



ASSESSING THE CONTRIBUTIONS OF NON-FARM INCOME TO RURAL HOUSEHOLDS' DEPENDENT ON OIL PALM-BASED VENTURES AS LIVELIHOOD STRATEGIES IN EDO AND DELTA STATES, NIGERIA

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ABSTRACT

Non-farm income sources are a crucial component of rural households' livelihood strategies as they provide a means of escaping poverty and increase their ability to withstand economic shocks. Therefore, this study evaluated the contributions of non-farm income to rural households that rely on oil palm-based businesses as a means of subsistence. The study's specific goals were to determine the respondents' socioeconomic characteristics, what activities the rural households engaged in, estimate the level of income generated from these activities, and assess the heterogeneity of income sources carried out by the rural households in the study area. The study used a multi-stage sampling procedure in selecting the respondents for the study. Descriptive statistics, the mean of income approach, and Simpson's diversification index (SDI) were used to analyze the data from 326 oil palm rural households in Edo and Delta State. The study revealed that most of the respondents were male (77.3%) and were of active age with farming experience ranging from 11 to 20 years (49.39%) in the study area. The respondents in the study area have varying levels of education, with the majority having completed their secondary education (52.76%). The study revealed that non-farm activities contributed a sizeable portion to the income of rural households through the diversification of livelihood strategies, as a considerable share of their incomes was earned from their activities. Delta State (0.33) exhibited a slightly higher level of income source diversity compared to Edo State (0.32), as shown by the Simpson's Diversification Index value. The study recommends that relevant authorities should improve the means of livelihood of rural households to further increase their economic portfolio because a large number of rural households engage in non-farm activities as their livelihood strategy.

Keywords: Simpson's diversification Index (SDI), mean of income approach, non-farm activities

1.0 Introduction

Oil palm-related ventures are essential to rural development by providing income opportunities and boosting the economy. The crop is cultivated to produce palm oil, a vegetable oil with a wide range of applications, including food, cosmetics, and biofuels (Corley & Tinker, 2016). According to Sundlin *et al.*, (2014), oil palm production is a common activity for rural households. They may participate as independent growers or as smallholders, overseeing comparatively small land areas within larger plantations. The cultivation process, which necessitates significant labor inputs, involves clearing land, planting oil palm seedlings, maintaining the plants, and harvesting (Obidzinski *et al.*, 2012). For rural households, smallholder oil palm farming provides a means of escaping poverty,

particularly in places with few other options for generating income (Clay, 2014). In rural areas of low-income nations today, farming is rarely an adequate means of subsistence (Ellis, 1998a). Because of this, the majority of rural households are found to rely on a wide range of pursuits and sources of income, with the production of crops and animals ranking among the many other activities that contribute to the well-being of the family. Diversification necessitates a range of revenue streams. To satisfy the demands of their farm households, farmers must engage in additional revenue-generating ventures to augment their farming income. While wage work in non-farm activities, employment in rural regions other than farms, and remittances from urban areas are also likely to be included, this may include off-farm wage work in agriculture (Ellis, 1998a). Combining many livelihood activities into one economic entity is known as diversification, provided that each livelihood activity is considered an independent economic entity. Johnson (1990) and Fabusoro (2010) claim that diversity acts as a hedge against changes in output, cash, income, consumption, and savings, hence assisting in the distribution of risk. A varied range of activities enhances a rural livelihood's long-term resilience against unfavorable trends and unexpected shocks, which in turn adds to its sustainability. It is generally acknowledged that households at or below the poverty level benefit from having the opportunity to diversify. The distinction between barely surviving livelihoods and destitution can be determined by one's options for generating revenue (Ellis, 1999; Scoones, 2009). One method to improve the income and security of farm families during a period of economic uncertainty is to diversify farm household employment by expanding both on-farm and off-farm non-agricultural industries. This strategy works even in industrialized economies.

Globally, rural households depend on a variety of non-farm revenue sources, or sources of income other than traditional agriculture. For rural households to minimize income volatility, improve resilience to economic shocks, and lessen poverty, non-farm income diversification is essential (Lanjouw & Lanjouw, 2001). Beyond typical agricultural operations, it provides opportunities for skill development, employment creation, and income growth (Reardon & Vosti, 1995).

Non-farm revenue sources are essential to rural households' livelihood plans because they provide avenues to escape poverty and strengthen their financial stability. At the moment, the means by which rural households earn their living, which constitute their livelihood strategies, is attracting a wide range of concern as what they earn from a single income source is no longer enough to meet their needs. Therefore, exploring other income opportunities could offer a pathway out of poverty for rural people. The significance of non-farm income activities on the welfare of rural households can no longer be ignored, as the rising incidence of low welfare levels among rural households in Nigeria remains unabated despite various policy reforms undertaken in the country.

The motivation for the study is to evaluate the contributions of non-farm income to rural households' dependence on oil palm-based ventures as livelihood strategies in Edo and Delta States, Nigeria. This analysis examines the current state of affairs in the study area and provides insight into what is going on. The specific objectives were to: identify the socioeconomic characteristics of the respondents; identify the activities carried out by rural households; estimate the level of income generated from these activities; and assess the diversity of non-farm income sources carried out by rural households in the study area.

The rest of the paper is divided into the following sections: section two discusses the literature review; section three is the methodology; section four unveils data analysis and results interpretation; and lastly, section five discusses the conclusion and policy recommendation.

2.0 Literature Review

2.1 Theoretical Framework

2.1.1 Push and Pull theory of Diversification

The incentives for diversification are divided into push and pull determinants (Barrett *et al.*, 2001; Haggblade *et al.*, 2007). The push-pull theory of diversification is based on the principles of neoclassical economics, rational choice, and factor price. The theory behind this is that increases in non-farm incomes encourage farm households to diversify their income sources (Reardon *et al.*, 2006). Push factors are unfavorable elements that could compel farm households to look for alternative sources of income, either inside or outside of farming. These comprise elements like risk, seasonality, land constraints brought on by population pressure and fragmented land holdings, absentee or incomplete labor, capital, and land markets, issues with market access resulting from inadequate infrastructure and high transaction costs, asset strategies, and coping mechanisms (Barrett *et al.*, 2001; Ellis 2000b). They are linked to a form of diversification known as "survival-led diversification," in which rural farm households with lower incomes are pressured to participate in low-return non-farm endeavors in order to survive, lessen their vulnerability, or keep from sinking further into poverty (Haggblade *et al.*, 2007).

Conversely, the pull theory of diversification suggests favorable elements that encourage people to increase their sources of income, either inside or outside of agriculture. Furthermore, diversification is a cumulative process that demands the capacity to produce income, make investments in assets, and vary one's range of activities in order to secure higher living standards (Ellis & Freeman 2004).

2.2 Empirical Review

This section reviews empirical literatures on the Contributions of Non-Farm Income to Rural Households Dependent on Oil Palm-Based Ventures as Livelihood Strategies.

Non-Farm Income to Rural Households

Non-farm income encompasses earnings generated from activities beyond traditional agricultural operations. Non-farm income covers a diverse array of activities undertaken by rural households to supplement their earnings. It plays an essential role in enhancing rural livelihoods by providing alternative employment opportunities, income stability, and poverty alleviation. It enables rural households to augment their earnings, improve living standards, and access essential goods and services. Moreover, non-farm income contributes to the resilience of rural economies by fostering economic diversification, stimulating local markets, and promoting entrepreneurship and innovation (Reardon *et al.*, 2000).

Jabo *et al.*, (2014) studied the impact of non-farm income-generating activities on the food security status of rural households in Nigeria. General household survey-panel data that adopted the World Bank living standard measurement survey (LSMS) technique was used. The study revealed that diversified households were relatively more food secure than undiversified households.

Nmeregini *et al.*, (2019) examined the non-farm income-generating activities of rural households in Abia State, Nigeria. The study used primary data obtained through the use of a structured questionnaire and an interview schedule. The findings revealed that the non-farm category had the highest income.

Odoh *et al.*, (2019) studied farm and non-farm income diversification activities among rural households in the south-east of Nigeria. Purposive and multi-stage sampling procedures were

used to collect data using a structured interview schedule. The result showed that the majority of rural households diversified their income sources into other non-farm activities as opposed to on-farm activities. Nasrin & Wahid (2015) investigated the contribution of rural non-farm activities in household income generation: A study on Khulna Region. The study was based on primary data collected through a questionnaire. The result shows that household income generation from non-farm activities was higher than income generated from other activities.

However, it was discovered that none of these studies has been able to capture the contributions of non-farm income to rural households' dependence on oil palm-based livelihood strategies. To fill this gap, the present study employed the Mean of Income approach and Simpson's Diversification Index (SDI) in examining the composition of household incomes in terms of different income-generating activities as well as the income shares and the level of diversity of their income among the different sources. This study is hereby meant to minimize the gaps and contribute to the literature by studying the contributions of non-farm income to rural households' dependence on oil palm-based ventures as livelihood strategies in Edo and Delta States, Nigeria.

3.0 Methodology

3.1.1 Study Area

Edo and Delta States are located in the south-south region of Nigeria, which is known for its rich biodiversity, diverse cultures, and significant economic activities, including oil palm cultivation. Edo State has eighteen (18) local government areas, with its capital in Benin City, which are characterized by lush vegetation, fertile soils, and a humid tropical climate conducive to agriculture (Igbafe, 2014). The state has a diverse ethnic composition, including the Edo (Benins), Esan, and Afemai peoples, each with unique cultural traditions and languages (Obayagbona & Irabor, 2017). Agriculture, particularly oil palm cultivation, plays a crucial role in the state's economy, providing employment and income for rural households (Egharevba *et al.*, 2016). Delta State, with its capital in Asaba, is renowned for its vast oil reserves, which have contributed significantly to Nigeria's economy (Osinubi *et al.*, 2017). The state is home to various ethnic groups, including the Urhobo, Itsekiri, Isoko, Anioma, and Ijaw, each with distinct cultural identities and livelihood practices (Onokerhoraye, 2010; Ogbovoh, 2018). The population of Delta State, according to the National Population Commission (NPC), in 2006 was 4,098,291 people. Oil palm cultivation is prevalent in Delta State, especially in rural areas, where it serves as a source of livelihood for many communities (Ogisi *et al.*, 2018).

3.2 Source of Data

Primary data was used for this study. Data were obtained from oil palm-based rural households with the aid of a well-structured questionnaire with open and closed ended questions of qualitative and quantitative data for the study.

3.3 Sampling Procedure and Sample Size

The study adopted a multi-stage sampling procedure in selecting the respondents for the study area. The first stage involved a proportionate sampling of 25% of the total Local Government Areas (LGA) from each state, giving five (5) for Edo and six (6) for Delta states based on the predominance of oil palm rural households. The LGAs were Ovia North-East, Ovia South-West, Orhionmwon, Owan East, Esan Central in Edo State, and Aniocha South, Ika South, Ndokwa West, Ethiope East, Ughelli North, and Isoko-North in Delta State. The second stage was a purposive sampling of five (5) oil palm-producing communities from each local government area. The third stage involved a random sampling of 50% of oil palm-related

rural households from each community, making a total of three hundred and forty-two (342) respondents from the list of oil palm producers obtained from the Oil Palm Growers Association of Nigeria (OPGAN), which served as the sampling frame (1095 and 1255 oil palm farmers for Edo and Delta states, respectively). From the sample size of 342 oil palm-related rural households, only 326 were valid for the analysis of the study. The sample size determination formula, as stated by Krejcie & Morgan (1970), was used to calculate the sample size since the population size was known. Below is the mathematical illustration for the Krejcie & Morgan Formula used in calculating the sample size:

$$n = \frac{N}{1 + N(e^2)}$$

Where,

n = sample size

N = population size

e = is the level of precision or margin of error, expressed as a proportion (0.05 for a 5% margin of error).

3.4 Analytical Technique

3.4.1 Descriptive Statistics

The data collected for the study were analyzed using descriptive statistics such as frequencies, percentages, and means to describe socio-economic characteristics and identify livelihood strategies.

3.4.2 Mean of Income Analysis

The *Mean of Income* approach was used to estimate the income obtained by the oil palm-related rural households in the study area. This approach estimates the incomes at the individual household level by finding the income from each income source in the total household income (THI) for each oil palm-related rural household. The mean income from each income source for all households is then calculated.

The general Mean of Income formula is given as:

$$MI = \frac{\sum_{h=1}^n y_{ih}}{n}$$

Where;

MI = the mean of income,

y = income from particular activity,

h = the household,

n = the number of households.

The sum of Total Household Income (THI) is given as:

$$THI = \sum_{j=i}^n Y_j$$

Where:

THI = Total Household Income,

Y = income coming from all sources,
j = income sources.

3.4.3 Simpson’s Diversification Index (SDI)

This index measures the diversity or heterogeneity of income sources among oil palm-related rural households. The SDI takes into consideration both the number of income sources as well as how evenly the distributions of income between the different sources are (Agyeman *et al.*, 2014; Minot *et al.*, 2006). This reason justifies the choice of the SDI as applied in this study over other measures of diversification. The SDI ranges between zero (0) and one (1). The closer the SDI value is to 1, the more diversified the household.

The formula for calculating Simpson's Diversification Index is as follows:

$$SDI = 1 - \sum_{i=1}^n P_i^2$$

Where:

SDI = Simpsons Diversification Index, *n* = number of income sources, *P_i* = Proportion of income coming from the source *i*,

The SDI model was expressed in this study as:

$$SDI = 1 - \sum_{i=1}^n \left\{ \left(\frac{cpoi}{thi}\right)^2 + \left(\frac{ffbi}{thi}\right)^2 + \left(\frac{pki}{thi}\right)^2 + \left(\frac{ki}{thi}\right)^2 + \left(\frac{pksi}{thi}\right)^2 + \left(\frac{pwti}{thi}\right)^2 + \left(\frac{cfi}{thi}\right)^2 + \left(\frac{lsi}{thi}\right)^2 + \left(\frac{tdi}{thi}\right)^2 + \left(\frac{arti}{thi}\right)^2 + \left(\frac{empi}{thi}\right)^2 + \left(\frac{peni}{thi}\right)^2 + \left(\frac{remi}{thi}\right)^2 + \left(\frac{cmi}{thi}\right)^2 + \left(\frac{illhi}{thi}\right)^2 + \left(\frac{dri}{thi}\right)^2 \right\}$$

Where:

Cpoi = crude palm oil income, ffbi = fresh fruit bunch income, pki = un-cracked palm kernel income, ki = cracked kernel income, pksi = palm kernel shell income, pwti = palm wine tapping income, cfi = crop farming income, lsi = livestock income, tdi = trading income, arti = artisan income, empi = employment income, peni = pension income, remi = remittance income, cmi = commercial milling income, illhi = income from leasing of land/house, dri = driving income, thi = total income of households.

4.0 Results and Discussion

4.1 Socio-Economic distribution of Respondents in the Study Area.

Table 1 presents the socio-economic distribution of respondents. The majority of respondents fall within the age range of 41–50 (43.25%), with a mean age of 56 years. There are more male respondents (77.3%) compared to female respondents (22.7%), and the majority of the respondents were married (88.3%). The respondents in the study area have varying levels of education, with the majority having completed their secondary education (52.76%), followed by those with tertiary education (19.94%). The majority of respondents have crop farms ranging from 0.1 to 2 hectares (70.25%), with the majority having farming experience ranging from 11 to 20 years (49.39%). The primary sources of credit for respondents are personal savings (46.3%), cooperatives (28.5%), and banks (12.0%) in the study area.

Table 1: Socio-Economic Distribution of Respondents

| Variables | Frequency | Percentage | Mean |
|----------------------------|-----------|------------|------|
| Age | 10 | 3.07 | 56 |
| ≤ 40 | 74 | 22.70 | |
| 41-50 | 141 | 43.25 | |
| 51-60 | 83 | 25.46 | |
| 61-70 | 18 | 5.52 | |
| >70 | 10 | 3.07 | |
| Total | 326 | 100 | |
| Sex | | | |
| Male | 252 | 77.3 | |
| Female | 74 | 22.7 | |
| Total | 326 | 100 | |
| Marital Status | | | |
| Single | 2 | 0.613 | |
| Married | 288 | 88.344 | |
| Widowed | 36 | 11.043 | |
| Total | 326 | 100 | |
| Household Size | | | |
| ≤ 5 | 80 | 24.5 | 7 |
| 6-10 | 215 | 66.0 | |
| 11-15 | 29 | 8.9 | |
| >15 | 2 | 0.6 | |
| Total | 326 | 100 | |
| Education (years) | | | |
| Attempted primary (1-5) | 11 | 3.37 | |
| Completed primary (6) | 50 | 15.34 | |
| Attempted secondary (7-11) | 28 | 8.59 | |
| Completed secondary (12) | 172 | 52.76 | |
| Tertiary (> 12) | 65 | 19.94 | |
| Total | 326 | 100 | |
| Crop farm size (Ha) | | | |
| 0.1 - 2 | 229 | 70.25 | |
| 2.1 - 4 | 81 | 24.85 | |
| 4.1 - 6 | 10 | 3.07 | |
| 6.1 - 8 | 5 | 1.53 | |
| ≥ 8 | 1 | 0.30 | |
| Total | 326 | 100 | |
| Farming experience | | | |
| 1-10 | 126 | 38.65 | |
| 11-20 | 161 | 49.39 | |
| 21-30 | 39 | 11.96 | |
| Total | 326 | 100 | |
| Source of credit | | | |
| Friends & relatives | 12 | 3.7 | |
| Bank | 39 | 12.0 | |
| Cooperative | 93 | 28.5 | |
| Money lender | 31 | 9.5 | |
| Personal savings | 151 | 46.3 | |
| Total | 326 | 100 | |

Source: Computed from Field Data; 2023

4.2 Distribution of respondents according to their income strategies (generating activities) among the respondents.

The results in Table 2 show the variety of income-generating activities that rural households engage in. Crop farming was the predominant livelihood activity, with 98.2%, while livestock keeping had 7.7% of households' engagement. This indicates that the majority of respondents carried out crop farming for additional income, indicating its significance as a primary source of income. This supports the research by Agyeman *et al.* (2014) that the majority of farm households engage in food crop production to be able to meet their food security needs and to earn income. Trading emerged as another significant livelihood strategy, with 30.1% of respondents engaged in it, and artisans had 5.5% of respondents engaged in it. Other livelihood strategies were remittance, which was also engaged by 18.1%, civil and public service (13.8%), and pension (8.3%). This finding underscores the diverse range of income-generating activities among rural households, with a significant reliance on agricultural-based activities (on-farm sources) alongside non-farm and off-farm sources of income. This is consistent with research conducted by Alobo and Bignebat (2017), which found that rural households use a variety of livelihood strategies to maintain their standard of living and may reduce the risks associated with relying solely on one source of income.

Table 2: Income activities carried out by the rural households.

| S/N | Livelihood categories | Livelihood Strategies | Frequency of Respondents Selected | Percentage of Respondents Selected |
|-----|-----------------------|------------------------------|-----------------------------------|------------------------------------|
| 1 | On-farm income | Crop farming | 320 | 98.2 |
| 2 | | Livestock keeping | 25 | 7.7 |
| 3 | Non-farm income | Trading | 98 | 30.1 |
| 4 | | Artisan | 18 | 5.5 |
| 5 | | Commercial milling | 12 | 3.7 |
| 6 | | Driving | 11 | 3.4 |
| 7 | Off-farm income | Remittance | 59 | 18.1 |
| 8 | | Civil/public service | 45 | 13.8 |
| 9 | | Pension | 27 | 8.3 |
| 10 | | Revenue from land/house rent | 17 | 5.2 |

Source: Computed from Field Data, 2023.

4.3 Distribution of respondents according to the income generated from their income activities in the study area.

Table 3 shows the income realized from their income activities. Income from on-farm activities, primarily crop farming and livestock keeping, contributed significantly to rural household incomes. In Delta State, income from on-farm activities amounted to ₦1,885,736.14, representing 49.99% of total household income, while in Edo State, it amounted to ₦2,347,922.53, accounting for 59.73% of total household income. This is consistent with research conducted by FAO (2014) and Reardon *et al.* (2003), which found that rural households mostly depend on agriculture as a source of income.

In addition, non-farm activities, including trading, artisanship, commercial milling, and driving, made a significant contribution to household earnings. Income from non-farm activities made up ₦1,609,532.59 in Delta State, or 42.66% of total household income, and ₦1,134,845.05 in Edo State, or 28.87% of total household income. This supported research by Barrett *et al.* (2001) and the World Bank (2018), which found that diversification of livelihood strategies beyond agriculture highlights the growing significance of non-farm income sources in rural economies.

Remittances, civil and public service, pensions, and income from house or land rentals were among the non-farm activities that made up a smaller portion of the household income. Off-farm income in Delta State was ₦277,304.33, or 7.35% of the total household income; in Edo State, it was ₦447,866.18, or 11.40% of the total income. According to the World Bank (2020) and FAO (2019), off-farm pursuits offer additional revenue sources and can strengthen a household's ability to withstand economic disruptions. The need for a varied livelihood portfolio for rural households, comprising both agricultural and non-agricultural income streams, to improve their economic resilience and well-being is further highlighted by the income estimates from various livelihood activities

Table 3: Income Estimates of the Rural Households from different Livelihood Strategies

| S/N | Income sources | Delta State (₦) | Edo State (₦) | Share of income sources in Delta in % | Share of income sources in Edo in % |
|-----|---|----------------------|-----------------------|--|--|
| 1 | Crop farming | 1,604,948.1 (184) | 2,202,218.31 (136) | 42.54 | 56.03 |
| 2 | Livestock keeping | 280,788.04 (19) | 145,704.22 (6) | 7.44 | 3.71 |
| 3 | Trading | 1,370,945.65 (67) | 726,225.35 (31) | 36.34 | 18.48 |
| 4 | Artisan | 129,304.34 (12) | 68,535.21 (6) | 3.43 | 1.74 |
| 5 | Driving | 54,782.60 (7) | 146,591.54 (4) | 1.45 | 3.73 |
| 6 | Commercial milling | 54,500 (3) | 193,492.95 (9) | 1.44 | 4.92 |
| 7 | Remittance | 84,782.60 (30) | 97,218.30 (29) | 2.25 | 2.47 |
| 8 | Civil/public service | 145,891.30 (21) | 246,000 (24) | 3.87 | 6.26 |
| 9 | Pension | 41,739.13 (12) | 74,366.19 (15) | 1.11 | 1.89 |
| 10 | Income from leasing of land/house | 4,891.30 (6) | 30,281.69 (11) | 0.13 | 0.77 |
| | Income from on- farm activities (1-2) | 1,885,736.14 | 2,347,922.53 | 49.99 | 59.73 |
| | Income from non- farm activities (3-6) | 1,609,532.59 | 1,134,845.05 | 42.66 | 28.87 |
| | Income from off- farm activities (7- 10) | 277,304.33 | 447,866.18 | 7.35 | 11.40 |

| | | |
|--------------------------------------|--------------|--------------|
| Total income from all the activities | 3,772,573.06 | 3,930,633.76 |
| N (Households) | 184 | 142 |

Source: Computed from Field Data, 2023.

4.5 Respondents distribution according to Heterogeneity of Income Sources

The distribution of respondents based on the heterogeneity of their income sources, grouped by index ranges, is shown in Table 4. In Edo State, the majority of respondents were within an index range of 0.30 to 0.49, constituting 44.4% of the households, while 0 accounted for 23.9%. Meanwhile, in Delta State, a notable proportion of respondents were within the index range of 0.30 to 0.49 (43.5%) and 0 (35%). This indicates that there is a considerable percentage of rural households that rely on numerous sources of income, indicating a moderate level of diversity in income sources in both states. The average diversity of income sources among respondents is reflected in the Simpson's diversification index (SDI) mean, with Edo State having a significantly lower mean (0.32). This implies that households in Edo State have, on average, diversified their income sources to some extent. Delta State has a slightly higher SDI mean (0.33). This suggests that households in Delta State have a slightly higher average level of income diversification than households in Edo State. The fact that the number is less than 0.5, however, suggests that there is still some revenue concentration in both states from particular sources. This may suggest that, should those main sources of income be impacted, there may be a possibility of sensitivity to economic shocks. The standard deviation (SD) in Delta State (0.20) is lower than in Edo State (0.22), indicating that respondents in Edo State have a higher degree of income source variability. Generally, the data shows that although respondents' heterogeneity of income sources varied somewhat in both states, a sizable majority of them obtained their money from a variety of sources, underscoring the significance of diverse income strategies in rural lives.

Table 4: Distribution of Respondents according to Heterogeneity of Income Sources

| Index range | Edo State Frequency | % | Delta State Frequency | % |
|--------------------|------------------------|------|--------------------------|------|
| 0 | 34 | 23.9 | 35 | 19.0 |
| 0.10-0.29 | 21 | 14.8 | 32 | 17.4 |
| 0.30-0.49 | 63 | 44.4 | 80 | 43.5 |
| 0.50-0.69 | 22 | 15.5 | 37 | 20.1 |
| 0.70-0.89 | 0 | 0 | 0 | 0 |
| 0.90-1.09 | 2 | 1.4 | 0 | 0 |
| SDI mean | 0.32 | | 0.33 | |
| Standard deviation | 0.22 | | 0.20 | |
| N | 142 | | 184 | |
| Range | 0.00-1 | | 0.00-0.65 | |

Source: Computed from Field Data, 2023.

5.0 Conclusion and Policy Recommendations

The study was designed to assess the contributions of non-farm income to rural households' dependence on oil palm-based ventures as livelihood strategies. The study specifically described the socio-economic characteristics, identified the livelihood activities, estimated the incomes from the livelihood strategies, and assessed the heterogeneity of income sources in the study area. A multi-stage sampling procedure was employed to select 342 respondents; however, 326 respondents were valid for the analysis. Primary data were collected through the use of a well-structured questionnaire administered to the oil palm-based rural households.

In the study area, the majority of respondents were male, between the ages of 41 and 50 (43.25%), and had between 11 and 20 years of farming experience (49.39%). The majority of the respondents in the study area (52.76%) have completed secondary education. The size of their crop farms ranges from 0.1 to 2 hectares (70.25%). Personal savings (46.3%) and cooperatives (28.6%) are the major sources of credit for the respondents in the study area. The findings of the result from the livelihood activity identification showed the activities that were engaged in by the rural households as crop farming (98.2%) and livestock (7.7%) made up the on-farm income, trading (30.1%), artisan (5.5%), commercial milling (3.7%), driving (3.4%) constituted the non-farm income, remittance (18.1%), civil/public service (13.8%), pension (8.3%), and revenue from land/house rent (5.2%) made up the off-farm income in the study area. It was found that Delta State's total household income was substantially lower than Edo State. They receive a substantial percentage of their money from several sources. From the SDI value, Delta State had a marginally higher degree of income source variety than Edo State. The fact that the SDI value is less than 0.5, however, suggests that there is still considerable income concentration among particular sources in both states, which may signal possible vulnerability to economic shocks in the event that those main sources of income were impacted. The findings from the result revealed that non-farm activities made up a significant portion of the rural households' incomes. Due to the diversification of their livelihood strategies, agriculturally based activities (or on-farm activities) remained a major source of income for these households. Non-farm activities have helped diversify their sources of income, thereby underscoring the livelihood strategies' significant economic contribution to the rural households in the study area. Furthermore, based on the findings of the study, this recommendation was made:

1. There should be a concerted effort by relevant authorities to improve the means of livelihood of rural households to further increase their economic portfolio because a large number of rural households engage in different activities as their livelihood strategy.
2. Policymakers should promote gender equity and inclusivity within the agricultural sector to reduce the male dominant and support more female farmers.
3. Deliberate initiatives should be implemented to provide an affordable credit source tailored to the needs of rural households by reducing bureaucratic procedures and offering competitive interest rates to encourage patronage.

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