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Analysis of Gender Involvement in Oil Palm Fruit Processing in Imo State, Nigeria

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Abstract
The study analyzed gender involvement in oil palm fruit processing in Imo State, Nigeria. The study specifically identified the methods used by men and women in the processing of oil palm fruits, ascertained the level of involvement of men and women in oil palm fruit processing and examined the constraints faced by men and women in oil palm fruit processing in the study area. Multi-stage sampling procedure was adopted in selecting 240 respondents comprising 120 men and 120 women oil palm fruit processors for the study. Primary data were used for this study. Data were collected with the use of structured questionnaire and analyzed with the use of both descriptive (frequency, percentage and mean) and inferential statistics (Z-test). The results revealed that semi-modern (52.50%) method was the major method used by men in the processing of oil palm fruits in Imo State. It also revealed that semi-modern (60.00%) method was the major method used by women in the processing of oil palm fruits in the study area. The results also showed that men ($\bar{x}$ = 2.45) and women ($\bar{x}$ = 2.76) were highly involved in oil palm fruits processing activities in the study area. Unavailability of improved technology and equipment ($\bar{x}$ = 2.27), poor access to improved seedlings ($\bar{x}$ = 2.26), inadequate land ($\bar{x}$ = 2.21) and distance to processing mills ($\bar{x}$ = 2.19) were the serious constraints faced by men in oil palm fruit processing in Imo State. Unavailability of improved technology and equipment ($\bar{x}$ = 2.43), inadequate land ($\bar{x}$ = 2.41), poor access to improved seedlings ($\bar{x}$ = 2.35) and distance to processing mills ($\bar{x}$ = 2.16) were serious constraints faced by women. The Z–test result revealed a significant difference in the level of involvement of men and women in oil palm fruit processing at 5% level of probability. The study concluded that both men and women were highly involved in oil palm fruit processing in the study area. The study therefore recommended that the state government gears up efforts in providing processing mills and modern, efficient processing equipment which would further enhance men and women involvement in oil palm fruit processing in the study area.
Keywords: Gender, Oil palm fruit, processing, Imo State

Introduction

Oil palm (*Elaeis guineensis*) is one of the most economically significant oil crops to have been cultivated in Nigeria (Adeomi and Fadoju, 2023). The high demand for palm oil is making oil palm cultivation become a means of livelihood for many rural families, and indeed the farming culture of millions of people in Southeast Nigeria, Imo State inclusive (Onu, Ekwe and Onuekwusi, 2021). In Nigeria, oil palm serves as a crucial livelihood resource for many rural families, particularly smallholder farmers who cultivate it as a communal cash crop (Abushe, Ikenga, Umehai, Emenim, Ototoh and Ofuoku, 2025).

In Nigeria, oil palm fruit processing is an economically significant activity, particularly in Southern Nigeria. Oil palm fruit processing is defined as a process by which palm fruits are processed into palm oil through threshing or stripping, milling and digestion, pressing and clarification (Onu *et al.,* 2021). Oil palm fruit processing involves harvesting, threshing or bunch quartering, fruit loosening, boiling, digestion, pressing/oil extraction, clarification and packaging/storage (Adeomi and Fadoju, 2023). Oyeronke and Adedotun (2019) stated that oil palm fruits can be processed by using the traditional method or industrial method. Traditionally, the process of producing palm oil involves distinct gender roles with women primarily responsible for tasks such as carrying harvested bunches and processing while men typically engage in activities related to land preparation and maintenance and harvesting of bunches (Abushe *et al.,* 2025). Onu, Ekwe and Nwachukwu (2021) also reported that oil palm fruit processing is mostly carried out by women under manual and subsistence methods in Southeast Nigeria, Imo State inclusive.

Empirically, the traditional method of oil palm processing is very tedious and labourious compared to mechanical methods and requires a substantial proportion of labour force. Similarly, Nwandu, Ike, Okonye and Onwuaroh (2021) noted that traditional oil palm processing is labour-intensive and involves the following activities; threshing, picking, parboiling, digestion, extraction and separation and these result in the production of low-quality palm oil with a high proportion of free fatty acid (FFA) contents and a large quantity of dirt and water. This suggests the need for the increased involvement of men and women in oil processing activities in order to increase palm oil output to bridge the demand-supply gap. However, the level of involvement of men and women in oil palm fruit in Imo State has not been extensively studied. However, despite oil palm processing being a major economic activity of rural households in Imo State, Adam (2018) opined that men and women involvement in agricultural activities is still a challenge due to the disparity in access to agricultural resources by both men and women notwithstanding the equal roles they play in agricultural activities.

Similarly, Esu and Akam (2023) noted that unequal access to resources by men and women results in different levels of their involvement in the production, processing and marketing of high-rated crops such as oil palm. Onu *et al.* (2021) further reported that rural households in Imo State faced constraints such as lack of modern processing equipment, lack of infrastructure, high cost of labour and difficulty in obtaining credit facilities in oil palm processing. Obviously, oil palm fruit processing activities are dominated by smallholders located in the rural communities of Imo State. These smallholders account for the greater percentage of palm produce output in the State but their output cannot even satisfy local demands both quantitatively and qualitatively (Onu *et al.,* 2021). Onyinyechukwu (2023) noted that gender inequality in access to land and other farm inputs has been identified as one of the causes of the declining productivity in agriculture in various parts of Nigeria, Imo State inclusive. Chakma, Ruba, Senthi and Rahman (2021) also reported that women have limited access to resources such as land, capital, input, technology, training, and marketing facilities as well as farm machinery, and transport equipment. These could have huge implications for the level of involvement of men and women in oil palm fruit processing in the study area. Onu *et al.* (2021) noted that the scarcity of gender-disaggregated data was the biggest constraint to the effective recognition of the roles and levels of involvement of men and women in agro-enterprises. It is against this backdrop that the study sought to empirically analyze men and women involvement in oil palm fruit processing in Imo State.

The broad objective of this study was to analyze men and women's involvement in oil palm fruit processing in Imo State. The specific objectives include the following: identify the methods used by men and women in the processing of oil palm fruits; ascertain the level of involvement of men and women in oil palm fruit processing and examine the constraints faced by men and women in oil palm fruit processing in the study area. It is hypothesized that, there is no significant difference in the level of involvement of men and women in oil palm fruit processing in the study area.

Methodology

The study was carried out in Imo State. Imo State is one of the Southeastern States of Nigeria. The State is subdivided into 27 Local Government Areas (LGAs). The State has a population of 4.6 million persons

with women constituting about 2.7 million (National Bureau of Statistics, 2017). The major crops cultivated include cassava, yam, maize, cocoyam, plantain, banana, oil palm, melon and vegetables. The animals reared include pigs, poultry, sheep, goats, rabbits, snails and apiculture (Mgbada, Ohajianya, Nzeh, Unaeze, Nwibo and Nwachukwu, 2021). Agriculture in the State is practiced by both men and women.

Multistage sampling procedure was adopted for the study. In the first stage, the three (3) agricultural zones (Okigwe, Orlu and Owerri) that make up Imo State were selected. In the second stage, two Local government areas (LGAs) were purposively selected from each of the three zones making a total of six LGAs. The purposive selection was based on the intensity of oil palm processing activities and the presence of oil processing mills. In the third stage, two communities were randomly selected from each of the six LGAs making it a total of twelve (12) communities. In the final stage, simple random sampling technique was used to select ten (10) men oil palm processors and ten (10) women oil palm processors respectively from each of the 12 (twelve) selected communities, which gave a grand total of one hundred and twenty (120) men oil palm processors and one hundred and twenty (120) women oil palm processors for the study. Primary data were obtained with the aid of structured questionnaire, and analyzed using descriptive and inferential statistics such as frequency, percentages, means and Z-test.

Model Specification

To identify the methods used by men and women in the processing of oil palm fruits, the simple descriptive statistical tools such as frequency distributions, means and percentages were used in realizing this objective. To ascertain the level of involvement of men and women in oil palm fruit processing, mean score was used. The rating scores were assigned as follows: Not involved = 1; occasionally involved = 2; always involved = 3. The options were quantified as 1, 2 and 3. The mean of 1, 2 and 3 equals 2.0 i.e. 1+2+3/3 = 2.0. For the purpose of decision making, any mean score response $\geq$ 2.0 was adjudged to be a high level of involvement in oil palm fruit processing, while a mean score that is < 2.0 was adjudged to be a low level of involvement in oil palm fruit processing in the study area.

To examine the constraints faced by men and women in oil palm fruit processing in the study area, the three (3) point rating scale of: very serious = 3, serious = 2, not serious = 1 was used. In using the 3-point rating scale, a mid-point was obtained by adding 3, 2 and 1 which gave 6 and when divided by 3 gave a mean score of 2.0. For the purpose of decision making, any mean score response $\geq$ 2.0 was adjudged to be a serious constraint, while a mean score that is < 2.0 was adjudged not to be a serious constraint faced by men and women in oil palm fruit processing in the study area.

The hypothesis testing for significant difference in the level of involvement of men and women in oil palm fruit processing in the study area was estimated using Z-test.

Results and Discussion

Methods used by men and women in the processing of oil palm fruits

The methods used by men and women in the processing of oil palm fruits is presented in Table 1. The result in Table 1 revealed that semi-modern (52.50%) method was the major methods used by men in the processing of oil palm fruits in Imo State. It also revealed that semi-modern (60.00%) method was the major method used by women in the processing of oil palm fruits in the study area. This finding implies that men and women predominantly used the semi-modern method in the processing of oil palm fruits in the study area. The reason for the predominant use of semi-modern method may be attributed to the ease of use and the efficiency of the method of processing. This finding is in agreement with Bankole (2022) who reported that most (78.5% and 87.9%) of men and women processors respectively used semi-modern method of processing. This category of processors made use of one or two of the modern processing techniques (men-38.33%, women-29.17%) to complete the processing of oil palm fruits.

Table 1: Methods used by men and women in the processing of oil palm fruits

Methods of oil palm processing	Men		Women	
	Frequency (n = 120)	Percentage (%)	Frequency (n = 120)	Percentage (%)
Traditional	11	9.17	13	10.83
Semi-modern	63	52.50	72	60.00
Modern	46	38.33	35	29.17

Source: Field survey, 2019

Level of involvement of men and women in oil palm fruit processing in the study area

Level of involvement of men and women in oil palm fruit processing in the study area is presented in Table 2. The results revealed that men were highly involved in pulp processing/extraction ($\bar{x}$ = 2.73), followed by fruit digestion ($\bar{x}$ = 2.68), stripping ($\bar{x}$ = 2.63), storage of palm oil ($\bar{x}$ = 2.60) and oil clarification/drying ($\bar{x}$ = 2.52). The result also revealed that women were highly involved in storage of palm oil ($\bar{x}$ = 2.96), followed by sterilization ($\bar{x}$ = 2.93), picking/removal from spikelet ($\bar{x}$ = 2.87), nuts/fibre separation ($\bar{x}$ = 2.84), oil clarification/drying ($\bar{x}$ = 2.79), pulp processing/extraction ($\bar{x}$ = 2.63), fruit digestion ($\bar{x}$ = 2.56) and stripping ($\bar{x}$ = 2.51). This implies that men and women were highly involved in oil palm fruits processing in Imo State. However, there was a higher involvement of women ($\bar{x}$ = 2.76) than men ($\bar{x}$ = 2.45) in the study area. The high involvement of men and women in oil palm fruits processing could be attributed to the fact that rural households perceived oil palm processing activities as major sources of livelihood in the study area. This finding is in consonance with Ajaero, Umunakwe and Anele (2021) who reported that the majority (41.4%) of sampled women in Imo State were actively involved in oil palm processing at various stages, and perceived oil palm processing as a source of income and employment. The result also agrees with Adejo *et al.* (2023) who reported that women (62.5%) and men (37.5%) were involved in oil palm processing in Kogi State.

Table 2: Ascertain the level of involvement of men and women in oil palm fruit processing in the study area

Oil palm processing activities	Men (n = 120)			Mean	Women (n = 120)			Mean
	3	2	1		3	2	1	
Stripping	81(67.5)	34(28.3)	5(4.2)	2.63	78(65.0)	25(20.8)	17(14.2)	2.51
Picking/removal from spikelet	44(36.7)	38(31.7)	38(31.7)	2.05	110(91.7)	4(3.3)	6(5.0)	2.87
Sterilization	51(42.5)	43(35.8)	26(21.7)	2.21	113(94.2)	5(4.2)	2(1.7)	2.93
Fruit digestion	88(73.3)	25(20.8)	7(5.8)	2.68	83(69.2)	21(17.5)	16(13.3)	2.56
Pulp processing/extraction	92(76.7)	24(20.0)	4(3.3)	2.73	79(65.8)	38(31.7)	3(2.5)	2.63
Oil Clarification/drying	79(65.8)	24(20.0)	17(14.2)	2.52	98(81.7)	19(15.8)	3(2.5)	2.79
Nuts/Fibre separation	48(40.0)	49(40.8)	23(19.2)	2.21	107(89.2)	7(5.8)	6(5.0)	2.84
Storage of palm oil	78(65.0)	36(30.0)	6(5.0)	2.60	116(96.7)	3(2.5)	1(0.8)	2.96
Grand Mean				**2.45**				**2.76**

Source: Field survey, 2019 Note: < 2.0 = low involvement; $\bar{x}$ ≥ 2.0 = high involvement; figures in parentheses are percentages

Constraints faced by men and women in oil palm fruit processing in the study area.

Constraints faced by men and women in oil palm fruit processing in the study area is presented in Table 3. Table 3 showed that unavailability of improved technology and equipment ($\bar{x}$ = 2.27), followed by poor access to improved seedlings ($\bar{x}$ = 2.26), inadequate land ($\bar{x}$ = 2.21) and distance to processing mills ($\bar{x}$ = 2.19) were the serious constraints faced by men in oil palm fruit processing in Imo State, while unavailability of improved technology and equipment ($\bar{x}$ = 2.43), inadequate land ($\bar{x}$ = 2.41), poor access to improved seedlings ($\bar{x}$ = 2.35) and distance to processing mills ($\bar{x}$ = 2.16) were serious constraints faced by women in oil palm fruit processing in the study area. This implies that unavailability of improved technology and equipment, poor access to improved seedlings, inadequate land and distance to processing mills were serious constraints faced by men and women in oil palm fruit processing in Imo State. Oil palm fruit processors in the study areas may lack the required capital to afford improved technology and equipment needed for oil palm fruit processing. On the overall, the Grand Mean scores of 1.88 and 1.92 for men and women respectively reveal that women palm fruit processors were faced with more constraints than men. This finding is similar to that of Onu *et al.* (2021) who reported that high cost of labour (88.9%), lack of infrastructure (82.2%), lack of modern processing equipment (80.0%) and difficulty in obtaining credit facilities (71.7%) were major constraints to rural household engagement in processing of oil palm produce in Imo State. This finding also agrees with Alabi, Famakinwa and Akinnawonu (2020) who noted that lack of funds, poor processing facilities and transportation problems constitute the major challenges facing the oil palm industry in Nigeria.

Table 3: Constraints faced by men and women in oil palm fruit processing in the study area

Constraints	**Men (n = 120)**			**Mean**	**Women (n = 120)**			**Mean**
	3	**2**	**1**		**3**	**2**	**1**	
High cost of milling	16(13.3)	17(14.2)	87(72.5)	1.41	4(3.3)	34(28.3)	82(68.3)	1.35
Lack/inadequate land	51(42.5)	43(35.8)	26(21.7)	2.21	63(52.5)	43(35.8)	14(11.7)	2.41
Poor access to improved seedlings	56(46.7)	39(32.5)	25(20.8)	2.26	66(55.0)	30(25.0)	24(20.0)	2.35
Cultural belief	0(0.0)	25(20.8)	95(79.2)	1.21	0(0.0)	21(17.5)	99(82.5)	1.18
Unavailability of improved technology and equipment	44(36.7)	64(53.3)	12(10.0)	2.27	65(54.2)	41(34.2)	14(11.7)	2.43
Lack of knowledge of use of improved technology	33(27.5)	21(17.5)	66(55.0)	1.73	33(27.5)	22(18.3)	65(54.2)	1.73
Distance to processing mills	44(36.7)	55(45.8)	21(17.5)	2.19	42(35.0)	55(45.8)	23(19.2)	2.16
Method of processing	9(7.5)	71(59.2)	40(33.3)	1.74	7(5.8)	71(59.2)	42(35.0)	1.71
Grand Mean				**1.88**				**1.92**

Source: Field survey, 2019 Note: $\bar{x}$ < 2.0 = not severe constraint; $\bar{x}$ ≥ 2.0 = severe constraint; figures in parentheses are percentages

Testing of Hypothesis

Test for significant difference in the level of involvement of men and women in oil palm fruit processing in the study area is presented in Table 4

Table 4: Z-test result of significant difference in the level of involvement of men and women in oil palm fruit processing in the study area

Mean difference in level of involvement	No. of respondents	Mean	Standard deviation	Df	Z-statistic	Z-tab
Mean level of women involvement [a]	120	2.758	1.136			
Mean level of men involvement [b]	120	2.450	0.859			
Difference (a-b)		0.308	1.377	119	2.453**	1.96

Source: Field survey, 2019 Note: ** = significant at P≤0.05; Df = Degree of freedom
Ho rejected at 0.05 level.

The Z-test result of significant difference in the level of involvement of men and women in oil palm fruit processing in the study area is presented in Table 4. The result shows that the mean levels of involvement of men and women in oil palm fruit processing were 2.450 and 2.758 respectively. This implies that there was a higher involvement of women in oil palm fruits processing than men in the study area. The Z-calculated value of 2.453 was also statistically significant at 5% level of probability, implying that there was significant difference in their levels of involvement. This finding is in agreement with Abushe *et al.* (2025) who reported a significant difference in gender-related tasks in oil palm processing in Delta State at 5% level of significance.

Conclusion and Recommendations

Based on the findings of this study, the study concluded that men and women were highly involved in oil palm fruits processing activities in Imo State. However, there was a higher involvement of women than men. Men and women processors also used a combination of both semi-modern and modern methods in the processing of oil palm fruits in the study area. Unavailability of improved technology and equipment, poor access to improved seedlings, inadequate land and distance to processing mills were major constraints faced by men and women in oil palm fruit processing in Imo State. Therefore, it recommended that:

1. There is the need for the State government to gear up efforts in providing adequate infrastructure such as processing mills and equipment which would further enhance men and women involvement in oil palm fruit processing in the study area.
2. Extension agencies, ministries of agriculture, non-governmental organizations and other stakeholders in the agricultural sector should assist in improving men and women access to improved oil palm seedlings in Imo State.
3. Extension agencies, ministry of agriculture, non-governmental organizations and other related stakeholders in the agricultural sector should structure and implement policies that would assist in addressing the identified constraints faced by oil palm processors in the study area.

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