in developing country agriculture: Evidence from case studies.
7. IFAD. (2024). Innovation and inclusive agricultural transformation in Nigeria. International Fund for Agricultural Development. Retrieved from https://www.ifad.org
8. Ikuenobe, C. E., Okoye, B. C., & Joshi, P. K. (2021). Sustainable oil palm farming in Nigeria: Institutional roles and farmer innovation. African Journal of Science, Technology, Innovation and Development, 13(4), 876–890.
9. Krishna, V. V., Kubitza, C., & Qaim, M. (2017). Land market effects of oil palm expansion in Indonesia. Land Use Policy, 69, 427–438.
10. Murphy, B., Goggin, G., & Paterson, M. (2021). Palm oil futures: Politics, sustainability, and innovation in the global south. Environmental Politics, 30(6), 1015–1035.
11. Olagunju, K. O., Adebayo, O. O., & Almodóvar-González, M. (2023). Farm size and productivity among Nigerian oil palm farmers: A gendered perspective. Food Policy, 117, 102345.
12. Olatunji, G. M., Anyanwu, S. O., & Ekwe, K. C. (2015). Agricultural innovations and their impact on oil palm productivity in Nigeria. International Journal of Agricultural Research, 10(3), 111–121.
13. Okoroafor, E. C., Adekunle, M. F., & Ibe, C. O. (2023). Demographic characteristics and adoption of agricultural innovations: Insights from oil palm farmers in southern Nigeria. Journal of Rural Development, 42(1), 57–75.
14. Owutuamor, E., Iruo, F. A., & Ologidi, J. A. (2021). Biomass valorization from oil palm residues: Opportunities for biochar production in Nigeria. Journal of Cleaner Energy Technologies, 9(2), 165–172.
15. Rogers, E. M. (2003). Diffusion of Innovations (5th ed.). Free Press.
16. Shehu, A., Salleh, M. A. M., & Ahmad, S. S. (2021). Challenges and prospects of sustainable oil palm production in Nigeria. Sustainability, 13(9), 4962.