



EXPLOITATION OF *IRVINGIA WOMBOLU* (OGBONO) BY RURAL WOMEN IN ETSAKO CENTRAL LOCAL GOVERNMENT AREA OF EDO STATE

¹Akemien, N. N., ²Adaaja, B. O., ^{*3}Alawiye, M. A., ⁴Ayuba-Abdul, J. M., ¹Owoeye, E. A. and ⁵Zaman, E. Y.

¹Moist Forest Research Station, Forestry Research Institute of Nigeria.

²Trial Afforestation Research Station, Kaduna, Forestry Research Institute of Nigeria.

³Federal College of Forest Resources Management, Fugar, Edo State.

⁴Northern Guinea Savannah Research Station, Nasarawa, Nasarawa State.

⁵Federal College of Forestry Jos, Plateau State.

*Corresponding authors' email: Adebowalem021@gmail.com Phone: +2348052504221

ABSTRACT

Exploitation of *Irvingia wombolu* constitutes a good source of livelihood and earnings for women in local communities. The study assessed rural women involvements in the exploitation of *Irvingia wombolu* popularly known as Ogbono in Etsako central local government area of Edo state, Nigeria. The study employed multi-stage random sampling and analyzed the data collected from 120 sampled respondents using SPSS to generate the descriptive statistics and principal component analysis (factor analysis) in line with the study objectives. The results showed that majority (53.3%) are within their active age group of 31-40 years. Majority (63.3%) of the sampled respondents were married. Majority of them had not more than 5 household size members. Most of them earn average of NGN30,000 – NGN40,000 monthly from *Irvingia wombolu* exploitation. Similarly, majority of them were into *Irvingia wombolu* business as their main occupation on forest land size of between 2-4 acres and farming experience of 10 years or below. In addition, homestead garden was mostly used (70.8%) for the cultivation of *Irvingia wombolu* tree by the respondents in the study area. Also, quite a number of them asserted that the exploitation of *Irvingia wombolu* had increased their earnings and benefitted their households' needs. However, the respondents noted that they had major challenge of inadequate finance for their business. Lastly, spoilage due to poor storage was a major factor (-0.778) limiting their involvement in exploitation of *Irvingia wombolu* in the study area. On this note, priority should be given to investment in storage facilities in order to increase the shelf life and reduces loss from exploitation of *Irvingia wombolu* particularly by the rural women.

Keywords: *Irvingia wombolu*, Rural women, Exploitation, Perceived benefits

INTRODUCTION

Irvingia wombolu (*AubryLecomte ex. O'Rorke*) traditionally called 'African mango' or 'bush mango' is a tree of between 15–40m size, with a slightly buttressed bole. *Irvingia wombolu* is enriched with significant biological potentials and invaluable antioxidants properties for utilization (Adeoye *et al.*, 2023; Ejiofor, 2004). The plant's fruit could be best described as a large ellipsoid drupe, yellowish with a juicy fibrous pulp when ripe. The plant appearance is usually in the form of a wild forest tree with dark green foliage and yellow fragrant flowers which are more prevalent in the wild lowland forest with the tendency for two to three of its trees to occur together or widespread in some areas as reported (Adeoye *et al.*, 2023).

Irvingia wombolu is largely distributed in Africa. The average length, width and thickness of the nut are (43.3×30.62×22.11) mm respectively (Adeoye *et al.*, 2023; Abreu *et al.*, 2008). The seeds are sold round the year in all markets where food stuffs are sold in Nigeria.

Usually, the fruit of *I. wombolu* is sour and the edible kernels are used for culinary purposes (Adeseko, 2020; Vihotogbe *et al.*, 2015; Chah *et al.*, 2014). *Irvingia wombolu* fruits bitterness are best differentiated through the assessment with other *Irvingia spp* and the bitterness could then be determined through the taste comparison of the fruits mesocarp, more so that *Irvingia wombolu* has little or no morphological differences with the other variety (Adeseko, 2020; Morah *et al.*, 2013).

Furthermore, *Irvingia wombolu* seeds are smaller in size but are most suitable in soup making because of their greater slimy nature in soup. It also gives stronger flavor to the soup.

The *Irvingia wombolu* seed has higher protein and ash content (Adeseko, 2020; Oduntan *et al.* 2019; Morah and Achu 2018). Women constitute about seventy percent (70%) of the total population in the locals (Johnson and Ifeoma, 2018). Often times, these women in local communities primarily survive through gathering of forest produce due to their access to forest and forest products as well as the knowledge and skills required for some of the methods of their utilization. Hence, exploitation of forest products constitutes a good source of livelihood earnings for rural through the sale of *Irvingia wombolu* fruits and seeds as well as other non-timber products and forest products. With little or no capital investment in the process of gathering, processing and marketing, exploitation of *Irvingia wombolu* provides parts of the dietary requirements for households' good health and wellbeing as well as income from its sale (Ajala *et al.*, 2024).

In essence, some of methods for the exploitation of *Irvingia wombolu* includes harvesting, storage, processing and utilization of the fruit seeds. These forms of exploitation are therefore an important source of economic sustenance and livelihood for rural women.

However, there are peculiar challenges faced by these rural women while exploiting *Irvingia wombolu* as an alternative to livelihood and income generation in their various communities. In the light of this, this research efforts are being focused on investigating the exploitation of *Irvingia wombolu* amongst rural women in Etsako central local Government area of Edo state.

MATERIALS AND METHODS

Study Area

Etsako Central Local Government is a local Government area in Edo State, Nigeria with its headquarters in Fugar town. The local Government is in between latitude 7°5' 26"N and between longitude 6°29' 53"E covering an area of an area of 660 km² and a population of 94,575 in the 2006 census (NPC, 2006). Etsako central cultures is manifested in the inhabitant's

mode of religious worship, folk lores, dance, art and crafts, festivals, among others. The local government area is located in the Northern part of Edo State. In addition, about 60% of the population in the area are farmers, hunters and fishermen. The types of crops and Non-timber Forest Products (NTFPs) prevalent in the area includes; African Bush Mango, Mango, Cashew, Wild fruits, vegetables, among others. The postal code of the area is 312 (NIPOST, 2009).

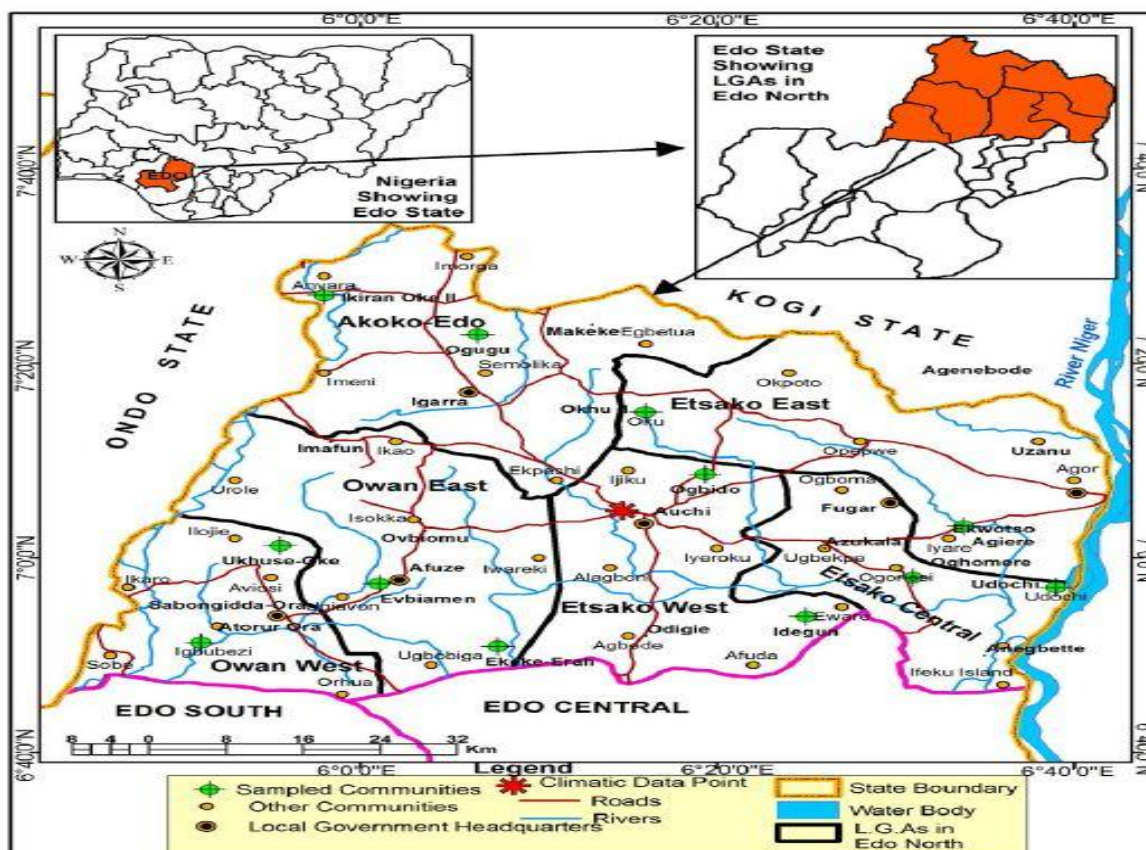


Figure 1: Map showing Etsako central local government area of Edo state

Source: Akingba et al., (2022)

However, the study employed multi-stage random sampling method. The first stage involved random selection of three (3) communities in Etsako central local government namely; Fugar, Ogbona and Ekperi. Second stage involved random selection forty (40) respondents from each community to make a total of 120 respondents. In addition, validated and pre-tested interview schedule was used to collect quantitative data from the respondents. Similarly, data management and analysis were carried out using Stata 14. Descriptive statistics, such as frequency counts, percentages, means and standard deviation, were used to summarise the data. Likewise, factor analysis was performed to evaluate perceived constraints affecting women involvement in exploitation of *Irvingia wombolu* in the study area.

RESULTS AND DISCUSSION

Demographic characteristics of the respondents

The results of distribution of demographic characteristics of the respondents in the study area as revealed in Table 1 showed that 53.3% of the sampled respondents used are within the Age bracket of 31-40years, 20.0% of them are with 41-50 years of Age, 16.7% of them are above 50years of Age while only 10.0% of them are within 21-30years of Age. This implies that the respondents used for this study are elderly

market women who have been involved in *Irvingia wombolu* exploitation for some years and responsible for their decision making.

Furthermore, the distribution of marital status of the respondents revealed that 63.3% of the respondents sampled were married, 19.2% of them were widowed, 15.8% of them are divorced while the remaining 1.7% of them are single. This result shows that majority of the sampled respondents are family women thus responsible and respected persons in their various communities. This result corroborates the findings of Bamiwuye et al., (2023) on their work titled "the assessment of post-harvest handling activities and marketing patterns of NTFPs by rural women in South Western, Nigeria where majority (91.9%) of the sampled respondents were married.

In addition, the findings showed that 76.7% of the sampled respondents exploited *Irvingia wombolu* business through active participation in planting, gathering & marketing of *Irvingia wombolu*, 15.0% of them were involved in the gathering & marketing only while 8.3% of them were involved only in the marketing of *Irvingia wombolu* in the study area.

In the same vein, 43.3% of the respondents had not more than 10 years of farming experience in *Irvingia wombolu* business, 29.2% of them had between 11-20 years of farming

experience, 18.3% of them had between 21-30 years of farming experience while only 9.2% of them had above 30 years of farming experience. The mean years of farming experience of the sampled respondents in the study area is 18 years. This simply indicated the respondents have been involved in *Irvingia wombolu* farming for a long period of years. This pattern is in line with the findings of Bamiwuye *et al.*, (2020) on their work titled "Participation of rural women in exploitation of NTFPs as a means of sustainable livelihood in South Western, Nigeria where majority (35%) of the respondents had not more than 10 years of farming experience.

Also, the study showed 40.2% of the respondents planted *Irvingia wombolu* on 2-4 acres of forest area, 33.3% of them planted *Irvingia wombolu* on less than 2 acres of forest area, 15.0% of the sampled respondents planted *Irvingia wombolu* on more than 7 acres of forest area while 7.5% of the sampled respondents planted *Irvingia wombolu* on 5-7 acres of forest area. The mean forest area used for *Irvingia wombolu* exploitation by the respondents is 2.5 acres. This showed that moderately large forest area was used for the exploitation of *Irvingia wombolu* in the study area.

Nevertheless, 49.2% of the respondents had not more than five (5) household members, 43.3% of the respondents between 6-10 household members while 7.5% of the sampled respondents had more than 10 household members. This indicated that the sampled respondents in the study area had a large household/family size and this could positively impact their *Irvingia wombolu* business. This result corroborates the

findings of Itoje *et al.*, (2023) on their work titled Knowledge and Utilisation of Forest Products among Rural Dwellers: Implication for Forest Conservation in Delta State, Nigeria where the average households family size of the respondents sampled was five (5) members.

More so, 44.2% of the respondents are predominantly *Irvingia wombolu* farmers, 22.5% of them were involved in other form of trade aside *Irvingia wombolu* business, 16.7% of them were into livestock farming business, 15.0% of them were also petty traders while 1.9% of the sampled respondents involved in *Irvingia wombolu* exploitation were civil servant. This indicated that majority of the sampled respondents in the study area had other streams of income inspite of their involvement in *Irvingia wombolu* exploitation. This could play a big part for them in stabilizing their *Irvingia wombolu* business and supporting their families. This result is similar to the findings of Ajala *et al.*, (2024) on their work titled "Involvement of Rural Women in Gathering of Forest Products as A Means of Livelihood in South-Western Nigeria" where majority (79.3%) of the respondents were involved in the exploitation of forest products such as *Irvingia wombolu* as their main occupation.

Lastly, the findings showed that 52.5% of the respondents earn between NGNG30,000 – NGN40,000 monthly from *Irvingia wombolu* exploitation, 19.2% of the sampled respondents earn above NGN50,000 monthly from *Irvingia wombolu* exploitation, 15.0% of them earn between NGN41,000 – NGN50,000 monthly while 13.3% of them earn below NGN30,000 from *Irvingia wombolu* business.

Table 1: Distribution of demographic characteristics of the respondents

Variable	Frequency	Percentage
Age		
21-30 years	12	10.0
31-40years	64	53.3
41-50years	24	20.0
Above 50years	20	16.7
Marital Status		
Single	2	1.7
Married	76	63.3
Divorced	19	15.8
Widowed	23	19.2
Areas of Involvement in <i>Irvingia wombolu</i> exploitation		
Planting, Gathering & Marketing	92	76.7
Gathering & Marketing	18	15.0
Marketing	10	8.3
Farming Experience		
Less or equal 10 years	52	43.3
11-20 years	35	29.2
21-30 years	22	18.3
Above 30 years	11	9.2
Mean =	18 years	
Forest land size		
<2 acres	40	33.3
2-4 acres	53	40.2
5-7 acres	9	7.5
>7 acres	18	15.0
Mean =	2.5 acres	
Households Size		
Not more than 5 members	59	49.2
6-10 members	52	43.3
Above 10 members	9	7.5
Primary Occupation		
Trading	27	22.5

<i>Irvingia wombolu</i> farming	53	44.2
Business women	18	15.0
Livestock farming	20	16.7
Civil servant	2	1.6
Average Monthly Income		
Below NGN30,000	16	13.3
NGN30,000-NGN40,000	63	52.5
NGN41,000-NGN50,000	18	15.0
Above NGN50,000	23	19.2
Total	120	100.0

Source: Authors findings, (2024)

Sources of *Irvingia wombolu* exploitation in the study area

The findings in Table 2 showed that 70.8% of the sampled respondents exploited *Irvingia wombolu* via their planted homestead garden, 53.3% of them exploited from *Irvingia wombolu* plantation made, 52.5% of them had gathered *Irvingia wombolu* fruits from their cultivated Agro-forestry land, 36.7% of them exploited *Irvingia wombolu* fruits via harvest from the wild and lastly, 26.7% of them gathered the fruits from the communal land. This agrees with the findings of Bamiwuye et al., (2020) on their work titled "Participation

of rural women in exploitation of NTFPs as a means of sustainable livelihood in South Western, Nigeria where majority (71.6%) of the sources of NTFPs exploitation were from cultivated forest rather than natural forest. In addition, this was also the view of Chah et al., (2014) on their work titled exploitation of bush Mango (*Irvingia wombolu* and *Irvingia gabonensis*) Among Rural Household in Enugu State, Nigeria where (85.7%) of the respondents harvested from homestead.

Table 2: Distribution of *Irvingia wombolu* exploitation sources in the study area

Variables	Frequency	Percentage
<i>Irvingia wombolu</i> plantation	64	53.3
Harvesting from Wild	44	36.7
Communal land	32	26.7
Agro-forestry land	63	52.5
Homestead garden	85	70.8

*Multiple responses

Source: Authors findings, (2024)

Perceived benefits derived from *Irvingia wombolu* exploitation

The findings in Table 3 showed that *Irvingia wombolu* exploitation served as an additional source of income for the sampled respondents with the mean score of (M= 2.9). This is evident in the fact that majority of the sampled respondents had other source of earnings despite their involvement in *Irvingia wombolu* exploitation for income generation. However, it also served as the main source of income to significant number of the respondents and has a mean score of (M= 2.7). Other perceived benefits of *Irvingia wombolu* exploitation include; food provision for family consumption

(M= 2.5), as a gift items to family and friends (M= 2.4), as a form of long-term investment (M= 1.9) and lastly, as a means of foreign exchange earnings (M= 1.8). This is to a greater extent in line with the submission of Ajala et al., (2024) that exploitation of forest products such as the *Irvingia wombolu* guarantees sustainable earnings for women in the rural areas. In addition, Bamiwuye et al., (2020) and Dishan et al., (2010) also made similar discoveries that forest gathering as an enterprise is a sustainable and indispensable means of income amongst rural women. This is also the view of (Suleiman et al., 2017; Olaniyi et al., 2013).

Table 3: Perceived benefits from *Irvingia wombolu* exploitation in the study area

Perceived Benefits	Mean	STD
Serves as major source of income	2.7	0.311
Serves as additional source of income	2.9	0.525
Serves as food for family consumption	2.5	0.612
Serves as gift items to family and friends	2.4	0.611
Serves as long term investment	1.9	0.752
Serves as source of foreign exchange	1.8	0.610

Source: Authors findings, (2024)

Constraints faced by the respondents in exploitation of *Irvingia wombolu* (bush mango)

The findings in Table 4 indicated that 85.8% of the sampled respondents had the major challenge of inadequate financial support, 79.2% of them faced the bottleneck of unstable market prices of farm produce, 70.8% of them had the challenge of labour intensiveness and 64.2% of them had

major constraints of inadequate capital. Meanwhile, the minor challenges faced by the respondents includes; *Irvingia wombolu* plantation location (63.6%), high processing cost (56.7%) and unstable weather condition (55.0%). However, the respondents highlighted not constraints in the following area; diseases outbreak (82.5%), problem of theft (80.8%) and middlemen activities (63.3%).

Table 4: Constraints faced by the respondents' involvement in exploitation of *Irvingia wombolu*

S/N.	Indicators	Major Constraints		Minor Constraints		Not a Constraints	
		Freq.	%	Freq.	%	Freq.	%
1.	Inadequate capital	77	64.2%	29	24.2%	14	11.7
2.	weather condition	54	45.0%	66	55.0%	-	-
3.	Unstable market prices	95	79.2%	12	10.0%	13	10.8%
4.	<i>Irvingia wombolu</i> plantation location	19	15.8%	76	63.3%	25	20.8%
5.	Middlemen activities	16	13.3%	28	23.3%	76	63.3%
6.	High processing cost	7	5.8%	68	56.7%	45	37.5%
7.	Diseases outbreak	14	11.7%	7	5.8%	99	82.5%
8.	Problem of theft	-	-	23	19.2%	97	80.8%
9.	Inadequate financial support	103	85.8%	14	11.7%	3	2.5%
10.	Labour intensiveness	85	70.8%	19	15.8%	16	13.3%

Source: Field Survey, 2024

Factor analysis of perceived constraints affecting exploitation of *Irvingia wombolu*

The findings from the table 5 below showed that the perceived constraints affecting women exploitation of *Irvingia wombolu* were factorized into different constraints which includes; production constraints (factor 1), economic constraints (factor 2), institutional constraints (factor 3), Technological constraints (factor 4) and demographics constraints (factor 5). Factors that loaded under production constraints were high production cost (0.630), inadequate capital (0.416) and diseases outbreak (0.742). This indicated that for production and domestication of *Irvingia wombolu* to be increased, faster and more successful propagation methods are needed. Likewise, pest attack, disease and deterioration, contribute to high losses of saleable *Irvingia wombolu* fruit. This may affect productivity in high quantities. Omokhua (2012) noted that lack of improved planting materials, absence of credit

facilities among others are major limiting factors of production of *I. wombolu*.

Economic constraints (factor 2) were unstable market prices (0.596). These may be a discouraging factor for commercializing of *Irvingia wombolu*.

In addition, variables that loaded under technological/institutional constraints (factor 3 and 4) were; labour intensiveness (0.768), problem of middlemen (0.550), problem of theft (0.526) and spoilage from poor storage facilities (0.778). According to USAID (2005), producers in developing regions often lack access to appropriate inputs and the necessary technical production skills due to inadequate input and credit markets. Lastly, plantation location (0.499), unstable weather conditions (0.269) variables are loaded under demographic constraint (factor 5). This implied that good weather condition and location could significantly boost the production and exploitation of *Irvingia wombolu* in the study.

Table 5: Perceived constraints affecting exploitation of *Irvingia wombolu*

Perceived Constraints	Component				
	1	2	3	4	5
Inadequate capital	-0.416*	-0.360	-0.358	-0.253	0.377
Unstable weather conditions	0.211	0.011	-0.006	0.269*	0.014
Unstable market prices	0.326	-0.063	0.579	-0.047	0.596*
Plantation location	0.499*	0.401	0.273	-0.287	-0.286
Problem of middlemen	0.550*	-0.242	-0.365	0.218	0.220
High production cost	0.252	-0.630*	0.079	0.042	-0.101
Diseases outbreak	0.742*	0.152	0.246	-0.069	0.181
Problem of theft	0.526*	-0.070	-0.271	0.280	-0.272
Labour intensiveness	-0.070	0.768*	-0.362	0.161	0.260
Spoilage from poor storage	0.018	-0.303	-0.159	0.290	-0.778*

*Factor analysis

Source: Authors findings, 2024

CONCLUSION

The study concluded that women involvement in exploitation of *Irvingia wombolu* greatly impact their income generations through the sales revenue of between NGN40,000 – NGN50,000 monthly from at least 2-4 acres of *Irvingia wombolu* land area. In addition, the study concluded that *Irvingia wombolu* were most planted by the respondents in the homestead garden and thus reflect the need for significant investment in *Irvingia wombolu* plantation so as to significantly harness the huge benefit from *Irvingia wombolu* exploitation. Lastly, the study highlighted inadequate capital, unstable market prices of the produce, challenge of labour intensiveness, spoilage from poor storage, high production cost, weather condition among other factors affecting exploitation of *Irvingia wombolu* by the women in the study

area. It is therefore recommended that investment in storage facilities should be given a priority by all the stakeholders involved in order to increase the shelf life and reduces loss from exploitation of *Irvingia wombolu* particularly by the rural women.

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