

Innovations

From Forests to Families: Exploring the Benefits and Challenges of Non-Timber Forest Products (NTFPs)

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Abstract

Background: Global demand for Non-Timber Forest Products (NTFPs) is leading to over-exploitation, resulting in dwindling species populations, and negatively affecting biodiversity. Many NTFPs are harvested destructively, potentially leading to species extinction. **Aim:** This study focused on the utilization, prospects, and challenges of non-timber forest products (NTFPs) in Ogoja Local Government Area (LGA) of Cross River State (CRS), Nigeria. **Method:** The study involved a sample of 140 household heads in three purposively selected communities at 10% sampling intensity, chosen through systematic sampling method. Data were collected via interviews, field observations, focus group discussions, and questionnaires, and analysed using descriptive statistics. **Results:** Findings indicated that numerous NTFPs were utilized for food and income generation, supporting children's education, skills acquisition, and farm development in the study area. Key NTFP species in the communities included vegetables such as *Gnetum africanum*, *Piper guineensis*, and *Gongronema latifolium*, bush mango (*Irvingia gabonensis*), birds, fuelwood, and snails, all serving as safety nets in various ways. Prospects for the sustainable management of NTFPs appeared promising due to the adequate availability and quality of land, straightforward and affordable land acquisition,

known cultivation techniques, and the overall affordability of the processes. Major challenges included a lack of awareness about establishing NTFP farms, unsustainable harvesting methods, and insufficient value addition in marketing collected NTFPs. **Conclusion:** Increase awareness of sustainable harvesting techniques and training programs for youths on domesticating NTFPs could motivate them to establish NTFP farms.

Keywords: Prospects, Utilization, Challenges, Non-timber forest products, Forest livelihoods, Forest-dependent communities, Sustainable management, Forest resource management, NTFP conservation.

1. Introduction

Non-timber forest products (NTFPs), also known as non-wood forest products (NWFPs) and minor forest products (MFPs), encompass all goods of biological origin and services derived from forests, woodlands, and trees outside forests, excluding wood in all its forms (FAO, 1999). Globally, many forest-dependent communities rely on NTFPs for their livelihoods, utilizing them for fibres, food, fodder, medicine, and other materials (Shrestha et al., 2020). While many households in forest-dependent communities engage in some form of NTFP collection, the total documented benefits from this sector appear minimal. The increasing global demand for NTFPs has led to their over-exploitation, resulting in declining species populations and negative impacts on biodiversity. Additionally, the destructive harvesting methods used for many NTFPs pose a risk of extinction for several species.

In forest-dependent rural household economies, NTFPs serve three main purposes (Heubachet *al.*, 2011). Firstly, they meet household needs for subsistence and consumption, such as energy, nutrition, medicine, and construction. Secondly, during economic downturns, such as revenue losses from crop failures, NTFPs act as a safety net. Thirdly, certain NTFPs provide a daily source of cash (Angelsen and Wunder, 2003; Cavendish, 2002). NTFPs often have a greater importance, both in use and monetary value, than timber production or land conversion to pastureland or farmland, especially when communities are knowledgeable about their benefits (Rogue, 1992). The commercialization of NTFPs is growing, both locally, regionally and globally thus providing significant income to many households (Welford and Breton, 2008; Cunningham, 2011). Research by Olsen (1998) showed that during the fiscal year 1993/94, 470,000 Nepalese households actively collected economically important NTFP species, deriving between 15 and 50% of their income from this sub-sector (APAARI/FAO, 2013; Edwards, 1996; MSFP, 2014). Adequate investment in this sector could create jobs for locals, reducing migration of youth to cities and abroad, and decreasing poverty by offering local income opportunities (GIZ, 2015; IUFRO, 2012).

Human activities, including forest exploitation, mining, tourism, hunting, fishing, and agriculture have led to significant forest resource losses, such as deforestation and forest degradation (Zhang, 2007). Low-intensity anthropogenic activities such as NTFPs collection has been seen to cause a long-term effect on the distribution of tree species (Asuk et al. 2023). It is estimated that 20% of forest area has been lost due to these activities, and many plant and animal species are now endangered (Maelle and Oghenerobor, 2012; Ghoddousi et al., 2021; Thom et al., 2017; Anand and Radhakrishna, 2017). Anthropogenic activities can have cascading effects on wildlife populations sometimes positively or negatively. According to Shrestha et al. (2020), NTFPs have been cultivated since ancient times for their medicinal properties. Over-harvesting and early collection of contribute to the degradation of NTFP species. People facing food shortages often turn to collecting NTFPs to supplement their food supply. Competition among collectors and encouragement from local traders to gather more NTFPs, particularly the most sought-after species, lead to overexploitation due to high market values (Edwards, 1994; Karki, 1996; Sharma, 1996). The degradation of these resources is linked to unclear property rights, a lack of conservation knowledge, and rising market demand (Subedi and Bhattarai, 1998).

Sustainable management of NTFPs will require coordinated efforts by rural communities, careful selection of species, resources, and sites, controlled harvesting, and regular monitoring of species regeneration and growth (Peters, 1990). The depletion of forest biomass by human populations and industrialization has been studied both theoretically and experimentally (Dubey and Narayanan, 2010; Agarwal and Devi, 2012; Chaudhary et al., 2013). Agarwal and Pathak (2015) developed a model to conserve forestry biomass and wildlife populations, considering the impact of illegal trade. Pathak et al. (2017; 2021) showed how human activities and industrialization affect forestry biomass and wildlife populations. Despite their significance, these findings often fail to reach the intended audience, including NTFP collectors. To overcome this, the current study employs a triangulation method to ensure robust data collection. This method combines data from various sources, enhancing the credibility of the findings. Data collection techniques include key informant interviews, personal interviews, field observations, demonstrations, administration of semi-structured questionnaires, and document review. The use of multiple methods helps verify the authenticity of the results (Alvi, 2016). This research aims to address gaps in the collection, utilization, and conservation of NTFPs in the Ogoja Local Government Area of Cross River State, Nigeria. The study will assess the role of NTFPs in rural livelihoods, explore the challenges and prospects of NTFPs, and recommend strategies for their sustainable management in Ogoja. This research seeks to provide valuable insights into sustainable NTFP management in Ogoja, thereby contributing to local and broader conservation initiatives.

2. Materials and Methods

2.1 Study Area

Ogoja Local Government Area is located in the Northern part of Cross River State, Nigeria. It is bounded by Bekwarra to the North, Obudu to the Northeast, Yala to Northwest, Boki in the Southeast and Ikom in the South. It lies between latitude $6^{\circ} 20' 0''$ N and $6^{\circ} 40' 0''$ N and longitude $8^{\circ} 30' 0''$ E and $9^{\circ} 0' 0''$ E (Figure 1), covering an estimated area of 972 km^2 and with a projected population of 171,901 people in 2021 (NPC, 2006). The area has a tropical climate, characterized by distinct wet and dry seasons (Weather Spark, 2020), which supports the cultivation of various food crops and tree species, in addition to the presence of naturally existing industrial resources. Its residents majorly depend on subsistence agriculture, the production and trading of: yams, cassava, corn, rice, NTFPs, palm oil, palm wine and many more.

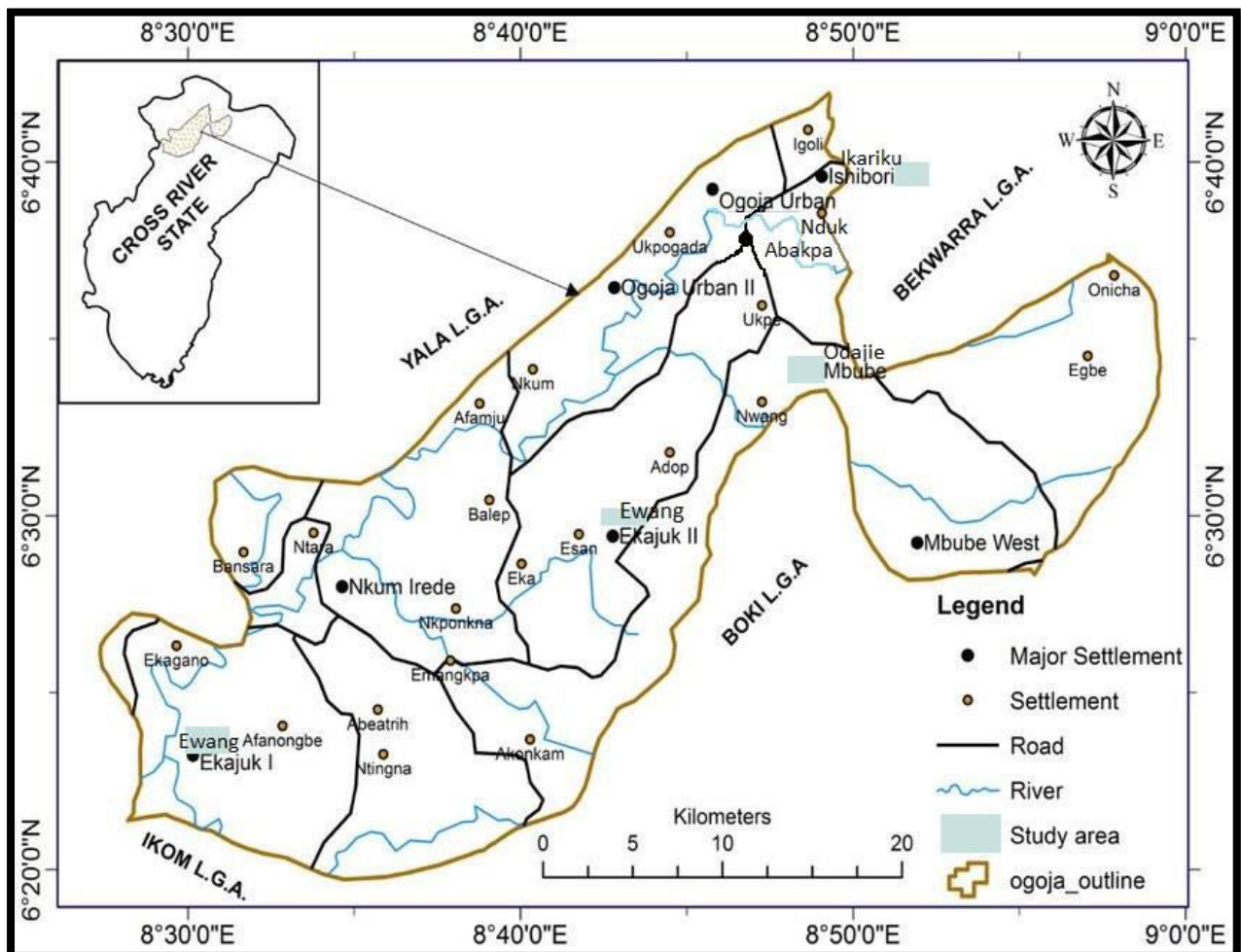


Fig 1. Map of Ogoja Local Government Area showing the study area

2.2 Data Collection and Analysis

Systematic sampling method was used (every third house) to select the subject (Respondents) who were mainly household heads in the three purposively selected communities. At a sampling intensity of 10%, respondents were summed up to 140 sample population (Table 1). Primary data were collected through personal interviews, field observations and demonstrations, and semi-structured questionnaires. Data were analysed using descriptive statistics, including frequency and percentage tables, and thematic analysis for the open-ended questions on the questionnaire and in-depth interviews. These methods tested the relationship between respondents' socio-demographic features and the prospects and challenges of non-timber forest products (NTFPs) in Ogoja Local Government Area.

Table 1. Sample Size Determination (Source: Field survey, 2021)

Community	Number of Households	Sample Size (10%)
OdajieMbube	520	52
IkarikuIshibori	667	67
EwangEkajuk	210	21
Total	1397	140

3. Results and Discussion

3.1 Socio-economic Features of the Respondents

From the gender distribution of the respondents, 57.1% were males and 42.9% were females. Among them, 32.9% were married, 14.3% were widowed, and 35.7% were single. The majority of the respondents (42.9%) fell within the age bracket of 18-27 years, followed by 27.1% in the 28-37 years bracket, and 14.3% in the 38-47 years bracket. Religiously, 92.1% of the respondents identified as Christians. Educationally, the largest group (55.7%) were secondary school leavers, followed by primary school leavers at 22.9%, and those with tertiary education at 17.1%. A small portion, 4.3%, had no formal education. Professionally, the respondents were primarily farmers (47.9%), traders (17.1%), civil servants (12.9%), artisans (8.6%), and manual workers (5.7%). Among the respondents, 65.7% were indigenes, and 34.3% were non-indigenes. Additionally, more than 80% were low-income earners, making less than 40,000 naira monthly (Figure 2).

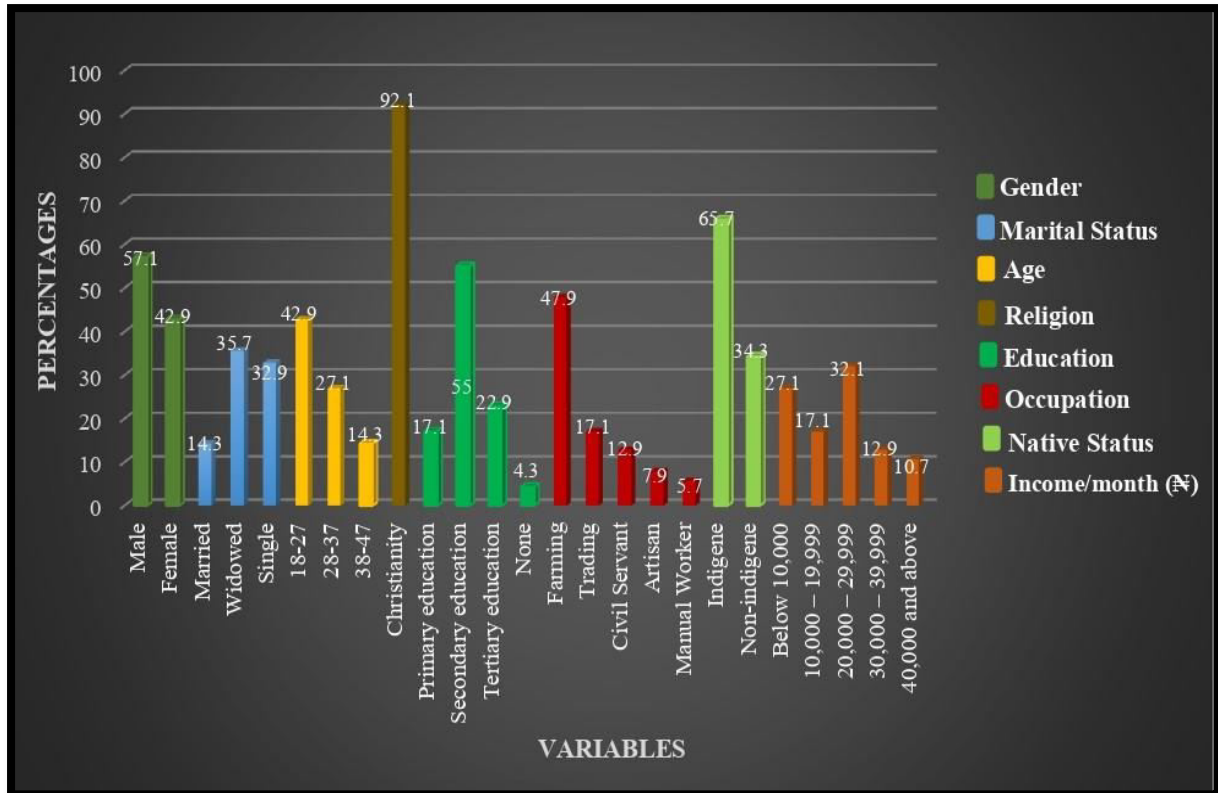


Fig. 2. Socio-economic Features of the Respondents (Source: Field survey, 2021)

3.2 Available Non-Timber Forest Products (NTFPs) in the Study Area

An enquiry into the available NTFPs in the study area revealed the presence of vegetables, bush mango, snails, honey, and other species, as attested by 37.9%, 21.4%, 20.7%, 7.9%, and 12.1% of the respondents respectively (Figure 3). The majority of the NTFPs (42.9%) were found in OdajieMbube, followed by EwangEkajuk with 31.4% and Ishibori with 25.7% (Figure 4).

The results indicated that males were more involved in the collection of NTFPs to sustain household demands and fulfil their responsibilities, conforming to Angelsen et al. (2014). Although NTFP collection was previously seen as a feminine activity, this is changing as more males embrace it. The NTFPs found in Ogoja included vegetables such as *Gnetum africanum*, *Piper guineense*, *Congronemalatifolium*, and *Talinum triangulare*. Asuk et al. (2023) identified 35 fruit-producing trees, including *Carica papaya*, *Mangifera indica*, *Irvingia gabonensis*, and *Brachystegia eurycoma*, utilised by forest-dependent communities in the area. This, along with flora documented in a survey on medicinal plants used in the treatment of ailments of utmost native importance in Cross River State (Ebu et al., 2021), highlights their use for food, income generation, and medicinal purposes. Their use for household consumption also included their use as feed for snails, aligning with Ebu et al. (2014) who recommended waterleaf (*Talinum triangulare*) and papaw (*Carica papaya*) as snail feed. As medicinal herbs, their phytochemical and nutritional contents were responsible for both therapeutic abilities and nutrient supply, corroborating Ebu

and Beshel (2020), who asserted that medicinal herbs provide healing potentials and nutrient supply.

Most respondents (42.9%) have consistently used these NTFPs for medicinal purposes with little or no side effects due to the low anti-nutrient content of the herbs, aligning with Ebu et al. (2019), who stated that most medicinal herbs are safe to consume as they contain low anti-nutrient levels far below their lethal doses. The combination of climbers, shrubs, trees, birds, and snails, among others, aligns with FAO (2010), which states that NTFPs include all plants and animals in the wild other than timber, including nuts, palms, resins, fibres, fruits, vegetables, game, medicinal plants, bark, grasses, small wood products, and firewood.

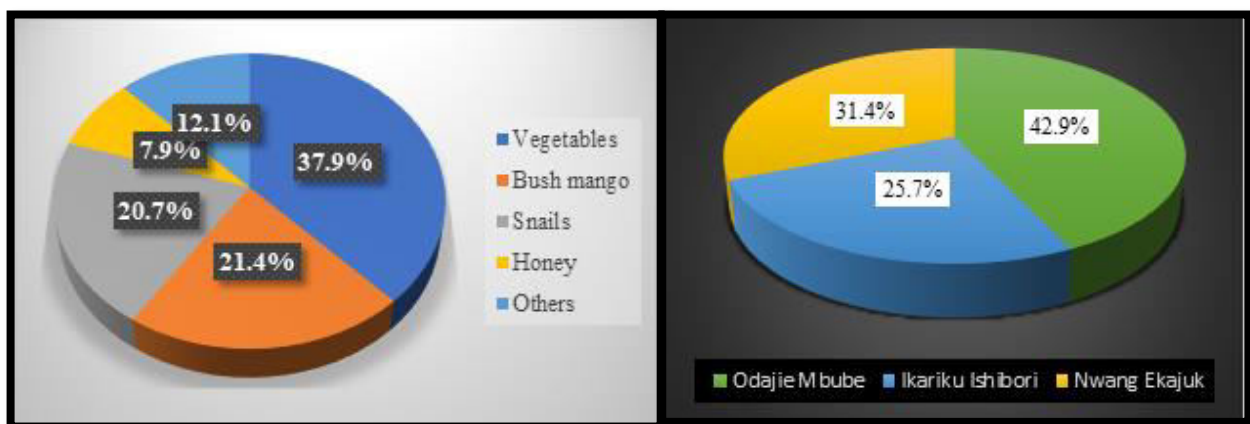


Figure 3 & 4. Some Available NTFPs in Ogoja LGA (Source: Field survey, 2021)

3.3 NTFPs Availability, Uses and Tangible Achievements

From oral interviews conducted to understand how collected NTFPs were utilized, 73.6% of the respondents mentioned sales, 17.9% mentioned household consumption, and 8.6% mentioned gifting to family friends. The tangible achievements from NTFP collection included 27.14% of respondents investing in farm establishments (especially cocoa, banana, plantain, and oil palm), 23.75% using proceeds to educate children, 10% to build houses, 17.86% for skill acquisition training for children, and 21.43% for other family needs (Figure 5).

In the study area, domestic energy use was primarily derived from fuelwood, like the Tanzanian experience where over 90% of the population uses charcoal and fuelwood for heating and cooking (Milledge et al., 2007). NTFPs generate significant economic value and large-scale employment in Ogoja, with some individuals making substantial profits from oil palm processing, as asserted by Nandi et al. (2016). NTFPs are a major livelihood source for farmers in rural Ogoja and will likely remain so, given the lack of alternative off-farm employment opportunities, conforming to the postulations of Olsen and Larsen (2003) and NEHHPA (2012).

3.4 Prospects of NTFPs in Ogoja LGA

Regarding constraints to NTFP cultivation, 97.9% of the respondents indicated that land availability was not an issue, as there was sufficient land for NTFP farm development. Additionally, accessing such lands is easy and affordable. On the challenges to NTFP production in Ogoja, 85% of respondents confirmed that the climate and soil were very suitable for NTFP growth. Most respondents (96.4%) affirmed possessing the basic knowledge needed to grow NTFPs, such as *Gnetum africanum*, *Piper guineense*, *Gongronema latifolium*, and *Irvingia gabonensis*. Furthermore, 77.1% of respondents stated that the financial requirements for establishing NTFP farms are minimal and affordable (Table 2).

The combination of abundant and quality land, favourable climate and soil, adequate knowledge of NTFP cultivation, and available finances indicates high prospects for NTFPs in Ogoja. This corresponded to the findings of NEHHPA (2012) and Rai et al. (2019), which showed that the workforce needed for sustainable management was readily available. The NTFP market in Ogoja is expected to expand significantly, given the numerous production factors.

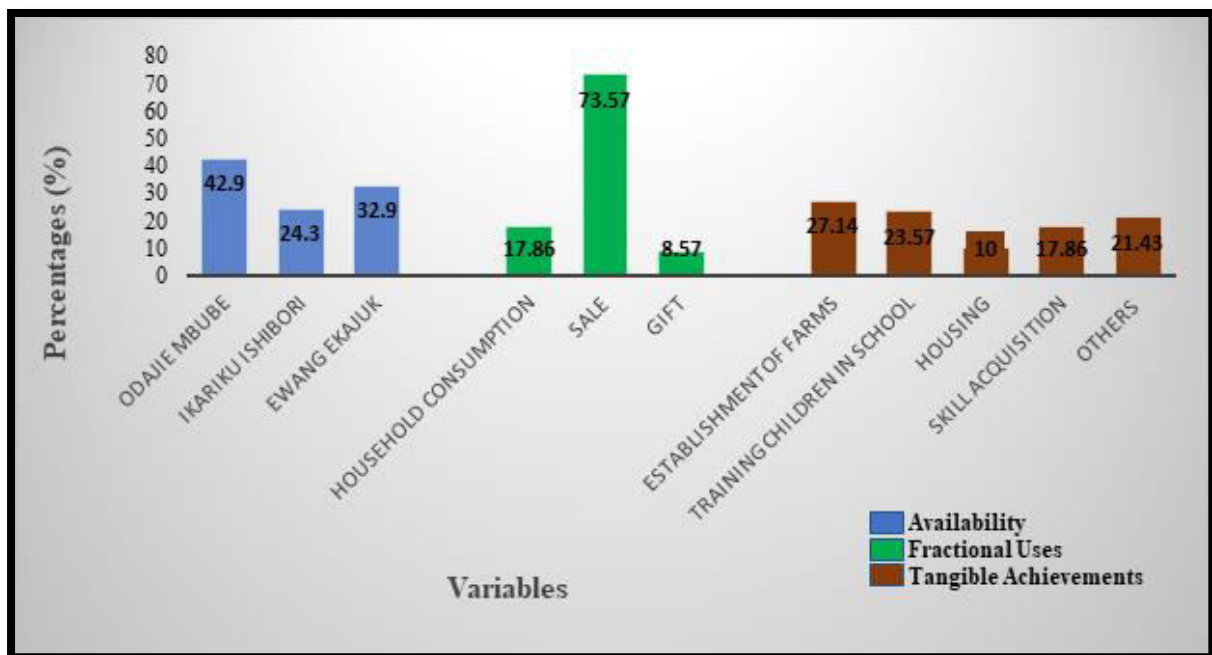


Fig. 5. NTFPs Availability/Spread, Fractional Uses and Tangible Achievements (Source: Field survey, 2021)

Table 2. Responses on the Prospects of NTFPs in Ogoja LGA (Source: Field survey, 2021)

Is land favourable to NTFPs development in Ogoja?	Frequency	Percentage (%)
Yes	137	97.9
No	3	2.1
Is the Climate and soil good for NTFPs Growth in Ogoja?	119	85
Yes	21	15
No		
Is there available knowledge on how to grow NTFPs in Ogoja?	135	96.4
Yes	5	3.6
No		
Do you have the needed finances to grow NTFPs in Ogoja?	108	77.1
Yes	32	22.9
No		

3.5 Challenges to NTFPs Conservation in Ogoja LGA

To summarise the investigation on constraints to mass production and distribution of NTFP farms, 93.6% of respondents highlighted a lack of awareness about the need to establish individual farms rather than depending on the wild (Table 3). The primary causes of over-exploitation from the wild were increased demand and sole dependence on wild sources, confirmed by 79.3% of respondents. Only 25% of respondents were knowledgeable about sustainable harvesting methods, while 75% were not. To address over-exploitation, 58.6% suggested establishing NTFP farms, while 2.9% disagreed (Table 3).

A major challenge for NTFP management in Ogoja is the lack of proper value addition, similar to Nepal's situation, where value-adding opportunities are unrealised (Subedi, 2003; Heinen and Shrestha-Acharya, 2011; Chakravarty et al., 2015). Limited processing and value addition are done to NTFPs collected and transported to Calabar and other distant parts of the country (Sunderland and Isoni, 2001). Improved and processed raw materials generally attract better prices than crude raw materials, but this advantage is not enjoyed due to low value addition. This has deprived the area of increased employment and reduced economic development. Harvesting practices in Ogoja, such as picking from the forest floor, peeling tree barks, or cutting down trees, are unsustainable and lead to low productivity and species loss, aligning with findings by Subedi (2003) and Heinen and Shrestha-Acharya (2011).

Despite research proving that NTFPs can be cultivated like other agricultural crops (Leakey and Newton, 1994; Bista and Webb, 2006; Pandit, 2008), NTFP

species are rarely planted in farms, plantations, or homesteads in Ogoja. Many commonly used annual and perennial NTFPs remain neglected for domestication. The reason for this reluctance to domesticate NTFPs remains unknown, despite their potential to meet household needs.

Table 3. Responses on the Challenges to NTFPs Conservation in OgojaLGA(Source: Field survey, 2021)

In what forms are the NTFPs delivered	Frequency	Percentage (%)
Crude raw form	132	94.3
Improved raw form	8	5.7
Improved processed form	0	0
Lack of awareness of owning NTFPs farms		
Yes	131	93.6
No	9	6.4
Over exploitation of NTFPs from the wild caused by demand increases and sole dependence on the wild?		
Yes	111	79.3
No	29	20.7
Acquaintances with sustainable harvesting methods of NTFPs		
Yes	35	25
No	105	75
In your view, do you think the establishment of individual NTFPs farms will ease the pressure on the wild?		
Yes	82	58.6
No	18	2.9

4 Summary

The research on from forest to families; exploring the benefits and challenges of non-timber forest products (NTFPs) in Ogoja LGA revealed diverse household and industrial uses for these products. NTFPs were found to be the primary source of livelihood for rural people and farmers in Ogoja, a trend expected to continue until off-farm employment opportunities become more prevalent. The study demonstrated that NTFPs are crucial for income generation, food security, healthcare, and providing social and cultural values to those living near forests. The prospects for NTFPs in Ogoja are high, with the majority of the population engaged in their collection.

The findings indicated that there is an abundance of suitable land, a favourable climate and soil, adequate knowledge of NTFP cultivation, and

available finances for establishing farms, suggesting very high prospects for NTFPs in the region. However, major challenges for the conservation and sustainable management of NTFPs in Ogoja LGA include a lack of domestication, value addition, and sustainable harvesting practices. Therefore, for the sustainable management of these NTFPs, it is essential to train harvesters in effective methods of farm establishment and NTFP harvesting to prevent the loss of forest resources.

4.1 Conclusion and Recommendations

The study showed that households in Ogoja Local Government Area of Cross River State rely on NTFPs for their livelihood. Major NTFP species found in the communities include vegetables such as *Gnetum africanum*, *Piper guineense*, and *Gongronema latifolium*, bush mango (*Irvingia gabonensis*), birds, fuel wood, and snails. These resources have served as a safety net in various ways. However, the increasing global demand for NTFPs is leading to their over-exploitation, resulting in declining biodiversity. The contribution of NTFPs to household economies is crucial for sustaining the livelihoods of many families, highlighting the importance of regulating the harvesting of these resources to ensure sustainability. Therefore, the following recommendations were made:

1. Resource-based enterprise development has not been initiated in Ogoja. Increasing efficiency in each stage of the NTFP value chain is needed.
2. Agroforestry practices can be used as a flexible land use system to promote the domestication of NTFPs. These practices can be adapted to the specific needs and existing practices of forest-dependent rural communities to promote their environment and ensure implementation.
3. There is a need to sensitize NTFP-harvesting households in the study area about the importance of NTFPs.
4. NTFP harvesters should be properly trained in sustainable harvesting methods to avoid unsustainable practices and ensure continuous use.
5. NTFP harvesters should be trained and retrained in scientific methods of preserving perishable NTFPs and adding value for better pricing.

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