

Impact of Nigeria Agriculture Promotion Policy (APP) on the Productivity of Smallholder Oil Palm Farmers in Edo State

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Abstract: The Nigeria Agriculture Promotion Policy (APP) was implemented between 2016 and 2020 with the goal of increasing agricultural productivity and income for smallholder farmers. This study evaluated the impact of the APP on the productivity of smallholder oil palm farmers in Edo State. A total of 165 oil palm farmers from 11 local government areas (LGAs) in three (3) senatorial districts in Edo State were surveyed using a mixed-methods approach. Quantitative data were collected through questionnaires and descriptive statistics were used to analyse the data. The findings of the study indicate that the APP was effective in improving the productivity of oil palm farmers in terms of technology adoption and yield/output performance. Additionally, the study found that the policy increased the income of smallholder oil palm farmers by 56.9% from NGN383,314.39 in 2015 to NGN597,392.17 in 2022. The study identified some limitations of the APP, such as the lack of regular training or skill development programs for farmers and the limited access to loan facilities to acquire more efficient oil palm production kits and machinery. The findings of this study have important implications for the future development of agricultural policies in Nigeria. The APP has shown to be an effective policy in improving the productivity of smallholder oil palm farmers.

Keywords: Agriculture, policy analysis, policy effectiveness, impactful development.

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1. Introduction

Nigeria has a lot of potential in agriculture, but the sector faces many problems, such as low productivity, poor infrastructure, and lack of credit. These problems affect the growth of the sector and the welfare of farmers, especially small-scale farmers who are the majority of farmers in the country. The government launched the Agriculture Promotion Policy (APP) in 2016 to solve these problems and increase the productivity of the sector.

The policy aims to attract private-sector investment in agriculture, boost agricultural output, and improve the living conditions of farmers. The policy plans to do this by helping farmers, enhancing access to credit, upgrading infrastructure, and promoting the use of new technologies. The policy gives a thorough analysis of the problems facing Nigeria's agricultural sector and the solutions suggested by the APP. One of the benefits of the policy is that it recognizes the need for a consistent and suitable policy framework for agricultural development in the country. However, the policy does not show how to achieve this, and it is not clear how the APP will handle the problem of policy uncertainty and inconsistency.

Another benefit of the policy is that it focuses on improving productivity, assembling private sector investment, and

repositioning institutions. However, the policy does not show how to implement these themes, and it is not clear how the APP will tackle the root causes of the problems facing the sector, such as political will, agricultural research and technology, infrastructure gap, and finance and risk management.

Furthermore, the policy does not show how the APP will deal with the issue of climate change and environmental sustainability, which are vital factors for the long-term success of Nigeria's agricultural sector. The policy also does not show how the APP will deal with the issue of food security and nutrition, especially for vulnerable groups such as infants, nursing mothers, and people with disabilities or chronic illnesses.

According to Lokpobiri (2019), the underlying focus of the Agricultural Promotion Policy (APP) includes the following:

1. The agricultural sector in Nigeria has been facing persistent challenges, including inadequate access to finance, poor infrastructure, and insufficient technology and research.
2. The Agricultural Promotion Policy (APP) is a comprehensive policy framework aimed at addressing the challenges in the agricultural sector and unlocking Nigeria's full potential in the sector.
3. The APP is driven by essential principles such as recognizing agriculture as a business, ensuring food security as a

fundamental human right, and factoring in environmental sustainability and climate change.

4. The APP focuses on three main themes, including productivity improvements, assembling in private sector investment, and institutional repositioning, to enhance agricultural development in Nigeria.
5. The APP identifies core challenges in the agricultural value chain, starting from production through domestic consumption to export markets, and sets out a roadmap towards addressing the challenges.
6. The APP recognizes the need for a suitable and enduring policy framework for agricultural rejuvenation in Nigeria, political commitment, agricultural research and technology, infrastructure development, and finance and risk management.
7. The APP aims to boost production, decrease post-harvest waste, expand market access, and increase farm productivity, among other objectives, to achieve food security, job creation, and economic diversification in Nigeria.
8. The APP requires substantial investments in human capital, processes, and systems to achieve its objectives, and the Nigerian government needs to provide a conducive legislative atmosphere and agricultural knowledge framework for promoting agricultural development in the country.

Oil palm is one of the major crops in Nigeria and is predominantly grown by smallholder farmers. The crop is essential for the economy, as it provides a significant source of income and employment for rural households. However, smallholder oil palm farmers in Nigeria face numerous challenges, including low productivity, inadequate access to markets, and limited access to credit.

Edo State is one of the major oil palm-producing states in Nigeria, with a significant number of smallholder oil palm farmers. The implementation of the Agriculture Promotion Policy in Edo State provides an opportunity to evaluate its impact on the productivity of smallholder oil palm farmers. This study aims to assess the effectiveness of the APP in improving the productivity of smallholder oil palm farmers in Edo State, and the extent to which it has improved their livelihoods. The study will provide insights into the effectiveness of the APP in improving the productivity of smallholder farmers and inform policy decisions aimed at enhancing the growth of the agricultural sector in Nigeria.

1.1 Problem Statement

Nigeria, as one of the leading producers of oil palm in Africa, has recognized the vital role of smallholder oil palm farmers in contributing to the nation's agricultural and economic growth. In this respect, the Nigerian government implemented the Agriculture Promotion Policy (APP) to promote and support smallholder farmers in various agricultural sectors, including oil palm

cultivation. Edo State, known for its significant oil palm production, has been a focal point of this policy implementation. However, there is a need to assess the actual impact of the APP on the productivity of smallholder oil palm farmers in Edo State to determine whether the policy has achieved its intended objectives.

1.2 Research Question

To evaluate the impact of the Nigeria Agriculture Promotion Policy on the productivity of smallholder oil palm farmers, the following research question will guide the study: What is the influence of the extension services and input support provided to farmers under the Nigeria Agriculture Promotion Policy (APP) impacted on the productivity of smallholder oil palm farmers in Edo State, and how have the policy measures influenced key aspects of their oil palm cultivation practices and overall livelihoods?

1.3 Research Objectives

The main objective of the study is to assess and understand how the Agriculture Promotion Policy in Nigeria has influenced the productivity of smallholder oil palm producers specifically within the agro-ecological region of Edo State. This objective would entail understanding the socioeconomic characteristics of smallholder oil palm producers in the study area and identify their present and potential challenges or opportunities within the context of the Agriculture Promotion Policy (APP).

2. Literature Review

The Agricultural Promotion Policy (APP) aims to address these challenges and put Nigeria on a path to food security, job creation, foreign exchange earnings and economic diversification. The APP is anchored on three main agricultural supports: investment, financing developmental programs, and research for innovation and productivity. The policy recognizes agriculture as a business and focuses on private-sector-led employment to drive the development of the agricultural sector. The APP also recognizes the principle of food as a fundamental human right and focuses policy tools for agricultural advancement as a social obligation of the government. The APP identifies the challenges facing the agricultural sector, including policy uncertainty, political commitment, agricultural research and technology, infrastructure deficit, and finance and risk management.

The policy provides solutions to these challenges, including land policy, soil fertility, access to inputs, livestock production, aquaculture/fishery inputs, irrigation systems, and mechanized farming. The APP aims to boost domestic food security and advance export earnings by expanding the production of native crops and emphasizing cassava, cocoa, sesame, oil palm, cashew nuts, and gum Arabic for export.

TABLE 1: DEMAND AND SUPPLY GAPS ACROSS STAPLE FOOD ITEMS IN NIGERIA

Crop	Demand (million tons)	Supply (million tons)	Observation
Chickens	200 birds	140 birds	Gap filled by illegal importations, which enter the market at lesser price point than local producers; gap also a moving target based on fast food/QSR demand
Cocoa	3.6	0.25	Demand is global demand that will rise to 4.5 million by 2020
Corn/Maize	7.5	7.0	Limited importations are needed but can shift owing to feed demand
Cotton	0.7	0.2	Demand is for seed cotton and can rise to 1.0 – 1.5 million tons subject to textile sector revival
Diary/Milk	2.0	0.6	Driven by inadequate milking cows and low yields (15-25 litres/day versus the norm of 35–40 litres NZ/US)
Fish	2.7	0.8	Fall off in ocean catch and weakness in aquaculture yields due to cost of fish feed a constraint on growth
Oil Palm	8.0	4.5	Refers to fresh fruit bunch from which oil is extracted at a 10–15 % efficiency rate
Rice	6.3	2.3	Insufficient supply chain integration remains an issue
Sorghum	7.0	6.2	Demand will rise further as use in feed grows in 2016–2020. Import of malt extracts and glucose syrup is currently utilised to manage the gap, thus, a commercial threat for Nigerian farmers
Soya Beans	0.75	0.6	Animal feed and protein cost alt. driving demand
Tomatoes	2.2	0.8	Actual production is 1.5 million tons, but 0.7 million ton is lost post-harvest
Wheat	4.7	0.06	Driven by demand for different types of wheat, for bread, biscuits and semovita
Yams	39	37	The limited gap today but volumes are expected to rise in the planning period

Source: FMARD (2016)

Agriculture is a key sector in Nigeria's economy, employing a significant proportion of the population and contributing to the country's GDP. The Nigerian government has implemented several policies to improve agricultural productivity and promote economic growth, with the Agricultural Promotion Policy (APP) being one of the recent policies. This literature review aims to examine previous studies on the impact of agricultural policies, particularly the APP, on the productivity of smallholder oil palm farmers in Edo State.

2.1 Impact of Agricultural Policies on Smallholder Farmers

Agricultural policies have been implemented in several countries to improve productivity and economic growth. Previous studies have shown that such policies have significant impacts on smallholder farmers. For instance, a study by Adenegan, Fagbemi, & Osanyinlusi (2018) on the Impact of the Growth Enhancement Support Scheme (GESS) on Farmers' income in Oyo State, Nigeria revealed that policies such as the Growth Enhancement Support Scheme (GES) positively impacted farmers' productivity and income. Similarly, a study by Kehinde, Adenekan & Olubiyi (2019) on the impact of the e-wallet system on smallholder farmers in Nigeria found that the policy improved farmers' access to fertilizers and seeds.

2.2 Impact of Nigeria's Agricultural Promotion Policy

The Nigerian government launched the Agricultural Promotion Policy (APP) in 2016 to improve agricultural productivity, food security, and employment in the sector. The policy focused on several agricultural value chains, including the oil palm value chain. Several studies have examined the impact of the APP on smallholder farmers in Nigeria.

A study by Ugwu & Kanu (2012) on the effects of agricultural reforms on the agricultural sector in Nigeria found that policy reforms positively impacted farmers' productivity and income. The study also revealed that the policy reform results in increased farmers' access to credit, inputs, and extension services.

Likewise, Aminu & Umoh (2020) investigated the economic factors affecting palm oil production in the Abak Local Government Area of Akwa-Ibom State, Nigeria. Data from 120 respondents, primarily women with an average age of 50, were analysed using descriptive statistics and multiple regression. Palm oil production proved profitable with a 1.17 rate of return. The research identified age, education, cooperative society membership, equipment costs, and labour costs as significant influencers of economic performance. Producers faced challenges

like limited capital, lack of credit access, inadequate inputs, and price fluctuations. The study recommended government intervention, such as providing affordable credit facilities, to support and enhance the economic performance of palm oil producers.

In another study by Abass, Omonona & Ogunniyi (2019) on the impact of the APP on smallholder rice farmers in Nigeria, the authors found that the policy improved farmers' access to extension services and inputs. The study also revealed that the policy positively impacted rice farmers' productivity and income.

2.3 Impact of Nigeria's Agricultural Promotion Policy on Smallholder Oil Palm Farmers

Few studies have specifically examined the impact of the APP on smallholder oil palm farmers in Nigeria. A study by Okoruwa, Bamire & Adejobi (2020) on the impact of the APP on Nigeria's oil palm value chain found that the policy positively impacted smallholder farmers' productivity and income. The study revealed that the policy increased farmers' access to credit, inputs, and extension services.

Similarly, a study by Babatunde, Oluwatayo, & Ogunniyi (2019) on the impact of the APP on smallholder oil palm farmers in Nigeria found that the policy positively impacted farmers' productivity and income. The study also revealed that the policy increased farmers' access to inputs and extension services.

Conclusion

Overall, previous studies have shown that agricultural policies have significant impacts on smallholder farmers' productivity and income. The Agricultural Promotion Policy (APP) in Nigeria has also been found to positively impact smallholder farmers in various agricultural value chains, including the oil palm value chain. However, there is a need for more research to be conducted on the impact of the APP on smallholder oil palm farmers, particularly in other regions of Nigeria.

3. Methodology

This study aims to assess the impact of Nigeria's Agricultural Promotion Policy on the productivity of smallholder oil palm farmers in Edo State. The key areas of investigation include the social and economic characteristics of the oil palm farmers, their yield and income levels, the adoption of improved technologies, and the main production constraints they face.

To achieve this, a survey design was utilized based on the Rapid Rural Appraisal (RRA) approach, which combines conventional surveys with unstructured research methods such as focus group discussions (FGDs), in-depth interviews, and observation studies. The RRA approach, as defined by Townsley (1996), involves a systematic, semi-structured activity conducted by a multidisciplinary team in the field, aimed at gathering the most up-to-date information and formulating innovative hypotheses about rural economic life. RRA was chosen because it incorporates the opinions and knowledge of rural people in evaluating development policies and programs. McCracken, Pretty,

& Conway (1988) describe RRA as a method for conducting action-oriented investigations in developing countries, rather than providing a strict definition. It employs techniques such as group dynamics, surveying and sampling, interviewing, and community mapping for data collection.

The data for this study were obtained from both primary and secondary sources. The secondary data were collected from institutional sources and included information related to oil palm production and palm oil processing technologies available in the study area. These institutional sources included Edo ADP and NIFOR. Primary data were gathered from various categories of respondents, including oil palm farmers, policymakers, and development practitioners. Policy-related data affecting oil palm production and palm oil processing were obtained from ADP and NIFOR. NIFOR represents the government research institute responsible for promoting research and development in the field of oil palm, while ADP is a government agency that promotes awareness and adoption of improved farming technologies.

The three Senatorial Districts of Edo State, namely Edo South, Edo North, and Edo Central, were purposively selected as they are known for oil palm farming. In the second stage of the sampling process, five Local Government Areas (LGAs) were purposively chosen in Edo South, and three LGAs were purposively chosen in both Edo Central and Edo North. Fifteen oil palm farmers were purposively selected per LGA, resulting in a total of 165 farmers targeted for questionnaire administration. The Snowball technique was used to identify and interview these farmers.

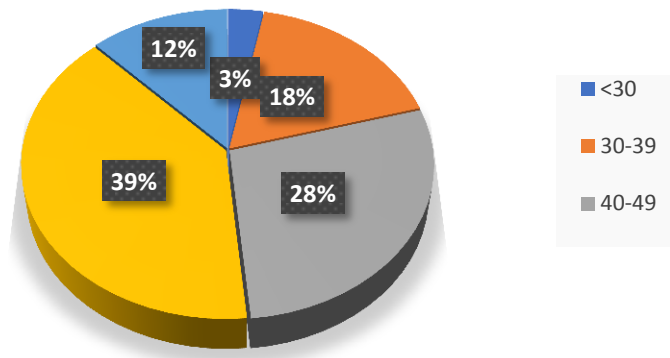
Result & Discussions.

4.1 Age range (years) of respondents

The findings from Figure 1 reveal several important insights regarding the age distribution of the respondents. Among the participants, 39.39% fell within the 50-59 age range, 27.88% were aged between 40-49, 17.58% were between 30-39, and 12.12% were 60 years or older. It is worth noting that the average age of the respondents was 48 years, suggesting that the majority of oil palm farmers in the study area are currently in their active age range and possess the necessary energy to engage in farming activities.

The age of the respondents serves as an indicator of a farmer's effectiveness, and the results of this study demonstrate that a significant proportion of oil palm producers in the area are still actively involved in farming. Consequently, one would expect to observe an increase in oil palm production rather than a decline. These findings support the observations made by Nnadi & Amaechi (2007) who stated that young farmers tend to be more innovative and enterprising.

Overall, these results underscore the potential for continued growth in oil palm production, given the active involvement of many farmers in the study area.

Figure 1: Age range of farmers**Source: Field Survey (2022)**

4.2 Sex of oil palm farmers

In Table 2, it is evident that the majority of the respondents, specifically 81.21%, were males, while 18.79% were females. This distribution implies that the control of oil palm processing and farming in the study area predominantly lies with men. This observation can be attributed to the labour-intensive nature of oil palm farming, particularly during activities such as harvesting, which involves climbing trees to cut down fresh fruit bunches (FFB). The physical demands of these tasks may explain why men are more actively engaged in this sector.

It is worth noting that these findings contrast with the conclusions drawn by other researchers, such as Adisa & Okunade (2011) who reported women as the dominant workforce in crop production. However, this discrepancy could be attributed to the fact that oil palm is a cash crop, which may have different gender dynamics compared to other crops.

Overall, the data suggest that men play a significant role in oil palm farming and processing in the study area, likely due to the physically demanding nature of the activities involved. This finding diverges from the observations made by other researchers, possibly due to the unique characteristics of oil palm as a cash crop.

TABLE 2: SEX DISTRIBUTION OF FARMERS

Sex	Freq	%
Female	31	18.79
Male	134	81.21
Total	165	100.00

Source: Field Survey (2022)

4.3 Marital Status of oil palm farmers

Most of the respondents (90.30%) in the study were found to be married, while 5.45% were single, 3.64% were widowed, and only about 0.61% were separated or divorced, as indicated in Table 3. This data highlights the prevalence of married individuals in the oil palm production or farming enterprise.

This finding implies that a significant proportion of the respondents had familial responsibilities, which might have motivated their engagement in oil palm farming as a means of providing for their families and generating income.

TABLE 3: MARITAL DISTRIBUTION OF FARMERS

Marital status	Freq	%
Married	149	90.30
Single	9	5.45
Widow(er)	6	3.64
Separated/Divorced	1	.61
Total	165	100.00

Source: Field Survey (2022)

4.4 Educational level of oil palm farmers

According to Figure 2, the educational background of the respondents provides valuable insights. The largest proportion (27.88%) of respondents had a secondary education, while 25.45% possessed a first degree (university education). Additionally, 15.76% had received

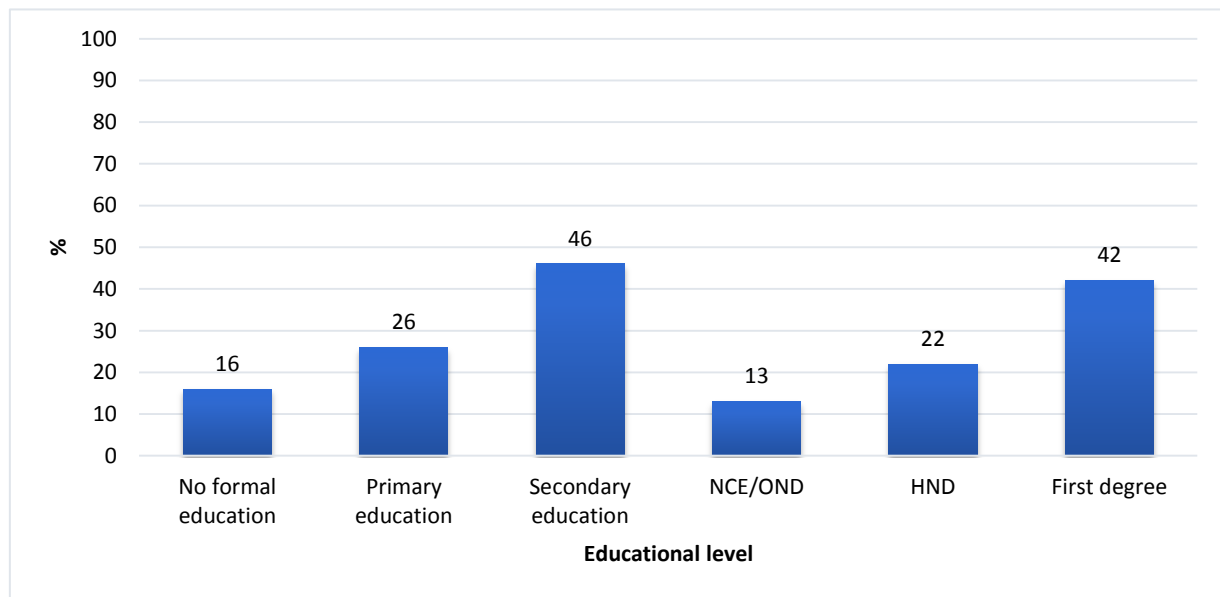
primary education, 13.33% held a Higher National Diploma (HND), and 9.70% had no formal education. A smaller percentage (7.88%) had completed a National Certificate of Education (NCE) or Ordinary National Diploma (OND).

These findings indicate that approximately 70% of the respondents had some level of formal education, suggesting a high level of literacy among most oil palm farmers in the study area. Being literate enables them to read, write, and comprehend policies related to oil palm farming. This literacy equips them with the necessary knowledge, capacity, and ability to understand and adopt new innovations and technologies. Education plays a crucial role in the adoption of such advancements.

Supporting this notion, Ani (2007) emphasized the direct connection between literacy and the adoption of innovations. Furthermore, Nnadi & Amaechi (2007) described educated farmers as innovative individuals who are more likely to successfully embrace and utilize new innovations.

In summary, the results highlight the significance of formal education among oil palm farmers in the study area. The majority of respondents were found to be literate, which enhances their potential to understand and implement innovative practices in their farming activities.

Figure 2: Educational level of farmers



Source: Field Survey (2022)

4.5 Household size of oil palm farmers

Table 4 provides insights into the household sizes of the respondents. The majority of participants (49.70%) reported having a household size ranging from 1 to 4 members, while 33.33% had a size of 5 to 8. Additionally, 14.55% had a household size of 9 to 12 members, and 2.42% had more than 12 members. On average, the family size was five, indicating that the respondents maintained a moderate household size, which aligns with the national average reported in previous studies (Anyanwu, 2014; Akaakohol & Aye, 2014).

The implications of these findings on home management are twofold. Firstly, having a relatively small household size means that the respondents have to meet the needs of fewer individuals, giving them the resources and flexibility to invest in oil palm production. Conversely, a larger family size among the farmers could potentially provide more assistance in the form of family labour on the farm. However, a smaller household size may face challenges with limited manpower to support the farm enterprise, potentially incurring additional costs if they need to hire labour.

Overall, the moderate household sizes reported by the respondents suggest a balance between resource availability and labour support for oil palm production.

TABLE 4: THE HOUSEHOLD SIZE OF FARMERS

Household size	Freq	%	Mean
1-4	82	49.70	
5 - 8	55	33.33	
9 - 12	24	14.55	
>12	4	2.42	
Total	165	100.00	5

Source: Field Survey (2022)

4.6 Livelihood Characteristics of Farmers

Table 5 reveals that the largest proportion of respondents (38.18%) consisted of crop farmers, followed by civil servants comprising 30.30%. Additionally, 19.39%, 6.06%, 3.64%, and 2.43% of respondents were involved in trading, livestock rearing, food vending/processing, and other occupations, respectively. These findings demonstrate that the respondents have engaged in various income-generating activities, indicating diversification of their sources of livelihood. This suggests that the income derived from oil palm production alone may not be sufficient to meet their needs, leading them to pursue additional ventures.

TABLE 5: OTHER OCCUPATIONS OF RESPONDENTS

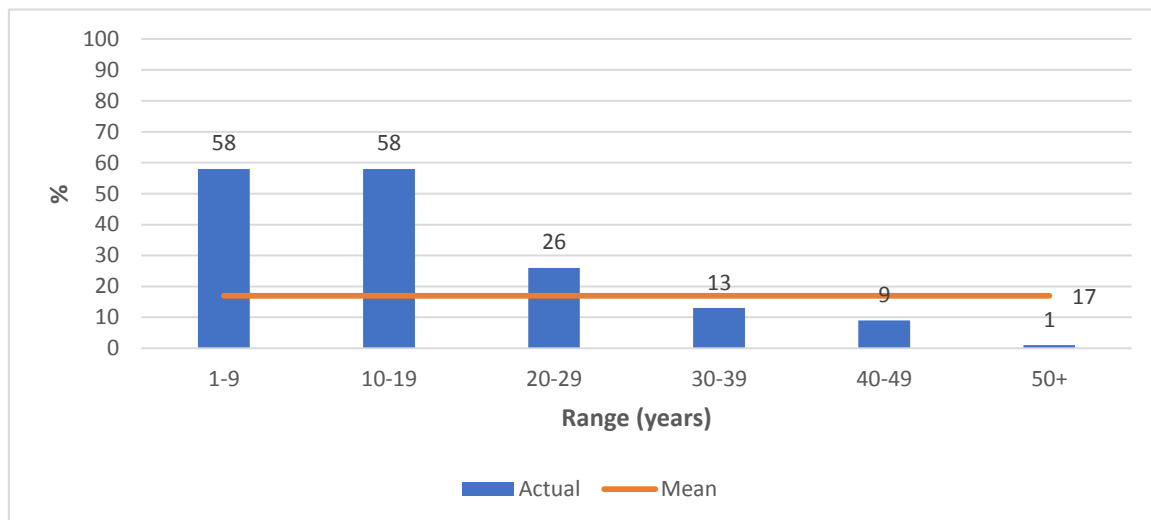
Occupations	Freq	%
Crop Farming	63	38.18
Trading	32	19.39
Civil Servant	50	30.30
Livestock rearing	10	6.06
Food vendor/processor	6	3.64
Others	3	2.43
Total	165	100.00

Source: Field Survey (2022)

4.7 Farming Knowledge Of Oil Palm Farmers

The farming skills of the majority (35.15 % and 35.15 %) of the respondents were 1-9 years and 10-19 years respectively (Figure 3). The average duration of farming experience of the respondents (in years) was 17 which implies that most of the respondents were quite experienced in oil palm farming. Hence, they are able to evaluate the impact of the agricultural promotion policy on their yield, farm size and income. Farming experience is also a measure of the technical know-how of farmers in their various farming enterprises. According to Nnadi & Amaechi (2007), experience equips the farmers with the right frame of mind to handle innovations just as Mgbako, Ugwu, & Frank (2013) noted that farmers with greater experience adopt innovation faster.

Figure 3: Farming Experience Range



Source: Field Survey (2022)

4.8 Ownership of Oil Palm Processing Mill

From Table 6., a larger percentage (67.88 %) of the respondents had no oil mill while 32.12 % had or owned an oil mill. This suggests that the majority of oil palm farmers in the area either sell their harvested fresh fruit bunches (FFB) or take them to the mill themselves to process which incurs an additional cost in their production chain.

TABLE 6: MILL OWNERSHIP STATUS OF RESPONDENTS (FARMERS)

Options	Freq	%
No	112	67.88
Yes	53	32.12
Total	165	100.00

Source: Field Survey (2022)

4.9 Membership of Association by Respondents

A larger proportion (69.09 %) of the respondents were non-members of any association while 30.91 % belonged to an association (Table 7). thus, a low proportion of the respondents are members of associations. Association membership promotes social interaction; these social associations according to Apu (2011) provide an effective platform for championing the course of agricultural development through information sharing, cross-fertilization of ideas, farmers' field school, capacity building, resource mobilization, etc. Hence, it can be extrapolated that the inadequate participation of the farmers in the activities of the social organization in the studied area could negatively affect the rate of oil palm technology diffusion.

TABLE 7: ASSOCIATION MEMBERSHIP STATUS OF RESPONDENTS

Options	Freq	%
Non-member	114	69.09
Member	51	30.91
Total	165	100.00

Source: Field Survey (2022)

4.10 Input Sources of Respondents

The sources of inputs such as oil palm seedlings, finance, labour and land for oil palm production/farming by respondents in the studied area are shown in Table 8. For oil palm seedlings, the table reveals that the majority (61.82 % and 53.33 %) of the respondents got their oil palm seedlings from NIFOR and fellow farmers respectively. The fact that a larger percentage got their seedlings from NIFOR, suggests that NIFOR, as an institute for oil palm research, is highly trusted by the farmers in the State.

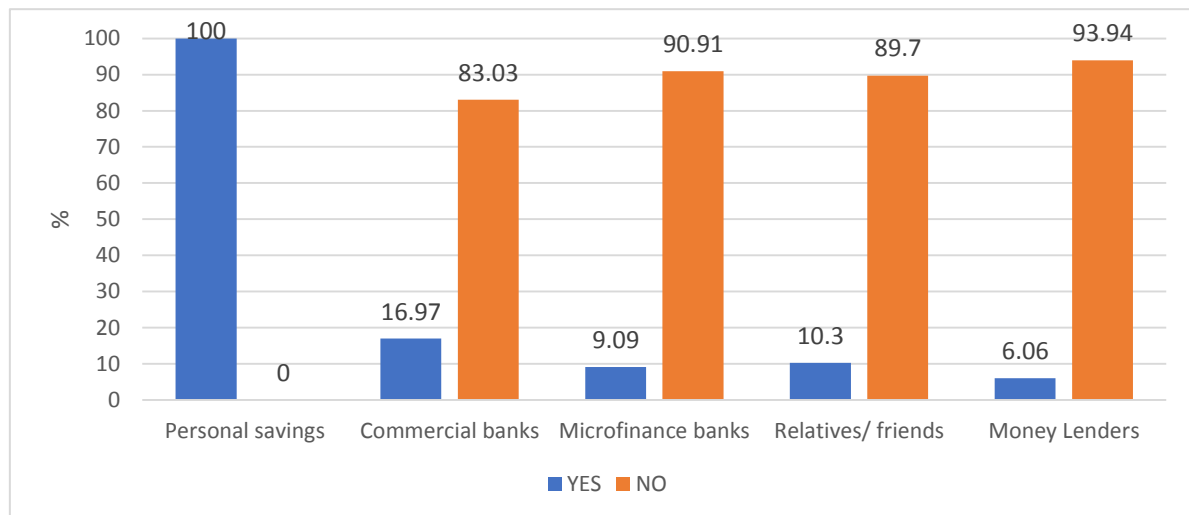
TABLE 8: INPUT SOURCES OF RESPONDENTS

	Yes		No	
	Freq	%	Freq	%
Source of seedlings				
Fellow farmers	88	53.33	77	46.67
Open market	33	20.00	132	80.00
NIFOR	102	61.82	63	38.18
ADP	43	26.06	122	73.94
Source of labour				
Self	106	64.24	59	35.76
Family	122	73.94	43	26.06
Hired	165	100.00	0	.00
Source of land				
Inherited	111	67.27	54	32.73
Purchased	10	6.06	155	93.94
Leased/rented	11	6.67	154	93.33
Family owned	40	24.24	125	75.76
Community-owned	5	3.03	160	96.97

Source: Field Survey (2022)

Hired labour was the main source of labour for all (100 %) of the respondents in the study area. In addition, a high proportion (73.94 % and 64.24 %) of the respondents used family and self-labour respectively. The source of land for most of the respondents was inherited (67.27 %) and family-owned lands (24.24 %) which suggests little financial investment in the purchase of land for oil palm farming.

The source of finance for virtually all (100 %) of the respondents was their personal savings (Figure 4). However, commercial banks, relatives/friends, microfinance banks and money lenders were other sources representing a proportion of 16.97 %, 10.3 %, 9.09 % and 6.06 % respectively. The fact that personal savings constitute the major source of funds for the respondents suggests that their level of investment in the oil palm business might be low. It equally shows that the formal financial sector plays little role in oil palm development in the study area.

Figure 4: Sources of Finance

Source: Field Survey (2022)

4.11 Policy Impact Assessment (Oil Palm Farmers)

The sub-section assessed the impact of the policy on the farm size and yield of oil palm producers (farmers),

4.11.1 Farm Size

Table 9 shows that in 2015, most (50.91 %) of the respondents in the study area cultivated 6 hectares and below, 43.64 % cultivated 6.1-10 hectares while only 5.45 % cultivated on a medium scale which is 10.1-50 hectares. In 2019, most (49.7 %) of the respondents cultivated 6.1-10 hectares, 44.85 % cultivated 6 hectares and below while only 5.45 % cultivated on a medium scale of 10.1-50 hectares. The average farm size cultivated by oil palm farmers in 2015 and 2022 were 6.65 ha and 6.96 ha respectively. This shows that there is an increase in the farm size cultivated by respondents after the policy was introduced. However, the farmers in the study locale were still farming below the medium-scale category of production.

TABLE 9: POLICY IMPACT ON FARM HOLDINGS

Farm size (ha)	2015			2022		
	Freq	%	Mean	Freq	%	Mean
6 & below	84	50.91		74	44.85	
6.1- 10	72	43.64		82	49.7	
10.1-50.0 (Medium scale)	9	5.45		9	5.45	
50 & above (Large scale)	0	0		0	0	
Total	165	100	6.65	165	100	6.96

Source: Field Survey (2022)

4.11.2 Farm (Oil Palm) Yield

The result (Table 10) reveals that in 2015, the majority (30.91 %) of the respondents in the study area obtained a yield of 20.01-30.00 MT. Others, 29.09 %, 23.03 % and 16.36 % of the respondents in 2015 recorded a yield of 10.01-20.00 MT, 10.00 MT and below and 30.01-40.00 MT respectively. In that same year (2015), the highest yield was between 40.01-50.00 MT and was achieved by only about 0.61 % of the respondents. In the year 2019, 27.27 % and 23.03 % of the respondents revealed that they obtained output of about 20.01-30.00MT and 30.01-40.00MT respectively. Other respondents, 20 %, 14.55 % and 9.09 %, got an output of about 40.01-50.00MT, 10.01-20.00MT and below 10.00MT, respectively. The highest yield recorded for the year 2022 by respondents (6.06 %) in the study area was 50.01MT and above.

TABLE 10: POLICY IMPACT ON FARM YIELD

Yield (mt)	2015			2022		
	Freq	%	Mean	Freq	%	Mean
<= 10.00	38	23.03		15	9.09	
10.01 - 20.00	48	29.09		24	14.55	
20.01 - 30.00	51	30.91		45	27.27	
30.01 - 40.00	27	16.36		38	23.03	
40.01 - 50.00	1	0.61		33	20	
50.01+	0	0		10	6.06	
Total	165	100	19.17	165	100	29.87

Source: Field Survey (2022)

The average yield obtained by the respondents in the study area for the years (2015 and 2022) under the survey was 19.17 MT and 29.87 MT respectively. This suggests an increase in the output of locale oil palm producers/farmers in Edo State after the introduction of the policy, which may indicate the positive influence of the policy on oil palm yield.

4.12 Policy Impact on the Income of Producers

This section reports the findings on the possible impact of the Nigeria agriculture promotion policy in increasing the income of smallholder oil palm value-chain actors in the area.

4.12.1 Income of oil palm producers

The result of the impacts of the policy on the revenue of oil palm farmers in the area studied is shown in Table 11. The result indicates that in 2015, the majority (38.79 %) of the respondents made about ₦ 250,001- ₦ 500,000 from their oil palm farm. Others, 30.91 %, 26.67 % and 3.64 % of the respondents, realized ₦ 500,001 - ₦ 750,000, ₦ 250,00 and below and ₦ 750,001 - ₦ 1,000,000 respectively. In 2022, majority (35.15 %) of the respondent made ₦ 500,001 - ₦ 750,000; others, 26.67 %, 18.18 % and 13.94 % of the respondents, made ₦ 750,001- ₦ 1,000,000, ₦ 250,001- ₦ 500,000 and ₦ 250,000 and below respectively.

The average income obtained by respondents in 2015 and 2022 were ₦ 383,314.39 and ₦ 597,392.17 respectively. This shows an increase in the income of the oil palm farmers, suggesting the positive effect of the agricultural promotion policy since it was introduced.

TABLE 11: POLICY IMPACT ON INCOME

Income (N)	2015			2022		
	Freq	%	Mean	Freq	%	Mean
250,000 & below	44	26.67		23	13.94	
250,001-500,000	64	38.79		30	18.18	
500,001-750,000	51	30.91		58	35.15	
750,001-1,000,000	6	3.64		44	26.67	
>1 million	0	0		10	6.06	
Total	165	100	383,314.39	165	100	597,392.17

Source: Field Survey (2022)

4.13 Technology Adoption

This sub-section addresses objective three, focusing on the descriptive impact of the agriculture promotion policy on facilitating increases in the adoption of production and processing technologies supported under the policy.

4.13.1 Technology Adoption among oil palm farmers

Table 12 shows the technologies that were adopted by farmers in the study location before the enactment of the Agricultural Promotion Policy i.e., 2015 and after the policy was introduced (i.e. 2022). The findings revealed that the use of improved oil palm variety (tenera) was adopted by only 43.03 % of the respondents while 85.45 % adopted it in 2019. In 2015, 40.61 % of the respondents adopted the 9m triangular arrangement while 73.33 % adopted it in 2019. In 2015, only 40 % of the respondents adopted the 7.62 m between rows while 69.7 % adopted it in 2022.

TABLE 12: TECHNOLOGIES ADOPTED BY RESPONDENTS

	2015				2022			
	Yes*		No		Yes*		No	
	Freq	%	Freq	%	Freq	%	Freq	%
Use of improved variety(tenera)	71	43.03	94	56.97	141	85.45	24	14.55
Inter Row Spacing for food crops 2-3m	66	40	99	60	134	81.21	31	18.79
Recommended herbicide	89	53.94	76	46.06	133	80.61	32	19.39
Recommended fertilizer application using organic or inorganic fertilizers	92	55.76	73	44.24	127	76.97	38	23.03
Mulching of oil palm using vegetative or dust mulch or black polythene film	69	41.82	96	58.18	123	74.55	42	25.45
Pruning/removal of dead or diseased leaves	83	50.3	82	49.7	123	74.55	42	25.45
9m in triangular Arrangement	67	40.61	98	59.39	121	73.33	44	26.67
Slashing of the plantation at least twice a year	60	36.36	105	63.64	121	73.33	44	26.67
7.62m Between the Rows	66	40	99	60	115	69.7	50	30.3
Harvesting using a harvesting pole, chisel knife	75	45.45	90	54.55	113	68.48	52	31.52
Weed control by Planting of cover crops	88	53.33	77	46.67	108	65.45	57	34.55
Use of Nursery Polythene Bags	54	32.73	111	67.27	96	58.18	69	41.82
Practice nursery (either Single or double-stage nursery)	36	21.82	129	78.18	71	43.03	94	56.97
Insecticide application	39	23.64	126	76.36	70	42.42	95	57.58

**Multiple responses, hence total exceeds the sample size*

Source: Field Survey (2022)

The inter-row spacing for food crops 2-3 m was adopted by 40 % and 81.21 % of the respondents in 2015 and 2022 respectively. The use of polythene bags was adopted by 32.73 % and 58.18 % of the respondents in 2015 and 2022 respectively. The practice of nursery (either single or double-stage nursery) was adopted by 21.82 % and 43.03 % of respondents in 2015 and 2022 respectively. Mulching of oil palm using vegetative or dust mulch or black polythene film was adopted by 41.82 % and 74.55 % of the respondents in 2015 and 2022 respectively. The use of insecticide was adopted by 23.64 % and 42.42 % in 2015 and 2022 respectively. Recommended fertilizer applications using organic and inorganic fertilizers were adopted by 55.76 % and 76.97 % of the respondents in 2015 and 2022 respectively. 53.76 % and 80.61 % of the respondents adopted the use of recommended herbicide in 2015 and 2022 respectively. The use of harvesting poles and chisel knives during harvesting was adopted by 45.45 % and 68.48 % of the respondents in 2015 and 2022 respectively. Weed control by the planting of cover crops was adopted by 53.33 % and 65.45 % of the respondents in 2015 and 2022 respectively. Pruning/removal of dead or diseased leaves was adopted by 50.3 % and 74.55 % of the respondents in 2015 and 2022 respectively. Slashing of the plantation at least twice a year was adopted by 36.36 % and 73.33 % of the respondents in 2015 and 2022 respectively.

The result also shows that the average numbers of technologies adopted in the study area by respondents in the year 2015 were 6 while 10 technologies were adopted in 2022. This shows that there is a rise in the number of technologies employed by oil palm farmers in the area under the agricultural promotion policy.

4.14 Production Constraints Faced by Farmers

The challenges the farmers faced are shown in Table 13. The result reveals that inadequate capital (mean = 3.44) and seasonal variability (mean = 3.35) were regarded as the most serious constraints by respondents in the study area. Other constraints, such as high cost of fertilizer (mean = 2.98), lack of government policy support (mean = 2.98), limited land (mean = 2.96), high cost of fertilizers (mean = 2.89) and limited access to credit (mean = 2.77) were equally serious. Also, high cost of labour (mean = 2.69), poor pricing of FFB (mean = 2.62), limited knowledge of oil palm technologies (mean = 2.59), poor fertility of the soil (mean = 2.56), non-availability of agrochemicals (mean = 2.54) and pest and disease (mean = 2.51) were serious constraints affecting oil palm farmers under the Agricultural Promotion Policy. However, the high price of oil palm seedlings (mean = 2.43), transportation challenge (mean = 2.12), produce theft (mean = 2.08) and non-availability of improved seedlings (mean = 1.81) were not regarded as serious by the respondents. The results suggest oil palm farmers are confronted with several challenges, and these might affect their level of productivity.

TABLE 13: PRODUCTION CONSTRAINTS

Constraints	Very serious		Serious		Little serious		Not serious		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Mean*	SD
Inadequate capital	112	67.88	25	15.15	17	10.30	11	6.67	3.44	.93
Seasonal variability	93	56.36	46	27.88	16	9.70	10	6.06	3.35	.89
High cost of fertilizer	45	27.27	88	53.33	15	9.09	17	10.30	2.98	.88
lack of Govt policy support	86	52.12	26	15.76	17	10.30	36	21.82	2.98	1.23
Limited land (land tenure)	77	46.67	31	18.79	30	18.18	27	16.36	2.96	1.14
High cost of herbicides	82	49.70	21	12.73	24	14.55	38	23.03	2.89	1.25
Limited access to credit	67	40.61	28	16.97	35	21.21	35	21.21	2.77	1.19
High labour cost	35	21.21	75	45.45	24	14.55	31	18.79	2.69	1.01
Poor pricing of FFB	55	33.33	43	26.06	17	10.30	50	30.30	2.62	1.23
Limited knowledge of oil palm technologies	54	32.73	42	25.45	17	10.30	52	31.52	2.59	1.24
Poor fertility of soil	55	33.33	32	19.39	29	17.58	49	29.70	2.56	1.23
Non-availability of agrochemicals	52	31.52	29	17.58	40	24.24	44	26.67	2.54	1.19
Pest & diseases	57	34.55	23	13.94	32	19.39	53	32.12	2.51	1.26
High price of oil palm seedlings	47	28.48	31	18.79	33	20.00	54	32.73	2.43	1.22
Transportation challenge	22	13.33	28	16.97	62	37.58	53	32.12	2.12	1.01
Produce theft	22	13.33	28	16.97	56	33.94	59	35.76	2.08	1.03
Non-availability of improved seedlings	0	.00	28	16.97	78	47.27	59	35.76	1.81	.70

*Serious (mean > 2.50)

Source: Field Survey (2022)

4.14.1 Key Informants Response

Other categories of respondents as key informants were interviewed to elicit responses on the issues under study, particularly the challenges facing the oil palm sector. The key informants were from key institutions and individuals who are key players or have a stake in the oil palm sector in Edo state. Two key institutions interacted with are NIFOR (Nigeria Institute for Oil Palm Research) and Edo State ADP (Agricultural Development Project). Also, the machine fabricator was interviewed.

In addition to the challenges reported by oil palm farmers, processors, and marketers, milling machine fabricators interviewed reported that they have not felt any impact of the government on their business. Important challenges noted as impeding them included the high cost of electricity, lack of policy support, high cost of construction materials, lack of machine fabricator tools, lack of training for fabricators and low patronage of local equipment. These challenges can be seen as an area where they need intervention. It will be advantageous to small-scale palm oil processors if they can afford the locally fabricated machines as one of the challenges revealed by oil palm processors was the high cost of processing machines.

The study also sought to identify institutional challenges to oil palm development. Key informants from NIFOR reported that inadequate funding, power supply, personnel and material resources were the major challenge in developing oil palm technologies in the institute. He further explained that the institute equally is hampered in the effective dissemination of the technologies developed; specifically, challenges highlighted were inadequate funding, market competition from sources selling sub-standard materials to farmers and lack of awareness of farmers. He expatiated that most farmers don't believe in the efficacy of improved technologies, preferring their old oil palm production practices.

In the same vein, another key informant from Edo State ADP lamented the lacklustre attention of the government towards the oil palm sector. He further noted that value chain actors such as farmers, processors and millers all faced financial constraints, which limits their level of investment considering the high cost of some of the inputs such as chemicals and seedlings. To this end, he recommended that for farmers to feel the impact of the agricultural promotion policy, the government should provide an interest-free loan to farmers, farmers to form cooperative groups, and the cost of materials/produce should be subsidized by the government.

Another key informant from the Edo State ADP identified the age of the plantation as a serious limitation to the output of farmers. Many of the plantations were reported to be old, and as such generally records declining yields over time. The informant, consequently, recommended

that the government should fund the establishment of new oil palm plantations and oil mills while also calling for the recruitment and training of personnel in the oil palm research institute.

4.15 Test of Hypotheses

T-test was employed in the test of the hypotheses. This section presents and discusses the results.

The following null hypotheses were tested:

Extension services and input support provided under the agriculture promotion policy have not significantly influenced the yield/production parameters of smallholder oil palm farmers in Edo State

4.15.1 Test of difference in Income of value chain actors

4.15.1.1 Impact of Policy on Farmers' Income (T-Test)

The impact of APP on the income derived by oil palm farmers is presented in Table 14. The average revenue of the respondents for 2015, before the introduction of the policy, was ₦383,314.39 while ₦597,392.17 was recorded for 2022. The difference in income between the two time periods was ₦214,077.78. The test result (t value = 17.23) shows that the difference was significant since the calculated t value (17.23) is greater than the tabulated t value at 5% (1.97). This implies that the introduction of the policy had significantly led to an increase in the income of smallholder oil palm farmers in Edo state.

TABLE 14: IMPACT OF POLICY ON FARM INCOME (T-TEST)

Year	Income/ha (naira)	SD	Difference	t value	prob. Level	Decision
2015	383,314.39	209,141.05	214,077.78	17.23	p < 0.01	Significant
2022	597,392.17	276,628.19				

Source: Field Survey (2022)

4.15.1.2 Test of difference in the adoption of oil palm technologies by farmers since the enactment of the Agricultural Promotion Policy

T-test was utilised to test the hypothesis that states that 'There is no significant difference in the adoption of oil palm technologies by the value chain actors (producers). For oil palm producers, the impact of the agriculture promotion policy on the number of technologies adopted among farmers is presented in Table 15. The test result was significant (p < 0.01) since the calculated t-value (27.23) is greater than the tabulated t-value (1.97). The null hypothesis is therefore rejected. The result shows that the average number of technologies adopted by farmers before (2015) and after (2022) the introduction of the APP was 6 and 10 respectively. T-test was employed to test if the difference of 4 was significant, indicating that a significant difference exists in the number of adopted technologies before and after the introduction of the agricultural promotion policy. This implies that the agricultural promotion policy has positively and significantly impacted the number of technologies adopted by oil palm farmers in Edo state.

TABLE 15: IMPACT OF POLICY ON ADOPTION OF FARM INNOVATIONS (T-TEST)

Year	No. of technologies adopted (Mean)	SD	Difference	t value	prob. Level	Decision
2015	5.8	1.98	3.9	27.23	p < 0.01	Significant
2019	9.7	1.75				

Source: Field Survey (2022)

4.15.2 Test of difference in the yield/production parameters of oil palm value chain actors since the enactment of the agriculture promotion policy

4.15.2.1 Impact of policy on farm size of producers (T-Test)

T-test was used to test the impact of the agriculture promotion policy on the farm size of oil palm farmers in Edo State. The result (Table 16) shows that the average farm size of respondents was 6.65 ha and 6.96 ha in 2015 and 2022, respectively. The difference of 0.31 ha suggests a positive effect of the policy on farm holdings devoted to oil palm processing in the study locale; however, the result (or difference) was not significant since the calculated t-test value (1.01) is less than the tabulated t statistic at the 5 % level (1.97). This implies that there has been an increase in the size of farms devoted to oil palm production even though the increase was not statistically significant.

TABLE 16: IMPACT OF POLICY ON FARM SIZE (T-TEST)

Year	Farm size (ha) Mean	SD	Difference	t value	prob. Level	Decision
2015	6.65	6.13	0.31	1.01	p > 0.10	Not Significant
2022	6.96	6.06				

Source: Field Survey (2022)

4.15.2.2 Impact of Policy on oil palm yield (T-Test)

The impact of APP on the yield of oil palm farmers in Edo state was tested using T-test, and the result is shown in Table 17. The average yield of oil palm farmers in 2015, before the introduction of the Agricultural Promotion Policy, was 19.17 MT while the value for 2022 was 29.87 MT. The test result shows that the difference in yield (i.e., 10.7 MT) was significant for oil palm farmers for the two-time period surveyed ($t = 17.23$; $P < 0.05$). This finding implies that the introduction of the agricultural promotion policy has significantly impacted the yield of oil palm farmers in Edo state based on the increase in the yield of the farmers.

TABLE 17: IMPACT OF POLICY ON YIELD (T-TEST)

Year	Yield (mt) Mean	SD	Difference	t value	prob. Level	Decision
2015	19.17	10.46	10.70	17.23	$p < 0.01$	Significant
2022	29.87	13.83				

Source: Field Survey (2022)

5. Conclusion and Recommendations

This study investigated the impact of Nigeria's agriculture promotion policy on the productivity of smallholder oil palm farmers in Edo State. The specific objectives addressed in this study included: the socio-economic characteristics of oil palm farmers in the study location; establishing the impact of the agricultural promotion policy on the yield, income and adoption behaviour of the farmers; and identifying serious constraints faced by small-holder oil palm farmers under the agriculture promotion policy.

The major findings of this study in line with the stated objectives are noted below:

- Oil palm production in the study area is a male-dominated enterprise (81.21 %). Women's participation in oil palm cultivation was low, largely because of the high labour demand associated with the enterprise as well as their limited access to finance.
- A larger percentage (67.88 %) of the respondents do not own an oil mill hence most oil palm farmers in the study locale either sell their harvested fresh fruit bunches (FFB) or take them to the mill themselves to process which incurs an additional cost in their production chain.
- Most respondents (69.09 %) do not belong to any oil palm producer association. The non-existence of such associations, ignorance of their existence where they exist, and lack of interest were identified as reasons for non-membership.
- The producers' client/customer base consisted of palm oil millers/processors and traders. The sales transaction is based on cash-n-carry.
- On sources of input, most of the respondents (61.82 %) got their seedlings from NIFOR and finances are nearly 100 % from personal savings, relatives and friends. Labour is majorly from hired labour (73.94 %) and self-labour (64.24 %) respectively while inherited land (67.27 %) was the major source of land for oil palm production.
- An increase in the average size of plantations from 6.65 ha in 2015 to 6.96 ha in 2019 was recorded, suggestive of the positive impact of the Agricultural Promotion policy on plantation size.
- Overall, the study noted a significant ($t = 3.88$; $P < 0.05$) increase in the average number of oil palm technologies adopted in the study locale from 6 to 10 between 2015 and 2019, indicative of the positive impact of the promotion policy in facilitating adoption behaviour of farmers in the area.
- Increased yield was also noticed after the implementation of the policy. The average yield obtained by the respondents in

the area increased from 19.17 MT in 2015 to 29.87 MT in 2019. The increase was determined to be significant ($t = 10.7$; $P < 0.05$).

- Also, the average income obtained by respondents rose from N383,314.39 in 2015 to N597,392.17 in 2019. This suggests the positive impact of the agriculture promotion policy on the yield of the farmers. The increase was determined to be significant at the 5% level ($t = 17.23$; $P < 0.05$).
- Oil palm processing in the area was faced with several serious constraints, the most serious being inadequate capital (mean = 3.44) and seasonal variability (mean = 3.35) high cost of fertilizer (mean = 2.98), lack of government policy support (mean = 2.98), limited land (mean = 2.96), and limited access to credit (mean = 2.77).

5.1 Recommendations

Based on these research findings, the following suggestions are proposed:

- The producer's low awareness of modern harvesting technologies can be a point of intervention for extension communication. Thus, to improve their awareness of the recommended production technologies, the extension service should promote knowledge sharing with reference to mechanical adjustable harvesters and other modern harvesting methods.
- The farmers should be exposed to regular training or skill development programmes on improved oil palm plantation management practices, especially nursery management, fertilizer application and improved harvesting methods.
- The farmers should be linked to credit institutions especially the newly CBN-established NIRSAL Microfinance Banks where CBN's N200 billion oil palm intervention fund is domiciled to enhance increased production and processing of oil palm products.
- Actors along the oil palm value chain should be sensitized to the inherent benefits of social associations (forming cooperatives) as a vehicle for attracting policymakers' attention and productivity enhancement support.
- Promote awareness of NIFOR SSPE among processors/millers, through sponsored seminars and exhibitions for practical demonstrations of the SSPE to processors/millers and fabricators.
- Expansion of market linkages solution at the macro level through the promotion of Micro, Small and Mediums enterprises that foster profitable business interactions between inputs suppliers, producers, processors, marketers and other actors along the oil palm value chains.

5.2 Recommendation for Future Research

This paper suggests conducting a study to assess how the Agriculture Policy (APP) affects the earnings of oil palm farmers in other Nigeria's oil palm-growing areas. These investigations should also consider the different incentives provided under the APP, which are designed to boost both the production of oil palm and the palm oil processing activities of smallholder participants.

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