# POVERTY STATUS AND INCOME INEQUALITY AMONG COOPERATIVE AND NON-COOPERATIVE COCOA FARMING HOUSEHOLDS IN EDO STATE, NIGERIA

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**BENIN CITY**

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION SERVICES, FACULTY OF AGRICULTURE, UNIVERSITY OF BENIN, BENIN CITY**

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## CERTIFICATION

This is to certify that the research work on the Poverty Status and Income Inequality Among Cooperative and non-cooperative Cocoa Farming Households in Edo State was carried out by Maduike Hellen Chinemere with the Mat. No AGR2004283 under the supervision of the department of Agricultural Economics and Extension Services, Faculty of Agriculture, University of Benin, Edo State, Nigeria.

_____ **Date:**_____

**Dr. (Mrs.) O.B. Izekor**
**Project Supervisor**

_____ **Date:**_____

**Prof. J. Egbodion**
Head of Department

## DEDICATION

This project is dedicated first to God Almighty, whose grace has never failed me.

It is also lovingly dedicated to my family, whose encouragement and unwavering support have been my greatest motivation.

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## TABLE CONTENT

## LIST OF TABLES

## LIST OF TABLES

## ABSTRACT

This study investigated the poverty status and income inequality among cooperative and non-cooperative cocoa farming households in Edo State, Nigeria. Cocoa production remains a major livelihood activity in rural communities, yet farmers continue to experience persistent poverty due to structural, financial, and agronomic challenges. The study specifically examined the socio-economic characteristics of cocoa farmers, identified services provided by cooperatives, assessed poverty levels using the Foster–Greer–Thorbecke (FGT) poverty indices, analysed determinants of poverty through logistic regression, and identified major constraints affecting cocoa production. A multistage sampling procedure was used to select 106 respondents, consisting of 54 cooperative members and 52 non-members. Primary data were collected using a structured questionnaire and analysed with descriptive statistics, FGT measures, and logistic regression models.

Findings revealed that cocoa farming in the study area is dominated by middle-aged and elderly males with moderate levels of education and household sizes. Cooperatives provided key services such as credit, agro-chemicals, improved seedlings, marketing support, and discounted inputs. Surprisingly, poverty incidence was higher among cooperative households ($P_0 = 0.407$) than among non-cooperative households ($P_0 = 0.288$). Poverty depth and severity followed the same trend, indicating that cooperative members were more deeply affected by poverty. Logistic regression results showed that cocoa income was the only significant determinant of poverty among cooperative farmers, while demographic factors such as age, household size, education, and farming experience had no significant effect. This underscores the central role of productivity and income-generating capacity in reducing poverty.

The study further identified several severe constraints affecting cocoa farmers, including high labour and input costs, fluctuating cocoa prices, inadequate finance,

ageing plantations, pest and disease incidence, and poor access to storage and processing facilities. These constraints collectively weaken the ability of farmers to improve productivity and income, thereby limiting the effectiveness of cooperative services. The study concludes that cooperative membership alone is insufficient for poverty reduction without broader institutional strengthening, improved access to inputs and credit, enhanced extension services, and better rural infrastructure. The study recommends targeted interventions to improve productivity, stabilise market conditions, and address structural challenges in the cocoa value chain to enhance the welfare of cocoa farming households in Edo State.

# CHAPTER ONE

## 1.0. INTRODUCTION

### 1.1 Background of Study

Agriculture has long served as a sustainable source of livelihood for millions of Nigerians. Its critical role in economic growth and development has drawn the attention of all tiers of government to the sector. The agricultural industry includes numerous products, each with its own value chain that spans from production to processing and marketing before reaching consumers (Oseni *et al*.,2018). Among these, cocoa stands out as a key agricultural commodity with a well-established value chain. Since Nigeria's independence, cocoa has consistently benefited the nation's economy, it supports livelihoods, ensures food security, supplies raw materials for industries, and generates employment for millions of Nigerians (Oseni *et al*.,2018).

Cocoa became Nigeria's primary source of foreign exchange, contributing roughly 30% to its foreign earnings. This dominance continued through the 1960s, a period when agriculture contributed up to 60% of the nation's Gross Domestic Product (Bello & Mitchell, 2018). In spite of its significant contribution to the economy, cocoa production in the country witnessed a downward trend in output. In the 1970s for instance, cocoa output peaked at 308,000 tonnes. Unfortunately, this figure dropped sharply in 1980 and 1981 to 155,000 tonnes. The downward trend continued to 110,000 tonnes by 1990 and 1991 farming season. Although in

2010/2011 production season, output increased to 212,000 tonnes, but declined to 200,000 tonnes in 2015/2016 production season (FAO, 2011 & ICCO, 2018). Olufikayo (2019) said that the world cocoa market is expected to grow from US$10.14 billion in 2015 to US$14.572 billion by 2026, this is because more young people around the world are starting to like chocolate. Tothmihaly (2017) also said that the demand for cocoa is getting stronger, especially in places like Eastern Europe and Latin America.

According to the 2018/19 Nigerian Living Standard Survey (NLSS) by the National Bureau of Statistics (NBS), 40.1% of Nigerians were living in poverty in 2019. This means about 82.9 million people spent less than ₦137,430 in a year (or ₦376.50 each day), which is below the poverty line, and were therefore classified as poor (NBS, 2019). According to Ravallion and Datt (2019), increasing agricultural productivity plays a significant role in poverty reduction through multiple pathways. Direct effects arise when agricultural growth leads to immediate increases in the incomes of poor farm and non-farm households. Indirect effects emerge as increased agricultural output stimulates demand across other sectors, leading to the creation of employment opportunities both upstream (input supply) and downstream (food processing and distribution). Additionally, higher productivity contributes to changes in real income and generates multiplier effects on the non-farm economy, including food pricing and local economic

activity. Under this situation, the farmers need strong institutions like cooperatives to break out of the vicious circle of income inequality and poverty.

A cooperative is a legally recognized organization that is owned and run by its members, who make decisions together in a democratic way (ICA, 2020). Members are usually directly involved with the cooperative, either as its workers, customers, or suppliers. Cooperatives have specific social values, including open membership, meaning anyone can join as long as they meet fair, non-discriminatory requirements. The financial benefits are shared based on how much each member uses or contributes to the cooperative, such as through a share of profits from sales or purchases, rather than based on how much money they invest (ICA, 2020). What sets them apart from other businesses is that they aim to balance profit or economic stability with the well-being of the community (ICA, 2020). Agricultural cooperative societies are organizations specifically created to meet the needs of people working in agriculture (Onyima and Okoro, 2019). They operate in various areas, including consumption, production, and marketing. According to Onyima and Okoro (2019), farmers enhance agricultural productivity and boost socio-economic activities by combining their limited resources through cooperative organizations.

## 1.2 Problem Statement

As Ojiagu and Onugu (2015) pointed out, many rural farmers are close to or even below the level needed to survive economically. Poverty remains a serious threat to human survival wherever it exists. It has become a persistent trap that affects entire households and, over time, can lead to death (Moshin Khan, 2019). Reducing and eventually eliminating poverty has become a major concern for countries worldwide and stands as a core goal and top priority on the international development agenda (United Nations, 2015). Co-operatives help their members become financially stable by giving them access to loans with little or no interest (Mutiso, 2019). This means that for co-operative societies to keep running well without problem, they must be able to pay for all their expenses, make some profit for their members, and operate without relying on external support or subsidies (Njoronge, 2018). However, a key question that arises, especially in times of economic hardship, is whether financial stability is truly achievable in the face of loan defaults. Based on this concern, the study focused on assessing the impact of co-operative membership on income level and poverty status among cocoa farming households in Edo State, Nigeria. In view of this, the study attempted to find answers to the following research questions:

1. What is the poverty status and level of income inequality of co-operative farming households relative to their non-cooperative counterpart?

2. What factors influences the income inequality and poverty status of co-operative and non-cooperative farming households?

## 1.3. Objectives of the Study

The main objective of this study is to compare the poverty status and income inequality of cocoa farming households among co-operative members and non-members in rural areas of Edo State. Specifically, the objectives are to:

1. identify the socio-economic characteristics of cocoa farmers who are members and non-members of cooperatives in Edo State.
2. identify the services provided by the co-operative societies to cocoa farmers in the study area.
3. assess and compare the income inequality and poverty levels of cooperative members and non-members among cocoa farmers.
4. examine the determinants of poverty among co-operative and non-cooperative cocoa farmers.
5. identify the constraints faced by cocoa farmers in the study area.

## 1.4. Justification of study

Based on research findings, some scholars have argued that cooperative societies are not financially stable because many members do not repay their loans on time or at all. This issue of loan default has created major challenges for co-operatives

pin states such as Anambra, Lagos, and Maiduguri (Okoli, 2018; Amusat *et al*., 2022; Hamsatu *et al*., 2023). My research includes an objective to identify the constraints faced by cocoa farmers in accessing the benefits of co-operative societies, understanding this issue helps contextualize the limits of co-operative effectiveness and their ability to uplift members financially. Adelodun (2017) carried out a review of existing studies on cocoa production in Nigeria, while Bello and Mitchell (2018) explored the political economy of cocoa in the country: a history of conflict or cooperation. This work gives a broad overview of cocoa production trends and challenges in Nigeria, which provides background knowledge for my study, though my study narrows that focus to poverty, Inequality, and co-operative membership in Edo state.

While Izekor and Oboh (2024) carried out a research on poverty status of co-operative and non-cooperative yam farmer households in Edo Central, Edo State and Abosede and Adeyemo (2019) examined the differentials in poverty levels of cocoa farmer cooperators and non-cooperators in Southwestern Nigeria. My research is distinct in several ways. It focuses specifically on cocoa farming households in rural Edo State and goes beyond poverty analysis to include income inequality among co-operative members and non-members.

It is on this background that the present study was initiated, with the aim of providing a quantitative framework for analyzing poverty status and income

inequality among cocoa farming households in Edo State, Nigeria. The findings of this study will benefit cocoa farmers by providing insights into how co-operative membership and non-membership influences income and poverty levels. Co-operative societies and their leaders will gain valuable information to improve their operations and member support. Policy makers and government agencies can use the findings to design targeted interventions for rural cocoa farmers in Edo state. Additionally, this study will serve as a valuable source of literature for future researchers, providing a foundation for further exploration and advancement of the subject.

# CHAPTER TWO

## 2.0 LITERATURE REVIEW

### 2.1 Conceptual Framework

#### 2.1.1 Concept of Co-operatives

##### 2.1.1.1 Origin and meaning of cooperative societies

The cooperative idea emerged as a collective response to people's social and economic challenges, especially among low-income and marginalized populations. The International Cooperative Alliance (ICA) defines a cooperative as an autonomous group of individuals who voluntarily unite to meet their shared economic, social, and cultural needs through a jointly owned and democratically managed enterprise (ICA, 1995). In contemporary understanding, a cooperative is viewed as an organized group that mobilizes members' resources, shares benefits equitably, and operates on democratic principles rather than profit maximization (Udenwa *et al*., 2023).

Although the concept of cooperation is as old as human society, the formal cooperative movement began in Europe during the 19$^{th}$ century. The most prominent example is the Rochdale Society of Equitable Pioneers, formed in 1844 by 28 artisans in Rochdale, England. Their aim was to achieve better living standards through joint purchasing and profit-sharing. While cooperative ideas had been practiced informally in many cultures long before this time, scholars regard the Rochdale initiative as the foundation of the modern cooperative model

due to its structure and sustainability (Sheereen, 2025). Over time, this model spread globally, adapting to different cultural and economic realities, including in developing nations such as Nigeria.

The essence of cooperatives lies in a set of core principles that define their operations. These include voluntary and open membership, democratic control by members, equitable economic participation, independence from external control, continuous education and training, collaboration among cooperatives, and commitment to community welfare (Kareem *et al*., 2018). These principles were first formalized by the ICA and remain central to cooperative identity today. Unlike conventional business enterprises, cooperatives prioritize the welfare of their members over profit, making them people-centered rather than capital-centered (Lawal, 2016).

Recent studies emphasize that cooperatives play dual roles; as economic ventures and as social institutions that promote inclusion, equality, and social capital formation. For example, Ndagi *et al*. (2023) observed that cooperative societies in Niger State, Nigeria, significantly enhanced farmers' livelihoods, increased their bargaining power, and provided better access to inputs and markets. This finding highlights how the cooperative model continues to serve as a vital instrument for empowering rural households and reducing poverty in agricultural communities.

In modern development discourse, the meaning of cooperative societies has evolved beyond traditional economic collaboration. Today, they are recognized as adaptive organizations that operate in diverse sectors such as agriculture, finance, housing, and technology. Their focus on collective ownership and democratic management makes them effective tools for addressing inequality, unemployment, and financial exclusion (Udenwa *et al*., 2023; Sheereen, 2025). Thus, while cooperatives originated from historical efforts to overcome economic hardship, their modern interpretation reflects a broader mission of promoting sustainable development, social inclusion, and economic resilience.

#### 2.1.1.2 Agricultural Co-operative societies: A Global perspective

Agricultural co-operative societies have emerged as crucial institutions for advancing productivity, inclusiveness, and sustainability in global agriculture. They are voluntary associations of farmers who pool their resources to collectively overcome production, marketing, and financial constraints (Birchall, 2018). Across the world, these organizations play a vital role in promoting inclusive growth, ensuring food security, and empowering rural populations, particularly in developing economies (FAO, 2020). According to the International Cooperative Alliance (ICA, 2021), over one billion people globally are members of cooperatives, with agricultural cooperatives serving as key drivers of rural employment and food system resilience.

In advanced economies, agricultural cooperatives have evolved into complex and highly structured enterprises. They control a substantial share of national agricultural output and market supply. For instance, in the United States, agricultural cooperatives manage about 30 percent of farm marketing activities and roughly 25 percent of farm supplies, thereby strengthening farmers' access to input and output markets (USDA, 2022). In Europe, cooperatives dominate several agricultural sectors, including dairy, cereals, and horticulture, and have contributed significantly to technological advancement and value-chain integration (Bijman & Iliopoulos, 2019). Likewise, in Scandinavian countries, cooperatives have transformed smallholder farming into competitive enterprises through collective processing, branding, and exports (Hanf & Schweickert, 2020).

In developing regions of Africa, Asia, and Latin America, agricultural cooperatives are often established as a strategic mechanism for tackling rural poverty, improving food security, and integrating smallholder farmers into modern value chains. The Food and Agriculture Organization (FAO, 2021) notes that these organizations enhance members' access to quality inputs, extension services, and markets while strengthening their adaptive capacity to climate change. A well-known example is India's Amul Dairy Cooperative, which has empowered millions of rural households through collective milk processing and marketing. Similarly, in Kenya, cooperative societies in coffee and tea production

have significantly contributed to income growth and rural empowerment (Mutunga *et al*., 2017).

Despite their achievements, global agricultural co-operatives continue to encounter difficulties such as poor access to finance, limited management capacity, and the challenge of digital transformation (Agarwal *et al*., 2023). However, emerging innovations show a gradual shift toward "smart cooperatives" that leverage digital tools, mobile technologies, and data systems to enhance transparency, decision-making, and traceability (Bhardwaj *et al*., 2023). Consequently, the global co-operative movement is undergoing transformation, combining its traditional principles of solidarity and democracy with modern business strategies to promote inclusive and sustainable agricultural growth.

#### 2.1.1.3 Agricultural Co-operative Societies in Nigeria

In Nigeria, agricultural co-operatives constitute one of the most effective platforms for enhancing farmers' economic participation and improving rural livelihoods. These co-operatives provide a mechanism through which smallholder farmers can collectively access inputs, credit, technical advice, and markets, thereby overcoming the limitations of operating individually (Owoeye *et al*., 2024). Over the decades, agricultural cooperatives have contributed to national agricultural development by facilitating resource pooling, enhancing bargaining power, and promoting agricultural innovation (Adegoke & Agbasi, 2023).

Empirical research across different parts of Nigeria confirms the positive impact of cooperative membership on agricultural outcomes. Olatinwo, Yusuf, and Bamidele (2023) found that farmers in Kwara State who belonged to cooperatives had greater access to fertilizers, improved seed varieties, and extension services, which led to higher yields and income compared to non-members. Similarly, Orngu (2024) reported that rice producers in Benue State who were cooperative members exhibited higher marketing efficiency and profitability. These findings demonstrate that agricultural cooperatives play a pivotal role in improving productivity, income distribution, and poverty reduction among farming households.

However, the co-operative sector in Nigeria is not without challenges. Persistent issues such as inadequate capital, weak leadership, limited government assistance, and poor management practices have restricted the effectiveness of many agricultural cooperatives (Ajayi, 2023). Enwa *et al*. (2024) highlighted the difficulties cooperatives face in accessing sufficient agricultural credit and maintaining financial accountability. Additionally, a lack of modern technology adoption continues to limit operational efficiency and market integration among rural cooperatives (Aremu *et al*., 2023).

Nonetheless, various policy interventions and institutional reforms have been introduced to strengthen the performance of agricultural cooperatives. Initiatives

such as the Anchor Borrowers' Programme, NIRSAL Microfinance Scheme, and the IFAD Value Chain Development Programme (VCDP) have significantly improved access to credit, inputs, and market linkages for cooperative members (CBN, 2023). These efforts show a growing recognition of agricultural cooperatives as instruments for achieving inclusive agricultural transformation and sustainable rural development in Nigeria.

#### 2.1.1.4 Roles of Agricultural Co-operatives on Farmers' Welfare

Agricultural co-operatives play a vital role in improving the welfare of farmers through enhanced access to inputs, credit, markets, and social capital. They serve as collective organizations that empower smallholder farmers to achieve economies of scale and reduce the risks associated with agricultural production (Birchall, 2018). Globally, cooperatives have been identified as a key instrument for addressing inequalities among rural populations and ensuring inclusive agricultural growth (FAO, 2021). They create opportunities for joint decision-making and collective bargaining, which help farmers secure fair prices, lower transaction costs, and strengthen their economic position (Bijman & Iliopoulos, 2019). By improving farm productivity and profitability, agricultural cooperatives contribute significantly to the overall welfare and resilience of their members.

One of the primary ways agricultural cooperatives enhance farmers' welfare is through;

1. **Access to agricultural inputs and credit facilities:** Smallholder farmers often face challenges in obtaining production inputs such as fertilizers, seeds, and agro-chemicals due to high prices and lack of collateral for loans. Cooperatives bridge this gap by collectively purchasing inputs in bulk at subsidized rates and distributing them among members (Adegoke & Agbasi, 2023). Similarly, they facilitate access to micro-credit and agricultural financing through savings and loan schemes, thereby reducing dependence on exploitative moneylenders (Enwa *et al*., 2024). In Ghana, for instance, cooperative credit unions have been found to significantly improve members' ability to invest in productive assets and sustain household income (Amponsah *et al*., 2020).

2. **Marketing and value-chain participation, which directly influences farmers' welfare**: By aggregating produce, cooperatives strengthen members' bargaining power and improve their access to reliable markets (Olatinwo *et al*., 2023). In Nigeria, rice and cocoa farmers who belong to cooperatives enjoy higher marketing efficiency, better pricing, and reduced exploitation by middlemen (Orngu, 2024). Beyond marketing, cooperatives are increasingly involved in processing and value addition, enabling farmers to capture a larger share of profits (Ajayi, 2023). This transition from subsistence farming to agribusiness enhances income stability and long-term welfare outcomes.

3. **Social welfare and human capital development**: They serve as platforms for training, knowledge sharing, and the dissemination of agricultural innovations (Aremu *et al*., 2023). Through partnerships with governmental and non-governmental agencies, cooperatives provide extension services and promote awareness of sustainable agricultural practices. According to Ndagi *et al*. (2023), members of agricultural cooperatives in Niger State reported improved access to extension education and empowerment programs, leading to better productivity and living standards. Furthermore, cooperatives foster community cohesion and social inclusion by encouraging democratic participation and mutual support among members (Birchall, 2018).

4. **Risk mitigation and income stabilization:** Farming is inherently risky due to price volatility, pest infestations, and climate variability. Cooperatives help farmers manage these risks by promoting group insurance schemes, joint savings, and diversification of income sources (FAO, 2020). They also act as safety nets during periods of crisis by providing emergency credit and social assistance to members (Adegoke & Agbasi, 2023). In Kenya and Ethiopia, cooperative societies have successfully implemented climate-smart initiatives and savings programs that protect members from shocks and income fluctuations (Mutunga *et al*., 2017).

5. **Enhance overall household welfare by raising income levels, improving food security, and promoting gender inclusiveness:** Empirical findings from Nigeria indicate that cooperative members are more likely to achieve food security, send their children to school, and improve their housing conditions compared to non-members (Owoeye *et al*., 2024; Adegoke & Agbasi, 2023). They also provide opportunities for women and youth to participate actively in economic decision-making, thereby contributing to social empowerment and poverty reduction (Ajayi, 2023). Collectively, these roles affirm that agricultural cooperatives are not only economic enterprises but also essential vehicles for sustainable rural development and welfare enhancement.

### 2.1.2 Concept of Poverty

Poverty is a complex and multidimensional condition that extends far beyond a lack of income. It reflects deprivation in critical areas of human well-being, including education, healthcare, nutrition, housing, and access to basic social services (World Bank, 2022). Essentially, poverty describes a situation where individuals or households cannot attain a minimum level of living considered acceptable within society (Akinbode *et al*., 2020). Over the years, the understanding of poverty has evolved from being viewed purely in economic terms to encompassing social exclusion, vulnerability, and the absence of empowerment (Alkire & Jahan, 2018). According to the United Nations

Development Programme (UNDP), poverty represents a state in which people are denied choices, opportunities, and dignity, thereby limiting their capacity to participate fully in societal development (UNDP, 2020).

Economists typically categorize poverty into absolute and relative dimensions. Absolute poverty describes a situation in which individuals cannot meet their most basic survival needs such as food, shelter, and clothing, and it is often measured using a global benchmark like the World Bank's $2.15 daily poverty line (World Bank, 2022). Relative poverty, in contrast, focuses on the disparities between individuals or groups within a society, highlighting inequality rather than basic deprivation (Townsend, 2019). To capture the multifaceted nature of poverty, scholars and policymakers increasingly rely on composite indices such as the Multidimensional Poverty Index (MPI), which incorporates indicators related to education, health, and living standards (Alkire & Foster, 2011; UNDP, 2020).

Globally, poverty remains one of the most pressing challenges despite sustained growth and development efforts. The World Bank (2022) estimates that about 8.4% of the global population, roughly 670 million people still live in extreme poverty, with the majority found in Sub-Saharan Africa and South Asia. Persistent structural challenges such as unemployment, limited access to credit, weak governance, and the growing impacts of climate change continue to aggravate the problem (FAO, 2023). The COVID-19 pandemic further deepened poverty levels

by disrupting livelihoods and pushing millions into vulnerability (OECD, 2021). These global realities underscore the need for collective and inclusive approaches, such as cooperative societies, to enhance resource access and social protection for disadvantaged groups.

In Nigeria, poverty remains both widespread and entrenched due to structural inequalities and limited institutional capacity. The National Bureau of Statistics (NBS, 2023) revealed that approximately 83 million Nigerians, about 40% of the population live below the national poverty threshold. The rural farming population is the most affected, largely because of poor infrastructure, declining agricultural productivity, and restricted market access (Afolabi, 2019). In addition, gender-based and regional disparities exacerbate poverty, with women and marginalized groups experiencing higher levels of deprivation (Okeke *et al*., 2022). Consequently, poverty in Nigeria must be addressed not only as an economic problem but also as a socio-institutional issue requiring interventions in cooperative development, rural investment, and equitable policy frameworks.

#### 2.1.2.1 Measurement of poverty

Measuring poverty is essential for understanding its extent, identifying vulnerable populations, and designing effective policies to reduce deprivation. Poverty measurement helps governments and development organizations determine who is poor, the depth of their deprivation, and the dimensions in which they are

disadvantaged (Alkire *et al*., 2020). Traditionally, poverty has been assessed through monetary indicators such as income or consumption expenditure, which reflect the ability of individuals or households to meet basic needs (World Bank, 2022). However, as the understanding of poverty expanded, it became clear that focusing solely on income is inadequate to capture its complex and multidimensional nature (UNDP, 2020). Modern approaches therefore integrate both economic and non-economic dimensions such as education, health, and living standards into the measurement process (Alkire & Foster, 2011).

The most commonly used measure of monetary poverty is the

1. **Poverty line**: which establishes a minimum income or consumption threshold necessary for basic survival. Individuals or households whose income falls below this line are considered poor (World Bank, 2022). The World Bank currently uses the international poverty line of US$2.15 per person per day, adjusted for purchasing power parity (PPP) (World Bank, 2022). National governments also set their own national poverty lines based on local cost-of-living conditions. For instance, the National Bureau of Statistics (NBS, 2023) reported that Nigeria's national poverty threshold is determined by household consumption per adult equivalent, taking into account both food and non-food requirements. Poverty can thus be categorized into headcount (the percentage of the population

below the poverty line), poverty gap (the shortfall of the poor from the line), and poverty severity (the inequality among the poor) (Akinbode *et al*., 2020).

2. **The Multidimensional Poverty Index (MPI)** developed by Alkire and Foster (2011) and adopted by the United Nations Development Programme (UNDP) has become one of the most widely used tools for assessing poverty beyond income. The MPI captures deprivations across three core dimensions education, health, and living standards using multiple indicators such as school attendance, nutrition, access to electricity, clean water, and housing conditions (UNDP, 2020). This index provides a more holistic understanding of poverty, particularly in developing countries where non-monetary forms of deprivation are prevalent (Alkire *et al*., 2020).

3. **Subjective and participatory approaches**, which rely on individuals' perceptions and community assessments of well-being. These methods recognize that people define poverty differently based on their social and cultural context (Narayan *et al*., 2019). Participatory poverty assessments (PPAs) enable local communities to identify the key dimensions of deprivation affecting them, such as lack of access to markets, credit, education, or cooperative support. This participatory approach has been

applied in several African countries, including Nigeria, to complement quantitative data and ensure that poverty reduction strategies reflect local realities (Okoro *et al*., 2022).

In Nigeria, various institutions including the National Bureau of Statistics (NBS), the World Bank, and the United Nations Development Programme (UNDP) regularly measure poverty using both monetary and multidimensional methods. The Nigeria Multidimensional Poverty Index (NMPI), introduced in 2022, assesses poverty across four dimensions: health, education, living standards, and work and shocks (NBS, 2023). According to this index, 63% of Nigeria's population is multidimensionally poor, with rural dwellers, particularly farmers, being the most affected.

Overall, the evolution of poverty measurement—from income-based indicators to multidimensional frameworks reflects a growing recognition that poverty is not solely about lack of money but also about lack of opportunity, empowerment, and well-being (UNDP, 2020; World Bank, 2022).

### 2.1.3 Concept of Income Inequality

Income inequality describes the uneven sharing of income among individuals or groups within a society. It shows how financial resources are distributed across the population and highlights differences in what people earn from wages, agriculture, trade, or investment activities (World Bank, 2022). Although

variations in earnings can arise from differences in education, skills, or productivity, wide income gaps often create social tension, slow down growth, and worsen poverty (OECD, 2017). Hence, income inequality is not only about the divide between the rich and the poor but also about the social and institutional systems that allow certain groups more access to wealth and opportunities than others (Atkinson, 2015).

The study of Income inequality has long been a central concern in development economics. One of the earliest explanations was offered by Kuznets (1955), who proposed that inequality tends to rise during the early stages of economic development but declines as economies expand and mature. While this idea was influential, later evidence revealed that income disparities are shaped by a complex mix of social, political, and economic factors (Piketty, 2014; Alvaredo *et al*., 2018). In low- and middle-income countries such as Nigeria, inequality has remained a major issue due to uneven access to land, finance, education, and markets (UNDP, 2020). As a result, a small segment of the population controls a large portion of national income while most people, especially rural farmers, struggle to meet their basic needs (Ojo & Olamide, 2024). Data from the World Inequality Database (2023) show that the top 10% of the world's population now receives more than half of global income, while the poorest 50% share less than 10%. This persistent imbalance has made income inequality a key concern in the global agenda for inclusive and sustainable development (World Bank, 2022).

In Nigeria, inequality reflects a deep divide between urban and rural areas, and between agricultural and non-agricultural sectors. The National Bureau of Statistics (2023) reported a Gini coefficient of about 0.35, suggesting a moderate but persistent level of inequality. Rural households, particularly those engaged in farming, face higher inequality levels due to limited infrastructure, inadequate access to productive resources, and lower educational attainment (Akinbode *et al*., 2020). Agricultural cooperatives have been identified as one mechanism that can reduce this gap by improving farmers' access to credit, technology, and markets (Adegoke & Agbasi, 2023).

Recent findings also show that inequality affects not just individuals but entire communities. High levels of inequality can erode social trust, weaken group cooperation, and limit participation in collective organizations such as cooperatives (Okoro *et al*., 2022).

#### 2.1.3.1 Measurement of Income Inequality

Income inequality can be assessed using a variety of statistical approaches designed to capture how income is distributed among individuals or households within a society. These methods are essential for understanding the level, pattern, and trend of inequality across different time periods, regions, or socio-economic groups (World Bank, 2022). Among the most commonly used indicators are the Gini Coefficient, Lorenz Curve, Theil Index, and Palma Ratio, each offering a

unique lens through which the fairness of income distribution can be examined (Alkire *et al*., 2020).

1. **The Gini Coefficient:** remains the most frequently applied tool in inequality measurement. Introduced by Corrado Gini in 1912, it expresses income disparity on a numerical scale ranging from 0 (representing perfect equality) to 1 (representing perfect inequality) (World Bank, 2022). This coefficient is mathematically derived from the Lorenz curve, which plots the cumulative percentage of total income against the cumulative percentage of the population. A higher Gini coefficient indicates a more unequal income distribution. According to OECD (2017) and the World Inequality Database (2023), nations with robust social protection and redistributive programs usually record lower Gini values, while those with weak fiscal policies often exhibit high inequality levels.

2. **The Lorenz Curve**: on which the Gini Coefficient is based, provides a visual depiction of inequality. It represents the cumulative share of total income earned by successive portions of the population, from the poorest to the richest (Alvaredo *et al*., 2018). The further the Lorenz curve bends away from the line of equality, the higher the level of income inequality in that economy. Although graphical, it provides valuable insights into income distribution trends and is often complemented with numerical

measures for detailed analysis. In recent years, researchers have also extended the Lorenz curve approach to explore inequality in multidimensional aspects such as health and education (UNDP, 2020).

3. **The Theil Index:** offers another robust measure of inequality, grounded in the principles of information theory. It is particularly useful because it can be decomposed into within-group and between-group components, showing how inequality differs among various population segments (Alkire *et al*., 2020). This feature helps to identify whether income disparities arise more from regional differences, occupational structure, or other social divides. In Nigeria, where income gaps exist between rural and urban households and between agricultural and non-agricultural sectors, the Theil index is an effective tool for evaluating these patterns (Akinbode *et al*., 2020). A higher Theil index value reflects greater inequality, and the measure is often used to inform targeted economic and agricultural development policies (Adegoke & Agbasi, 2023).

4. **The Palma Ratio:** Is a more recent metric that focuses on income extremes — comparing the income share of the richest 10% of the population with that of the poorest 40% (Cobham & Sumner, 2016). This ratio was developed to address limitations of the Gini Coefficient, which can sometimes mask significant differences in the upper and lower ends of

the income distribution. A higher Palma ratio suggests a wider gap between the rich and the poor. Evidence from the World Bank (2022) indicates that many developing countries, particularly in sub-Saharan Africa, report Palma ratios exceeding 2.0, implying that the top 10% earn more than double the total income of the bottom 40%.

In Nigeria, these inequality measures are frequently employed in welfare and poverty analyses to compare income variations among different categories of farming households. Akinbode *et al*. (2020) found substantial income gaps between cooperative and non-cooperative farmers, using both the Gini Coefficient and Theil Index. Their findings suggest that membership in cooperatives can significantly reduce inequality by improving access to credit, farm inputs, and market opportunities. Similarly, Okoro *et al*. (2022) observed that cooperative farmers experienced lower income disparities than non-members, reinforcing the role of cooperatives as mechanisms for promoting equitable growth.

## 2.2 Cocoa and its Origin

Cocoa (Theobroma cacao L.) is a vital tropical crop grown primarily for its beans, which serve as the major raw ingredient in chocolate and other confectionery products. The scientific name Theobroma, meaning “food of the gods,” was assigned by Carl Linnaeus in 1753 to reflect the crop’s exceptional cultural and economic significance (Afoakwa, 2018). The plant is believed to have originated

from the humid forests of Central and South America, especially within the Amazon Basin, where it has been cultivated for over three millennia (ICCO, 2023). Archaeological evidence indicates that ancient civilizations such as the Mayans and Aztecs utilized cocoa beans in the preparation of ritual beverages and also regarded them as a form of currency (Aremu & Ogunleye, 2020).

The introduction of cocoa into the global trade network began with European exploration and colonial expansion. Historical accounts show that Spanish explorers first brought cocoa to Europe in the 1500s, where it was initially consumed as a luxury beverage by the elite (Wood & Lass, 2016). Its popularity grew rapidly with the advent of the Industrial Revolution, which introduced new processing techniques that made chocolate products more affordable. Consequently, cocoa cultivation spread to Africa and Asia during the late 19$^{th}$ century through colonial agricultural initiatives aimed at increasing export diversification (FAO, 2022; Afoakwa, 2018).

Africa soon emerged as the world's dominant cocoa-producing region, with West African countries such as Côte d'Ivoire, Ghana, Nigeria, and Cameroon now accounting for more than 70% of global output (ICCO, 2023). Production in these countries is largely carried out by smallholder farmers managing small plots of land, usually ranging between one and three hectares. Cocoa farming provides a crucial source of income and employment for millions of rural households and

plays a major role in sustaining national export revenues (Adebayo *et al*., 2021; Aremu & Ogunleye, 2020).

Cocoa cultivation was introduced to Nigeria in the 1870s by Portuguese missionaries, who planted the first seedlings in the western region—particularly around Agege and Ibadan (Oluwaseun *et al*., 2020). The crop adapted well to the favorable agro-climatic conditions of the southwestern states, including Ondo, Osun, Ogun, Ekiti, and Oyo, which continue to dominate national production. During the 1950s and 1960s, cocoa became Nigeria's leading agricultural export, contributing significantly to the economy before oil exploration shifted national priorities (Adedeji *et al*., 2019). Although output declined in subsequent decades, the crop remains one of Nigeria's most valuable agricultural commodities, sustaining thousands of small-scale farmers (FAO, 2022).

In recent times, cocoa has retained its economic and developmental importance both globally and domestically. Scholars emphasize that beyond serving as a source of foreign exchange, cocoa farming enhances rural livelihoods and contributes to poverty alleviation (Adebayo *et al*., 2021). To strengthen the sector, recent policies and programs in Nigeria are directed toward improving productivity, revitalizing cooperative structures, and promoting sustainable agricultural practices such as agroforestry and organic cocoa cultivation (Aremu & Ogunleye, 2020; Oluwaseun *et al*., 2020).

## 2.3 Cocoa Production

Production is concentrated within the humid tropics between 20° north and south of the equator, where temperature, rainfall, and soil conditions are favorable. West Africa dominates global supply, accounting for approximately 70% of total production, with Côte d'Ivoire, Ghana, Nigeria, and Cameroon as the major producers (FAO, 2022). Other important producing regions include Latin America notably Brazil, Ecuador, and Peru and parts of Southeast Asia such as Indonesia and Malaysia (Afoakwa, 2018). Cocoa is largely cultivated by smallholder farmers who manage small plots averaging 2 hectares or less. These producers face recurring challenges such as pest and disease infestation, ageing trees, climate variability, and fluctuating market prices, all of which affect productivity and household income (Aremu & Ogunleye, 2020).

The global cocoa industry has evolved over the past decade due to changing consumer preferences, technological innovation, and growing demand for sustainable and ethically sourced products. Multinational companies are increasingly investing in certification schemes such as Fairtrade, Rainforest Alliance, and UTZ to promote sustainable production and traceability (Adebayo *et al*., 2021). Meanwhile, international organizations, including the Food and Agriculture Organization (FAO) and the International Cocoa Organization (ICCO), continue to promote research on climate-smart cocoa farming and improved value-chain integration to enhance farmer livelihoods (FAO, 2022; ICCO, 2023).

Despite persistent structural challenges, global cocoa output has shown steady growth, averaging 5–6 million metric tons annually over the last five years, reflecting its continued economic relevance and the expanding global demand for chocolate and related products (ICCO, 2023).

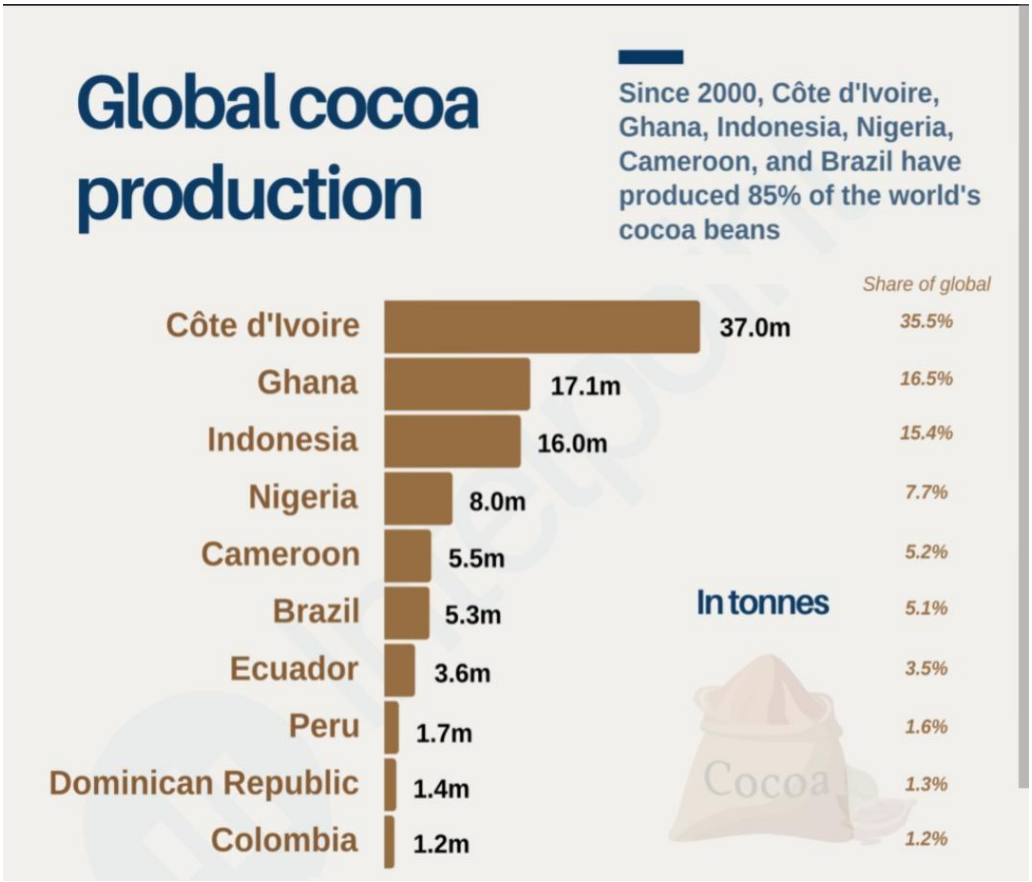


Fig 2.1: Top 10 cocoa-producing countries in the world (cumulative 2000-2022). Source: FAO, 2022

#### 2.3.1.2 Cocoa Production in Nigeria: Trends, Challenges, and Opportunities

Cocoa remains one of Nigeria's most valuable export crops and a major contributor to household income in rural areas. Historically, it served as the backbone of the country's economy prior to the discovery of crude oil in the early 1970s. During the 1950s and 1960s, Nigeria ranked among the world's top three cocoa producers, alongside Ghana and Côte d'Ivoire, and accounted for nearly 20% of global output (Adedeji *et al*., 2019). The crop is mainly cultivated in the southwestern part of the country Ondo, Osun, Oyo, Ogun, Ekiti, and parts of Edo and Cross River States, where agro-climatic conditions such as high rainfall and rich soils favor its growth (Oluwaseun *et al*., 2020). Cocoa contributed significantly to Nigeria's foreign exchange earnings, infrastructural development, and rural employment until the petroleum boom led to policy neglect and a decline in production (Aremu & Ogunleye, 2020).

Over the years, cocoa production in Nigeria has experienced cyclical fluctuations caused by both structural and institutional factors. Declining yields have been linked to ageing cocoa trees, low adoption of improved varieties, pest and disease infestations, inadequate extension services, and limited access to finance (Lawal & Abiodun, 2018). The dismantling of the Cocoa Marketing Board during the Structural Adjustment Programme (SAP) era in the 1980s exposed smallholder farmers to market risks and price volatility (Adebayo *et al*., 2021). Additionally, the rural–urban migration of young people has left an ageing farming population

in the sector, reducing labor availability and innovation potential (Oluwaseun *et al*., 2020).

Despite these challenges, cocoa remains a strategic commodity for Nigeria's non-oil export diversification. Recent data from the International Cocoa Organization (ICCO, 2023) show that Nigeria produces approximately 280,000 to 300,000 metric tons of cocoa beans annually, ranking fourth globally after Côte d'Ivoire, Ghana, and Indonesia. The Federal Government and private stakeholders have initiated several revival programs aimed at restoring productivity and competitiveness in the sector. These include the Cocoa Transformation Agenda under the Agricultural Transformation Agenda (ATA), the Cocoa Rebirth Programme, and various state-level initiatives focusing on seedling distribution, farmer training, and cooperative formation (Aremu & Ogunleye, 2020; FAO, 2022).

Emerging opportunities are also reshaping Nigeria's cocoa industry. There is growing global demand for sustainably produced and traceable cocoa, which presents new market niches for certified Nigerian cocoa under schemes such as Fairtrade and Rainforest Alliance (Adebayo *et al*., 2021). Additionally, the expansion of local processing industries in Ondo, Lagos, and Cross River states is encouraging value addition and creating employment opportunities. Researchers emphasize that strengthening farmer cooperatives, enhancing access to credit, and

adopting climate-smart agricultural practices will be critical for revitalizing the sector and improving smallholder livelihoods (Udenwa *et al*., 2023; Aremu & Ogunleye, 2020).

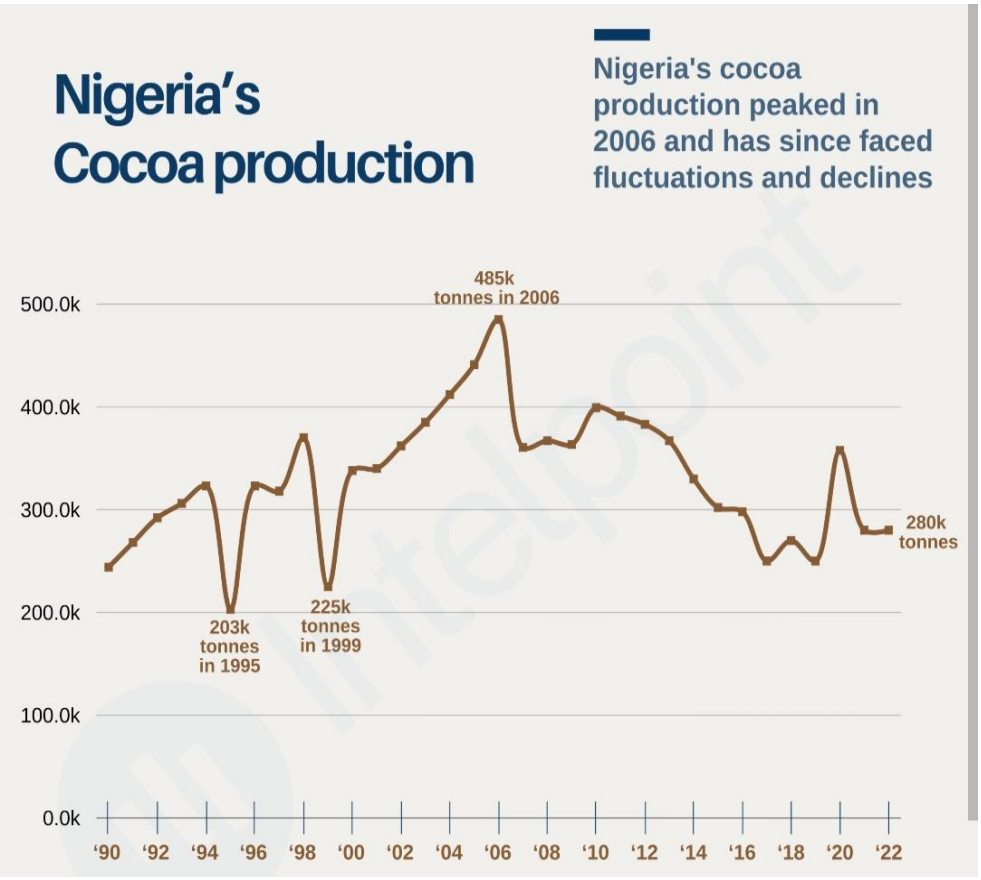


**Fig. 2.2 Cocoa beans production in Nigeria (1990-2022).**

**Source: FAO, 2022**

### 2.3.2 Economic Importance of Cocoa Production in Nigeria

Cocoa production plays a vital role in Nigeria's agricultural and economic development, serving as a key source of foreign exchange earnings, employment generation, and rural livelihood sustenance. Before the discovery of crude oil in the early 1970s, cocoa was the major export crop and a leading foreign exchange earner for Nigeria, accounting for over 40% of agricultural export revenues (Adedeji *et al*., 2019). The cocoa subsector contributed significantly to infrastructure development, education, and rural transformation, especially in southwestern states such as Ondo, Osun, and Oyo (Aremu & Ogunleye, 2020). Even after the oil boom, cocoa continues to serve as a crucial non-oil export commodity, helping to diversify Nigeria's export base and mitigate the risks associated with oil price volatility (FAO, 2022).

At the microeconomic level, cocoa production is a major source of income for rural households. Most Nigerian cocoa farmers are smallholders cultivating between two and five hectares of land, whose livelihoods depend heavily on the seasonal returns from cocoa sales (Oluwaseun *et al*., 2020). Cocoa contributes significantly to poverty reduction by providing employment opportunities in farming, processing, transportation, and marketing activities within rural communities (Adebayo *et al*., 2021). According to Udenwa *et al*. (2023), cooperative participation among cocoa farmers has enhanced access to credit, improved market linkages, and strengthened bargaining power, thereby increasing

household incomes and welfare levels. Furthermore, cocoa farming has multiplier effects across related sectors such as agro-input supply, local manufacturing, and export logistics.

Cocoa's contribution to Nigeria's Gross Domestic Product (GDP) and foreign exchange earnings remains substantial. The International Cocoa Organization (ICCO, 2023) reports that Nigeria produces between 280,000 and 300,000 metric tons of cocoa annually, with annual export revenues exceeding USD 800 million. The subsector employs more than 500,000 farming households directly and supports millions more through indirect value chain activities (Adedeji *et al*., 2019). The crop's economic importance is also reflected in its capacity to stimulate rural industrialization through the establishment of cocoa processing industries, which produce cocoa butter, powder, and liquor for both local consumption and export (Aremu & Ogunleye, 2020).

At the macroeconomic level, cocoa contributes to Nigeria's non-oil export diversification strategy and aligns with the government's policy objectives under the Agricultural Promotion Policy (APP) and the National Agricultural Technology and Innovation Policy (NATIP) (Federal Ministry of Agriculture, 2021). Cocoa's stable demand in the international market offers Nigeria an opportunity to enhance foreign exchange reserves and balance of trade performance (FAO, 2022). In recent years, there has been growing attention

toward value addition and sustainable cocoa production practices as pathways to improving export competitiveness, environmental sustainability, and farmer welfare (Udenwa *et al*., 2023).

Beyond its economic contributions, cocoa production also plays an important social and environmental role. It helps sustain rural communities by discouraging rural-urban migration and promoting inclusive agricultural growth. Cocoa trees contribute to environmental sustainability through carbon sequestration and biodiversity preservation in agroforestry systems (Adebayo *et al*., 2021). The expansion of certified cocoa production under international standards such as Rainforest Alliance and Fairtrade has further strengthened Nigeria's position in the global cocoa market while ensuring better returns for farmers through premium pricing and sustainable practices (ICCO, 2023).

In summary, cocoa production remains an indispensable component of Nigeria's agricultural economy. It not only generates substantial income and foreign exchange but also supports rural livelihoods, promotes environmental sustainability, and contributes to national economic diversification. Strengthening cooperative structures, expanding local processing capacity, and enhancing government support are essential strategies for maximizing cocoa's economic potential and achieving inclusive growth in the sector (Aremu & Ogunleye, 2020; FAO, 2022; Udenwa *et al*., 2023).

## 2.4 Constraints Facing Cocoa Production

Although cocoa production remains a key agricultural activity in Nigeria, it is confronted by numerous challenges that limit its growth and competitiveness both locally and globally. One of the foremost issues is the ageing condition of cocoa trees and farms across major producing regions. Most plantations are over three decades old, resulting in low yields and reduced bean quality (Adedeji *et al*., 2019). The limited use of improved, high-yielding, and disease-resistant cocoa varieties further intensifies this problem (Oluwaseun *et al*., 2020). Because many smallholder farmers cannot afford essential inputs such as fertilizers, pesticides, and hybrid seedlings, they are often unable to rehabilitate or replant ageing farms (Adebayo *et al*., 2021).

1. **Pest and disease outbreaks:** In particular, the black pod disease (Phytophthora megakarya) and capsid insect attacks remain persistent problems, with potential yield losses of 30–40% annually when poorly managed (Aremu & Ogunleye, 2020). Many farmers lack adequate knowledge of pest control methods or access to extension support to manage these threats effectively (FAO, 2022). The reduction in government-funded extension services following market liberalization has

left most farmers without technical assistance or access to improved production practices (Lawal & Abiodun, 2018).

2. **Financial limitations constitute another major obstacle to increased cocoa productivity**: Small-scale farmers rely largely on personal savings or informal loans, which are insufficient for significant investments in farm inputs and technology (Udenwa *et al*., 2023). Formal lending institutions often consider agricultural loans too risky because of price instability, poor collateral, and low repayment capacity (Aremu & Ogunleye, 2020). Weak cooperative structures have also made it difficult for cocoa farmers to access group-based financial assistance or credit schemes that could enhance productivity (Adebayo *et al*., 2021).

3. **Market and infrastructural deficiencies:** The deregulation of the cocoa industry and the removal of the Cocoa Marketing Board during the Structural Adjustment Programme (SAP) era introduced market instability and price fluctuations (Adedeji *et al*., 2019). Inadequate rural infrastructure—such as poor road networks, lack of storage facilities, and unreliable transportation—has increased production costs and post-harvest losses (FAO, 2022). Middlemen dominate the marketing chain, often buying cocoa beans from smallholders at low farm-gate prices, which

reduces farmers' earnings and discourages production (Lawal & Abiodun, 2018).

4. **Demographic and environmental issues:** The sector is largely dominated by older farmers, as most young people migrate to urban areas in search of better opportunities (Oluwaseun *et al*., 2020). This has created a labor shortage and slowed innovation in cocoa farming. In addition, women's participation in cocoa production remains limited due to unequal access to land, finance, and training opportunities (Udenwa *et al*., 2023). Climate change has further worsened production outcomes, with irregular rainfall, higher temperatures, and prolonged dry spells reducing yield and increasing the vulnerability of smallholders (Adebayo *et al*., 2021; FAO, 2022).

5. **Institutional weaknesses and inconsistent policy support:** Although programs such as the Cocoa Rebirth Initiative and the Cocoa Transformation Agenda were introduced to revitalize production, their effectiveness has been undermined by inadequate funding, poor coordination, and limited farmer engagement (Aremu & Ogunleye, 2020). Experts suggest that resolving these issues will require comprehensive reforms aimed at strengthening cooperatives, improving access to credit,

expanding extension coverage, and investing in rural infrastructure (Udenwa *et al*., 2023).

Overall, the constraints facing Nigeria's cocoa industry are multifaceted ranging from biological and financial to infrastructural and institutional challenges. Sustainable improvement will depend on an integrated approach that combines effective policy measures, private sector participation, and cooperative-driven interventions. Replanting programs, access to improved inputs, enhanced market regulation, and adoption of climate-smart agricultural practices are essential steps toward restoring productivity and competitiveness in the Nigerian cocoa sector (Adebayo *et al*., 2021; FAO, 2022; Udenwa *et al*., 2023).

## 2.5 Theoretical Framework

### 2.5.1. Progressive Social Theory

The Progressive Social Theory provides a foundational perspective for explaining how cooperative societies contribute to improving the living standards of rural households and reducing poverty and inequality. This theory focuses on collective participation, social empowerment, and inclusive development as key strategies for promoting equitable economic growth (Smith, 2017). It is based on the belief that individuals can overcome social and economic disadvantages by working together within cooperative structures that emphasize shared responsibility and democratic participation (Johnson & Brown, 2019). Through these collective

efforts, communities can challenge institutional barriers that sustain underdevelopment and economic disparity (Miller, 2020).

Proponents of the theory argue that genuine social advancement happens when people establish cooperative systems that encourage equality, empowerment, and shared benefits (Harris, 2018). It stresses that economic development is not determined solely by market mechanisms, but also by the strength of social and institutional frameworks that ensure fairness and inclusivity. From this viewpoint, cooperatives—being voluntary and member-owned organizations—serve as vital instruments for enhancing the welfare of disadvantaged groups by improving their access to production resources, financial services, and economic opportunities (Adeyemi & Ojo, 2021).

The theory further explains that poverty and inequality persist when individuals or groups are unable to access essential productive assets such as capital, information, and technology. By promoting joint ownership and collective bargaining, cooperatives help bridge these gaps, ensuring a more balanced distribution of wealth (Williams, 2020). They act as platforms for social and economic innovation, allowing rural farmers to achieve progress through unity, self-help, and mutual support (Adeyemi & Ojo, 2021).

In relation to cocoa farming in Nigeria, the Progressive Social Theory helps to clarify how belonging to a cooperative society can influence farmers' economic

and social wellbeing. Members of cooperatives often benefit from pooled resources, reduced transaction costs, access to input subsidies, market linkages, and extension support that non-members may not enjoy (Aremu & Ogunleye, 2020).

## 2.6 Analytical Framework

### 2.6.1 Foster–Greer–Thorbecke (FGT) Poverty Indices

To assess the extent, depth, and severity of poverty, the study applies the Foster–Greer–Thorbecke (FGT) poverty measure developed by Foster, Greer, and Thorbecke (1984). The FGT index is widely used for poverty analysis because it decomposes poverty into meaningful components, allowing comparisons between different population groups (Miller, 2020; Adeyemi & Ojo, 2021).

The general formula for the FGT index is expressed as:

$$P\,a \;= \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z\text{-}yi}{z}\right)^{a} \qquad (1)$$

For poverty incidence, gap, and severity the formula is specified below:

$$P_{0} = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z\text{-}yi}{z}\right)^{0} \qquad (2)$$

$$P_{1} = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z\text{-}yi}{z}\right)^{1} \qquad (3)$$

$$P_{2} = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z\text{-}yi}{z}\right)^{2} \qquad (4)$$

Where:

Pα = poverty index,

N = total number of households,

q = number of poor households (i.e., households with income below poverty line),

$Z$ = poverty line (usually two-thirds of the mean per capita income),

$Y\_i$ = income of the $i^{th}$ poor household,

$\alpha$ = poverty aversion parameter.

Depending on the value of $\alpha$

When $\alpha = 0$, $P_0$ measures poverty incidence (headcount ratio).

When $\alpha = 1$, $P_1$ measures poverty depth (poverty gap index).

When $\alpha = 2$, $P_2$ measures poverty severity, giving more weight to the poorest individuals.

The FGT model helps this study quantify how cooperative participation affects the proportion, intensity, and distribution of poverty among cocoa farmers. Cooperative members are expected to have lower poverty incidence and severity due to better access to resources, training, and credit facilities (Aremu & Ogunleye, 2020; Adeyemi & Ojo, 2021).

### 2.6.2 Gini Coefficient

To measure income inequality among cocoa-farming households, the study uses the Gini Coefficient, a widely accepted statistical measure of income distribution (World Bank, 2021). The Gini coefficient ranges from 0 to 1, where 0 represents perfect equality and 1 represents perfect inequality (Williams, 2020).

The Gini coefficient Is mathematically expressed as:

$G = 1 - \sum XY$

Where:

G = Gini coefficient,

$Y_i$ = cumulative proportion of income,

$X_i$ = cumulative proportion of households arranged in ascending order of income,

N = total number of households.

A lower Gini value among cooperative members compared to non-members would indicate a more equitable income distribution resulting from collective participation, joint marketing, and shared resource utilization (Smith, 2017; Johnson & Brown, 2019).

### 2.6.3 Logit Regression Model

To analyze the determinants of poverty among cocoa-farming households, this study employs the binary Logit regression model, which is suitable when the dependent variable is dichotomous that is, whether a household is poor (1) or non-poor (0) (Gujarati & Porter, 2009; Adeyemi & Ojo, 2021)**.**

$Y_i = Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \cdots + \beta 8X8 + \mu$

Where:

$\beta 0$ = Constant term,

$\beta 1$ - \beta_n = Coefficients of explanatory variables,

$X_1 – X_n$ = Independent variables (e.g., age, education, household size, cooperative membership, farm size, access to credit, etc.),

$\mu i$ = Error term.

This transformation linearizes the relationship, allowing for the estimation of parameters using maximum likelihood techniques (Gujarati & Porter, 2009).

### 2.6.4 Relative Poverty Line using Per Capital Household Expenditure

To determine whether a household is poor or non-poor, the study adopts a relative poverty line approach based on per capita household expenditure. This method is widely used in welfare analysis because expenditure better reflects long-term living standards than income, especially in rural settings where income flows are irregular (World Bank, 2021; NBS, 2022).

The per capita household expenditure (PCE) is computed as:

$$PCE_i = \frac{TEi}{HSi}$$

Where:

$PCE_i$ = Per capita expenditure of the $i^{th}$ household,

$TE_i$ = Total household expenditure,

$HS_i$ = Household size (number of members).

The relative poverty line is then defined as two-thirds of the mean per capita household expenditure for the entire sample (Foster *et al*., 1984; NBS, 2022):

$$Z = \frac{2}{3} \text{ X } (\overline{PCE})$$

Where:

Z = Relative poverty line,

\bar{PCE} = Mean per capita expenditure for all households in the sample.

Households are then classified as:

Poor if $PCE_i < Z$

Non-poor if $PCE_i$ \ge Z

This classification provides the dependent variable for the Logit model analysis. The use of the relative poverty line ensures that poverty is measured in context reflecting inequalities in welfare distribution within the sample population rather than using an arbitrary threshold (Miller, 2020; World Bank, 2021).

## 2.7 Empirical Framework

### 2.7.1. Profitability of Cocoa Production in Nigeria

Several empirical studies have demonstrated that cocoa production remains one of the most profitable agricultural enterprises in Nigeria despite numerous challenges. Bamidele *et al*. (2019) found that cocoa production is profitable with a positive gross margin and a benefit-cost ratio greater than one, suggesting that the enterprise is economically viable. Similarly, Ogunleye and Adepoju (2020) revealed that profitability in cocoa farming depends significantly on access to farm inputs, extension services, and market prices. Their study showed that farmers who belong to cooperatives record higher net returns due to collective marketing and reduced transaction costs. In a related study, Adejumo *et al*. (2022) emphasized that profitability is influenced by the age of cocoa trees, labor costs, and access to credit facilities, concluding that organized groups like cooperatives provide a more stable structure for increased returns. Overall, empirical evidence supports the profitability of cocoa farming but underscores the need for institutional support and efficient resource management to maximize income.

### 2.7.2. Poverty Status among Rural Farmers

Empirical evidence across Nigeria indicates that poverty remains widespread among rural farming households despite their active engagement in agriculture. Izekor and Oboh (2010) examined poverty levels among rural farming households in Edo State and reported that the majority of the farmers lived below the poverty

line. Their findings revealed that cooperative membership, access to credit, and level of education significantly influenced the poverty status of these households. The study further emphasized that farmers who belonged to cooperative societies had higher income and better access to productive resources than non-members.

Similarly, Ogunyemi and Ojo (2018) found that about 45% of farming households in Oyo State lived below the poverty line using the Foster–Greer–Thorbecke (FGT) index, highlighting the multidimensional nature of rural poverty. They identified low income, large household size, and inadequate access to production assets as major poverty determinants. Okeke *et al*. (2020) also reported that education and cooperative participation reduced poverty incidence among rural farmers, while poor access to extension services exacerbated poverty levels. In another study, Nwosu *et al*. (2021) discovered that households engaged in non-farm activities experienced lower poverty levels, demonstrating that income diversification plays a key role in improving living standards.

Overall, these studies establish that poverty among rural farmers in Nigeria is a persistent and multidimensional problem. They underscore the importance of institutional support particularly through cooperatives, credit access, and education in reducing poverty levels among farming households.

### 2.7.3 Income Inequality among Farming Households

Adewale and Yusuf (2017), using the Gini coefficient, reported moderate inequality (0.43) among rural farmers in Ondo State, attributing it to disparities in access to productive resources and market opportunities. Adeniran and Adebayo (2020) found that cooperative members exhibited lower income inequality compared to non-members, indicating that collective participation helps reduce welfare gaps. Similarly, Musa *et al*. (2021) revealed that inequality widens in communities with limited access to infrastructure, extension services, and credit. More recent studies by Okon *et al*. (2023) further highlighted that education and cooperative participation are key drivers of equitable income distribution among rural farmers. These findings confirm that inequality among Nigerian farming households is strongly influenced by socio-economic characteristics, institutional access, and cooperative involvement.

### 2.7.4. Effects of Cooperative Membership on Farmers' Welfare in Nigeria

Numerous studies have established a positive relationship between cooperative membership and improved welfare among Nigerian farmers. Afolabi and Lawal (2019) discovered that cooperative members earned significantly higher income and enjoyed better access to credit than non-members, particularly among smallholder crop producers. Similarly, Okechukwu and Eze (2021) reported that cooperatives enhance farmers' productivity through shared access to inputs, extension services, and collective marketing systems. Oluwaseun and Taiwo

(2022) also observed that cooperative participation reduces poverty incidence and inequality by promoting savings culture and facilitating group investment in farming inputs. Furthermore, Abubakar *et al*. (2023) found that cooperative societies contribute directly to improved welfare indicators such as better education, nutrition, and health outcomes among rural households. These empirical findings collectively show that cooperatives play a crucial role in economic empowerment and social inclusion among Nigerian farmers.

# CHAPTER THREE

# METHODOLOGY

## 3.1 Area and Scope of Study

Edo State is one of the 36 states in Nigeria, located in the South-South geopolitical zone. The state lies roughly between latitudes 5°44′N and 7°34′N, and longitudes 5°4′E and 6°45′E. It shares boundaries with Kogi State to the northeast, Delta State to the southeast, Ondo State to the northwest, and the Atlantic Ocean to the south. The state has a total land area of approximately 17,802 square kilometers and an estimated population of over 4 million people, according to the National Population Commission projections. Edo State is administratively divided into 18 Local Government Areas (LGAs), with Benin City serving as the state capital and the most urbanized center. Agriculture is a major economic activity in the state, employing a significant portion of the rural population. The state lies within the tropical rainforest zone, which supports the cultivation of both food and cash crops. Cocoa, in particular, is one of the key cash crops grown in several LGAs, including Ovia South-West, Owan East, Owan West, Uhunmwonde, and Esan West. These areas benefit from fertile soils and a humid climate conducive to cocoa farming.

## 3.2 Sampling Technique and Sampling Size

A purposive sampling technique was adopted for this research. The target population consisted of all farm household heads registered with the Ministry of Agriculture and Food Security in Edo State and the Ministry of Business, Trade, and Co-operatives, Edo State.

In the first stage, 30% of the Local Government Areas (LGAs) in the state was randomly selected out of 18 LGA using a simple random sampling to get 5 LGAs; Etsako East, Esan South-East, Owan West, Owan East, and Ovia North-East. The second stage involved, a selection of co-operative members from the selected co-operative in each community using the simple random sampling technique. The same method was used to select non-cooperative cocoa farmers from the same communities and LGAs where the Cooperative Cocoa farmers were selected from.

**Table 3.1: List of Cooperative societies**

| Local Governments | Names of cooperative societies |
|---|---|
| Etsako East; Imiekuri, Okpella | Ifesowapo-Titobioluwa Bode Camps Mpcs |
| | Ebi Limited |
| Esan South-East; Ubiaja | Orix Global Mpcs |
| Owan West; Ozalla, Ikpeyan | Okha cocoa Cooperative |
| Owan East; Uokha | Igue Agbado MPC society |
| | Fz cocoa farmers Cooperative |
| | Ugor cocoa farmers |
| Ovia North-East; Okada | Harmony Cocpa Farmers MPCS. |
| | Ifesowapo-Olaiya cocoa farmers MPCS |
| | Friendly farmers Mpcs |
| | Utese Agbama cooperative |
| **Total** | **11** |

## 3.3 Method of Data Collection

Data for this study was collected through primary source. The primary data was obtained through a well structured questionnaire, as well as through field survey complimented with interviews for the non- literate respondents.

## 3.4 Measurement of Variables

A. The variables to describe the **socio-economic characteristics** include:

Age: This will be measured in years as a continuous variable (e.g., 35, 50).

Gender: Coded as Male = 1, Female = 2.

Educational level: Measured by the highest level completed and coded as: No formal education = 0, Primary = 1, Secondary = 2, Tertiary = 3.

Household size: Measured as the number of people in the household (e.g., 6).

Farm size: Measured in hectares of land under cocoa cultivation (e.g., 2.5 hectares).

Years of farming experience: Measured in number of years the respondent has been farming cocoa (e.g., 15 years).

Access to extension services: Measured as Yes = 1, No = 0.

Access to credit: Measured as Yes = 1, No = 0.

Membership in a cooperative society: Measured as Member = 1, Non-member = 0

Years in cooperative: Measured in number of years as a member (e.g., 5 years).

Level of participation in cooperative activities: Coded as Active = 1, Passive = 2.

B. The variables to **identify the services provided by the co-operative societies to cocoa farmers:**

- Provision of seedlings
- Provision of agro-chemicals
- Provision of farming implements
- Provision of loans
- Transportation services
- Discount price on inputs
- Marketing of produce
- Education/Training

C. The key variables to be used to assess and compare **the income inequality and poverty levels of Cooperative members and non-members among cocoa farmers**:

Income distribution: Measured across households. Income inequality will be calculated using a Gini Coefficient, which ranges from 0 (perfect equality) to 1 (perfect inequality). This analysis will be done separately for cooperative members and non-members.

D. Variables to examine the **determinants of poverty among co-operative and non-cooperative cocoa farmers** include:

Perceived income stability: This will be measured by asking if membership in a cooperative has helped farmers earn more stable income over time.

Perceived reduction in income gap: Respondents will be asked whether they believe cooperative membership has reduced income inequality among cocoa farmers.

Perceived income advantage over non-members: Farmers will indicate if they think they earn more than non-cooperative members.

Equality in income opportunities: This variable will assess whether members feel that cooperative benefits are fairly distributed, allowing equal income chances.

Market shock resilience: Measured by asking whether cooperative membership helps farmers handle price changes and market fluctuations better.

Access to income enhancing resources: This will capture if farmers feel they have gained fairer access to farm inputs, markets, or finance since joining the cooperative.

Perceived poverty reduction: Respondents will be asked if they believe cooperative activities have helped reduce poverty among their households.

Each of these variables will be measured using a 5-point Likert scale: Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly Disagree = 1.

E. Variables to **identify the constraints faced by cocoa farmers in the study area** include:

This objective include multiple constraint indicators, each measured using a 5-point Likert scale:

- Inadequate Finance
- Incidence of pests
- Lack of improved disease resistant varieties
- High cost of labour
- Fluctuating prices of cocoa
- High cost of transportation

Inadequate access to agro-chemicals

Each of these will be measured through farmers' responses, coded as: Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly Disagree = 1.

### 3.5 Analytical Technique

**Objective 1:** To identify the socio-economic characteristics of cocoa farming households in the study area descriptive statistics (frequency, mean, percentages, standard deviation) will be used.

**Objective 3:** To compare the income and poverty levels of co-operative members and non-members among cocoa farmers, Foster-Greer-Thorbecke (FGT) poverty index will be used.

### 3.5.1 Foster-Greer-Thorbecke (FGT) model:

The Foster-Greer-Thorbecke (FGT) model adopted from Sallawu *et al*. (2016) and Yisa *et al*. (2020) was used to determine the poverty status of the farming households in both categories. To this effect, the household monthly per-capita expenditure approach was used. The FGT model is specified below:

$$P\,a = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z\text{-}yi}{z}\right)^{a} \qquad (1)$$

For poverty incidence, gap, and severity the formula is specified below:

$$P_0 = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z\text{-}yi}{z}\right)^{0} \qquad (2)$$

$$P_1 = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z\text{-}yi}{z}\right)^{1} \qquad (3)$$

$$P_2 = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z\text{-}yi}{z}\right)^{2} \qquad (4)$$

Where:

Pα = poverty profile of the respondents

Z = poverty line value (₦)

N= total population

q = the number of poor respondents (below the poverty line)
yi = household monthly per capita expenditure of the respondents (₦)

a = is a parameter which measures the incidence, depth, and severity of poverty respectively, with the values of 0, 1 and 2 as indicators of the poverty status of respondents.

### 3.5.2 Gini Coefficient

Objective 4: To examine the determinants of income inequality and poverty status between co-operative and non-cooperative cocoa farming households, the logit regression model will be used.

### 3.5.3 Gini coefficient: To measure income inequality

**G = 1 –EXY**

**Where**

X = cumulative population share

Y = cumulative income share

### 3.5.4 Binary Logistic Regression Model (Logit model)

The Binary Logit model is a type of generalized linear model that extends the linear regression model by linking the range of real numbers to the 0 or 1 range (Agresti 1996). To determine the income inequality of the cocoa farming households in Edo State, the implicit form of the model is as specified in equation.

$F(X'\beta) = \Phi(X'\beta) = \int -\infty$

The explicit form of the model is specified in the equation below.

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \cdots + \beta 8X8 + \mu$ (6)

Where:

$Y$ = dependent variable Poverty status (poor = 1, non-poor = 0)

B0 = Intercept

$\beta$1-8 = Parameters to be estimated,

X1 – X2 = Independent variables,

X1 = Age of respondents (years),

X2 = Household size

X3 = Educational level (years of formal education),

X4 = Farming experience (years),

X5 = Farm size of cocoa (hectares),

X6 = Income from cocoa production (₦),

X7 = Income from other productive activities (₦),

X8 = Membership in co-operative (member=1, otherwise=0),

μ = Random error term

Objective 5: The identification of the constraints faced by cocoa farming households will be determined using the Likert scale analysis (mean ranking).

# CHAPTER FOUR

## 4.0 RESULTS AND DISCUSSION

### 4.1 Socio-economic characteristics of cocoa farmers

**Age of respondents**

Cooperative members have an average age of 49 years, while non-members are slightly older with a mean age of 54 years. Most cooperative farmers (42.6%) and non-cooperative farmers (65.4%) fall within 51 years and above, indicating that cocoa farming is dominated by middle-aged and elderly individuals. This aligns with the findings of Odebode and Ayodele (2021), who reported that cocoa farming in Nigeria is largely dominated by ageing farmers due to limited youth participation.

This suggests that younger farmers participate less, possibly due to low interest in agriculture or migration to urban areas.

**Sex**

Both cooperative and non-cooperative farmers are predominantly male. This reflects that cocoa farming is a male-dominated activity in the study area. This is consistent with the observations of Adeyemi *et al*. (2016), who noted that cocoa cultivation in Nigeria is largely controlled by men because the enterprise requires substantial labour and financial resources, areas where women typically have lower access.

**Marital Status**

Most respondents across both groups are married (about 64%), implying stability in household responsibilities and potential access to family labour.

**Educational Level**

Most farmers have secondary education (40.7% cooperative; 48.1% non-cooperative). Very few have tertiary education, especially among non-cooperative members (3.8%). This level of education is beneficial, as it enhances farmers' ability to understand improved farm technologies, keep production records, and participate in cooperative activities. Similar results were reported by Afolami *et al*. (2015), who found that moderate education levels positively influence farmers' efficiency and willingness to join cooperatives.

**Household Size**

Cooperative and non-cooperative households have a mean size of 4 persons. . Adepoju and Salman (2013) noted that larger households often have access to family labour, reducing the cost of hired labour and potentially contributing to higher productivity. However, the relationship between household size and welfare is complex; while labour availability may increase productivity, larger households also face higher consumption expenditures, which may contribute to poverty if income is insufficient.

**Farming Experience**

Non-cooperative farmers appear more experienced, with an average of 10 years, compared to 8 years for cooperative members. This supports the findings of Adetayo and Adeola (2019), who reported that farming experience enhances technical knowledge and contributes to better decision-making in cocoa production.

**Farm Size**

Mean farm sizes are similar; Cooperative: 7.34 ha and Non-cooperative: 7.11 ha.

This finding aligns with Adeyemi *et al*. (2016), who reported that cocoa farms in southwestern Nigeria generally fall within 1–5 hectares due to land scarcity, inheritance practices, and the high cost of acquiring additional farmland. Small farm sizes are often associated with lower output and limited economies of scale, which reduce income potential and increase farmers' vulnerability to poverty. Similarly, Ruf and Varlet (2019) observed that fragmented and small cocoa plots limit farmers' ability to invest in mechanization, adopt improved varieties, or achieve substantial productivity gains.

**Occupation**

Most farmers engage primarily in farming, but non-cooperative members have more traders (34.6%) whereas cooperatives have more civil servants (22.2%).

This may affect the ability of farmers to join and participate in cooperative activities.

**Table 4.1: Socio-economic characteristics of cocoa farmers**

| | Cooperative, n= 54 | | Non-Cooperative, n = 52 | |
|---|---|---|---|---|
| **Age in years** | **Freq.** | **%** | **Freq.** | **%** |
| 31.00 - 40.00 | 13 | 24.1 | 1 | 1.9 |
| 41.00 - 50.00 | 18 | 33.3 | 17 | 32.7 |
| 51.00+ | 23 | 42.6 | 34 | 65.4 |
| Mean (Std. Dev.) | 48.67 (9.77) | | 54.25 (8.51) | |
| **Sex** | | | | |
| Male | 47 | 87 | 46 | 88.5 |
| Female | 7 | 13 | 6 | 11.5 |
| **Marital Status** | | | | |
| Single | 13 | 24.1 | 10 | 19.2 |
| Married | 34 | 63 | 34 | 65.4 |
| Divorced | 7 | 13 | 5 | 9.6 |
| Widowed | | | 3 | 5.8 |
| **Highest educational Level** | | | | |
| No formal education | 4 | 7.4 | 4 | 7.7 |
| Primary | 19 | 35.2 | 21 | 40.4 |
| Secondary | 22 | 40.7 | 25 | 48.1 |
| Tertiary | 9 | 16.7 | 2 | 3.8 |
| **Size of your household** | | | | |
| <= 5.00 | 44 | 81.5 | 37 | 71.2 |
| 6.00 - 10.00 | 10 | 18.5 | 15 | 28.8 |
| Mean (Std. Dev.) | 3.63 (2.18) | | 4.16 (2.17) | |
| **Years of experience in cocoa farming** | | | | |

| | | | | |
|---|---|---|---|---|
| <= 5.00 | 16 | 29.6 | 5 | 9.6 |
| 6.00 - 10.00 | 31 | 57.4 | 33 | 63.5 |
| 11.00+ | 7 | 13 | 14 | 26.9 |
| Mean (Std. Dev.) | 7.95 (2.61) | | 9.55 (3.17) | |
| **Size of your Cocoa Farm in hectares** | | | | |
| <= 5.00 | 15 | 27.8 | 11 | 21.2 |
| 5.01 - 10.00 | 31 | 57.4 | 39 | 75 |
| 10.01+ | 8 | 14.8 | 2 | 3.8 |
| Mean (Std. Dev.) | 7.34 (2.65) | | 7.11 (2.15) | |
| **Main Occupation** | | | | |
| Farming | 41 | 75.9 | 34 | 65.4 |
| Trading | 1 | 1.9 | 18 | 34.6 |
| Civil Service | 12 | 22.2 | | |
| Others | | | | |
| **Member of a Co-operative Society** | 54 | 100.0 | | |
| **If you are a member, have you ever obtained assistance from the co-operative** | 53 | 98.1 | | |

Source: Field Survey, 2025.

## 4.2 Services provided by the cooperatives

Cooperative societies serve as important institutional mechanisms that support smallholder farmers by providing economic, technical, and social services aimed at improving their productivity and overall welfare. In the study area, cocoa farmers who belonged to cooperatives reported receiving a range of services that helped to reduce production challenges and promote access to critical farm resources. Table 2 outlined these services, and this section provides a more detailed analysis of the nature, frequency, and implications of each service provided by the cooperatives.

### 4.2.1 Provision of Seedlings

A significant proportion of cooperative members (63.3%) indicated receiving improved cocoa seedlings from their cooperatives. Improved seedlings are crucial in perennial crop production because they ensure higher yields, early maturity, better disease resistance, and improved bean quality. Many of the cocoa farms in the area are old and declining in productivity; therefore, access to improved seedlings is a vital tool for farm rehabilitation and long-term sustainability.

This finding aligns with the submissions of Olatunji & Olusola (2020), who stressed that access to improved varieties is one of the strongest determinants of cocoa productivity in Nigeria.

### 4.2.2 Provision of Agro-Chemicals

About 76.7% of cooperative members reported receiving agro-chemicals such as pesticides, fungicides, and herbicides. Cocoa production in Nigeria faces numerous threats from diseases (e.g., black pod) and pests (e.g., capsids), which can lead to significant yield reductions. Cooperatives therefore play a central role in ensuring that farmers have access to timely and affordable agro-chemicals.

In many communities, agro-chemicals in the open market are expensive and sometimes adulterated. Cooperative-provided chemicals often come at subsidised prices and with better guarantees of quality. This helps farmers improve their crop health and productivity, consistent with the observations of Adeyemi *et al*. (2016) that access to genuine agro-chemicals directly increases cocoa yield.

### 4.2.3 Distribution of Farming Implements

About 45.6% of cooperative farmers received farming implements such as sprayers, cutlasses, protective clothing, and pruning tools. Although this percentage is lower compared to other services, the importance of farm implements cannot be understated, especially for perennial crops that require regular maintenance.

The relatively low percentage suggests limited cooperative resources or prioritisation of other services. Nevertheless, access to implements enhances production efficiency and reduces labour intensity, as highlighted by FAO (2020).

### 4.2.4 Provision of Loans and Credit Facilities

The provision of loans was the most widely accessed service, reported by 82.2% of cooperative members. Credit access is a major challenge for smallholder farmers due to collateral constraints, high interest rates, and strict lending conditions imposed by formal financial institutions.

Cooperatives bridge this gap by offering; Soft loans, Low-interest lending, Group-guarantee systems, Short-term production loans, Emergency loans. These financial resources allow farmers to purchase inputs, hire labour, or rehabilitate their farms during critical production stages. This finding is consistent with the work of Bernard & Spielman (2009), who noted that access to cooperative credit significantly boosts smallholder investment capacity.

### 4.2.5 Transportation Services

About 31.1% of cooperative farmers benefited from transportation support. Transportation is a major challenge in rural communities where road networks are poor and transportation costs are high. Cooperatives occasionally hire trucks or organise group transport to collect produce from farms to buying centres. Although this service is not as widely available as others, it is crucial because high transportation costs eat into farmers' profits.

The limited access suggests that more investment is needed in cooperative-owned logistics and transportation.

### 4.2.6 Discounted Prices on Inputs

More than half (57.8%) of the farmers received inputs at discounted prices. Through bulk purchasing, cooperatives are able to: Negotiate lower prices, ensure product quality, distribute inputs at reduced cost. The discounting of inputs is particularly beneficial given the rising costs of fertiliser, chemicals, and farm tools. Without cooperative support, many smallholder farmers would struggle to afford production inputs at market price.

This aligns with the report of ICA (2018), which states that collective input procurement is one of the most effective ways cooperatives reduce production costs for members.

### 4.2.7 Marketing of Produce

A significant 73.3% of respondents stated that cooperatives helped with the marketing of their cocoa beans. Marketing support includes; Bulk sale of produce to obtain better prices, reducing exploitation by middlemen, quality grading and standardisation, linking farmers with licensed buying agents, negotiating premium prices for high-quality beans.

Cooperative marketing enhances farmers' bargaining power, ensures more stable prices, and provides better income security. This aligns with the findings by

Danso-Abbeam *et al*. (2018), who demonstrated that cooperative marketing significantly increases farmers' net returns in Ghana and Nigeria.

### 4.2.8 Education, Training, and Capacity Building

About 52.2% of cooperative members reported receiving training on; Best agronomic practices, integrated pest management, farm rehabilitation techniques, post-harvest handling, financial literacy, group dynamics and record keeping. Training enhances technical efficiency and helps farmers adopt innovations. Continuous learning is essential for perennial crops like cocoa, where improved management practices can significantly enhance yields. According to Afolami *et al*. (2015), training through cooperatives improves farmers' knowledge of improved farming techniques and positively impacts productivity.

**Table 4.2: Services provided by the cooperatives**

| Service Provided | Frequency | Percentage (%) |
|---|---|---|
| Provision of Seedlings | 57 | 63.30 |
| Provision of Agro-chemicals | 69 | 76.70 |
| Provision of Farming Implements | 41 | 45.60 |
| Provision of Loans | 74 | 82.20 |
| Transportation Services | 28 | 31.10 |
| Discount Price on Inputs | 52 | 57.80 |
| Marketing of Produce | 66 | 73.30 |
| Education / Training | 47 | 52.20 |

Source: Field Survey, 2025.

## 4.3 FGT Poverty Indices for Co-operative Cocoa Farming Households

The Foster–Greer–Thorbecke (FGT) poverty indices presented in Table 3 reveal important differences in the poverty profile of cooperative and non-cooperative cocoa-farming households in Edo State. The poverty incidence ($P_0$) shows that 40.7 percent of cooperative members live below the poverty line, while only 28.8 percent of non-cooperative households are classified as poor. This indicates that poverty is more widespread among cooperative households, despite the expectation that cooperatives should enhance members' welfare. Several Nigerian studies help explain this outcome. Ojiagu and Onugu (2015) note that a significant number of farmers join cooperatives not because they are economically stable, but because they are already vulnerable and hope to access credit or input support through collective action. Similarly, Abosede and Adeyemo (2019) found that cooperative societies in southwestern Nigeria often attract poorer cocoa farmers who seek relief from fluctuating market prices and declining productivity. This tendency for poorer farmers to self-select into cooperatives may partly explain why the headcount poverty ratio is higher among cooperative members than non-members in the present study.

The poverty depth ($P_1$) values 0.0846 for cooperative farmers compared to 0.0563 for non-members, further show that poor cooperative households fall further below the poverty line than their non-cooperative counterparts. This suggests that cooperative members not only experience higher poverty rates but also deeper

financial shortfalls. Nigerian research provides several insights into this pattern. Okoli (2018) and Nwankwo, Oboh, and Agbaeze (2020) report that many Nigerian cooperatives struggle with financial instability, poor loan recovery, and governance weaknesses that limit their ability to support members effectively. When cooperatives lack financial strength or face management challenges, the poorest members remain underserved, resulting in deeper poverty gaps. The situation is further compounded by challenges such as high input costs, limited access to modern farming technologies, and inconsistent support from government agencies, all of which disproportionately affect poorer cooperative members (Afolami, Obayomi, & Vaughan, 2015; Izekor & Oboh, 2014).

The poverty severity index ($P_2$) shows a similar pattern: poverty is more severe among cooperative farmers (0.0245) than among non-cooperative ones (0.0155). This measure gives greater weight to the poorest households and indicates that the most economically deprived cooperative members are significantly worse off than the poorest among non-members. This result is consistent with findings by Eze, Ugwu, and Chukwu (2017), who observed that benefits within farmer cooperatives in Nigeria are sometimes captured by more influential or better-connected members, thereby leaving the poorest members at a disadvantage. Likewise, Nchuchuwe and Adejuwon (2012) argue that rural development institutions in Nigeria often struggle with internal elite dominance, where more powerful members influence resource allocation in ways that do not always favor

the poorest. This internal inequality contributes to the higher poverty severity observed among cooperative farmers in the present study.

The findings show the FGT indicators collectively suggest that cooperative households experience not only higher poverty incidence but also deeper and more severe poverty than non-cooperative households. This finding indicates that cooperatives in the study area may not be functioning optimally as mechanisms for poverty reduction. Nigerian scholars such as Oladejo (2021) and Ajieh (2012) emphasize that the effectiveness of cooperatives depends on strong institutional structures, transparent governance, and adequate financial capacity. When these conditions are weak, the potential benefits of cooperatives are not fully realized, and marginalized members remain poor. The results from this study therefore align with Nigerian evidence showing that while cooperatives have significant potential, their impact on poverty reduction varies widely depending on management quality, funding strength, and the socio-economic profile of members.

**Table 4.3: FGT Poverty Indices for Co-operative, and Non-Cooperative Cocoa Farming Households**

| | | Cooperative Members | Non-Cooperative |
|---|---|---|---|
| **FGT Index** | **Description** | **Computed Value** | **Computed Value** |
| $P_0$ | Poverty Incidence (Headcount) | 0.407 | 0.288 |
| $P_1$ | Poverty Depth (Poverty Gap) | 0.0846 | 0.0563 |
| $P_2$ | Poverty Severity (Squared Gap) | 0.0245 | 0.0155 |

Source: Field Survey, 2025.

### 4.4. Poverty Status of cooperative and non-cooperative members

The poverty status distribution presented in Table 4 reveals clear differences between cooperative and non-cooperative cocoa-farming households in Edo State. Among cooperative members, 40.70 percent are classified as poor, while 59.30 percent fall into the non-poor category. In contrast, only 28.80 percent of non-cooperative farmers are poor, compared with 71.20 percent who are non-poor. These figures suggest that cooperative members experience a higher incidence of poverty than their non-cooperative counterparts, reinforcing earlier evidence from the FGT indices. This finding highlights a notable paradox: although cooperatives are expected to enhance members' welfare by reducing production constraints, improving access to inputs, and strengthening market participation, the cooperative group in this study shows a higher proportion of poor households.

Several Nigerian scholars have documented similar patterns, offering explanations for why cooperative membership does not always translate into improved welfare outcomes. For instance, Orebiyi and Olanike (2011) observed that many cooperatives in Nigeria struggle with limited capital, management weaknesses, and inadequate extension support, which diminish their capacity to provide the expected economic benefits to members. As a result, households who join cooperatives particularly those motivated by financial hardship, may continue to experience poverty despite their membership. In addition, empirical studies by

Babatunde, Omotesho, and Sholotan (2007) argue that poor households tend to be more vulnerable to fluctuations in agricultural income, land constraints, and market shocks, factors that are prevalent in rural Nigeria and may disproportionately affect cooperative members. This vulnerability may explain why a larger percentage of cooperative households in the present study remain poor.

Furthermore, findings from Yusuf, Balogun, and Falegan (2018) show that internal cooperative dynamics often shape members' welfare outcomes. Their study on farmers' cooperatives in southwestern Nigeria revealed that benefits within cooperatives particularly credit, subsidized inputs, and training are sometimes unevenly distributed, with more active or long-standing members enjoying greater advantages. Such disparities can leave poorer or less influential members with limited support, thereby maintaining higher poverty levels among a segment of cooperative households. This supports the present study's indication that cooperative structures alone are not sufficient to guarantee poverty reduction; the internal functioning and inclusiveness of these organizations matter significantly.

Similarly, the relatively lower poverty incidence among non-cooperative households in this study aligns with findings by Olowa and Olowa (2011), who noted that many non-cooperative farming households diversify their livelihoods

more extensively, relying on off-farm employment, petty trade, and informal social networks to supplement agricultural income. Such diversification strategies often help reduce poverty risks, especially in environments where formal institutions like cooperatives face operational constraints. This may explain why a higher proportion of non-cooperative cocoa farmers in the present study are categorized as non-poor compared to cooperative members.

The poverty status data suggest that cooperative membership in the study area does not automatically confer economic advantage. Instead, as shown in several Nigerian studies, the effectiveness of cooperatives in reducing poverty depends heavily on resource availability, good governance, adequate training, and the equitable allocation of benefits. Where these conditions are weak, cooperatives may attract poorer households without being able to substantively improve their welfare, resulting in poverty outcomes similar to those observed in this study.

**Table 4.4: Poverty status**

| | Cooperative | | Non-Cooperative | |
|---|---|---|---|---|
| **Poverty Status** | **Freq. (n = 54)** | **%** | **Freq. (n = 52)** | **%** |
| Poor | 22 | 40.70 | 15 | 28.80 |
| Non-Poor | 32 | 59.30 | 37 | 71.20 |

Source: Field Survey, 2025.

## 4.5. Gini Coefficient for Income Inequality

### 4.5.1. Income Inequality for Cooperative members

The income distribution pattern for cooperative cocoa-farming households, as presented in Table 5, provides a clear indication of how income is unevenly distributed among members of the cooperative societies in the study area. The table divides total household income into five intervals and assesses the distribution using frequency counts, population shares, income shares, and cumulative distribution measures. The resulting Gini coefficient of 0.317 indicates a low-to-moderate level of income inequality among cooperative members. Although this value does not suggest extreme inequality, it does reveal that income is not evenly distributed across households, and certain members earn significantly more than others.

An examination of the income intervals shows that the lowest income bracket (₦1,000,000–₦4,400,000) contains the largest share of cooperative members, accounting for 33.96 percent of the population but only 17.51 percent of the total income. This initial disparity reflects a structural skewness in income distribution where a large proportion of cooperative farmers earn relatively low incomes. This finding aligns with the work of Akinbode and Dipeolu (2012), who report that many smallholder farmers in Nigeria cluster around low-income levels due to limited access to credit, poor input availability, and low productivity. Similarly, Omonona (2009) notes that low-income farmers often lack the capacity to invest

in yield-enhancing technologies, further contributing to persistent income disparities within rural communities.

The mid-income categories show a progressive increase in income share. For instance, the second interval (₦4,400,000–₦7,800,000) represents 24.53 percent of the population but accounts for 28.57 percent of income. The third interval (₦7,800,000–₦11,200,000), which includes 26.42 percent of cooperative members, contributes a disproportionately high 47.93 percent of the group's total income. This sharp jump in income share highlights a concentration of earnings among a subset of cooperative members who appear to be more economically advantaged. This pattern reflects broader evidence in Nigerian agriculture, where differences in land size, access to improved seedlings, and involvement in diversified agribusiness ventures often generate uneven income outcomes among farmers. According to Oyakhilomen and Zibah (2014), disparities in resource access especially land, extension services, and improved varieties significantly influence income heterogeneity among Nigerian smallholders.

The upper income intervals further reveal the widening disparity. Although households earning ₦11,200,000–₦14,600,000 constitute only 7.55 percent of the cooperative population, they contribute 18.60 percent of the total income. The highest income bracket (₦14,600,000–₦18,000,000) also comprises just 7.55 percent of members but contributes 23.49 percent of the overall income. The

concentration of wealth in these higher intervals indicates that a relatively small proportion of cooperative members earn substantially more than the majority. This inequality is consistent with findings by Awotide, Kehinde, and Adejobi (2012), who observed that income distribution among Nigerian farmers is often influenced by differential access to markets, credit facilities, and labor availability. These advantages tend to accumulate among a limited group of farmers, thereby widening income gaps.

The cumulative income share values reinforce this trend. By the time 84.91 percent of cooperative members are accounted for, they collectively command 94.01 percent of total income. The cumulative income share surpasses 100 percent in the upper brackets due to the interval-based Gini computation technique, which involves midpoint aggregation; however, this does not affect the interpretive validity. The accelerating rise in cumulative income relative to cumulative population shows clear evidence of disproportionate earnings. This is consistent with findings from Olawuyi and Adetunji (2013), who noted that income inequality persists among Nigerian farming households due to varying levels of access to productive assets and institutional support.

The Gini coefficient of 0.317 confirms that income inequality is present but not excessively high. The value falls within the range of moderate inequality commonly recorded in Nigerian agricultural communities. For instance, Oni,

Yusuf, and Malomo (2009) report Gini coefficients between 0.28 and 0.40 for different categories of rural farmers in southwestern Nigeria, attributing inequality to varying levels of education, farm size, and participation in off-farm income activities. Moreover, Agwu and Okoye (2011) argue that cooperative societies do not automatically eliminate income disparities, as more active or better-resourced members often benefit more from cooperative opportunities than poorer or less active participants.

In the context of this study, the moderate inequality among cooperative members suggests that while cooperatives provide some form of collective support, this support is not uniformly accessed or utilized. Differences in scale of production, years of experience, access to credit, and level of participation within the cooperative likely contribute to the uneven distribution of income. This outcome reinforces findings by Nwankwo, Igwe, and Nwaeze (2014), who emphasize that the effectiveness of cooperatives in improving member welfare is highly dependent on internal governance, transparency, and equitable distribution of benefits.

Therefore, the income distribution pattern presented in Table 5 reveals that cooperative members experience a moderate level of income inequality, driven largely by structural, institutional, and resource-based factors. This suggests that cooperatives in the study area offer economic benefits, but the extent of these benefits differs significantly across households. Strengthening cooperative

governance, improving access to inputs, and ensuring equitable participation could help reduce the observed disparities.

**Table 4.5: Income Inequality for cooperative members**

| Income Interval (₦) | Midpoint ($m_i$) | Freq. ($f_i$) | Pop. Share ($f_i/n$) | Income ($m_i \times f_i$) | Income Share | Cum. Pop. Share ($F_i$) | Cum. Income Share ($Y_i$) |
|---|---|---|---|---|---|---|---|
| 1,000,000–4,400,000 | 2,700,000 | 18 | 0.3396 | 48,600,000 | 0.1751 | 0.3396 | 0.1751 |
| 4,400,000–7,800,000 | 6,100,000 | 13 | 0.2453 | 79,300,000 | 0.2857 | 0.5849 | 0.4608 |
| 7,800,000–11,200,000 | 9,500,000 | 14 | 0.2642 | 133,000,000 | 0.4793 | 0.8491 | 0.9401 |
| 11,200,000–14,600,000 | 12,900,000 | 4 | 0.0755 | 51,600,000 | 0.186 | 0.9245 | 1.1261* |
| 14,600,000–18,000,000 | 16,300,000 | 4 | 0.0755 | 65,200,000 | 0.2349 | 1 | 1.3610* |

Source: Field Survey, 2025.

Total income = ₦377,700,000; Gini Coefficient = 0.317.

### 4.5.2. Income Inequality for non- cooperative members

The income distribution pattern for non-cooperative cocoa-farming households, as shown in Table 6, illustrates how income is allocated across different income brackets among farmers who are not affiliated with cooperative societies in the study area. The computed Gini coefficient for this group is 0.286, indicating a low level of income inequality, and suggesting that income is distributed somewhat more evenly among non-cooperative farmers than their cooperative counterparts. This level of inequality falls within the range commonly observed among Nigerian rural farmers, a trend noted by Oni, Yusuf, and Malomo (2009) in their study of rural households in Southwestern Nigeria, where Gini coefficients ranged between 0.28 and 0.40 depending on livelihood composition.

A closer look at the income intervals shows that the lowest bracket (₦1,000,000–₦4,400,000) contains 28.85 percent of non-cooperative farmers and accounts for 15.88 percent of total income. This reveals a moderate concentration of farmers in the lower income tier and suggests that a considerable proportion of non-cooperative farmers earn limited income, a pattern consistent with findings by Babatunde, Omotesho, and Sholotan (2007), who reported that many Nigerian smallholders operate close to subsistence levels due to limited access to productive inputs and market opportunities. However, the share of total income

captured by this group is not disproportionately low, which partly explains the relatively low inequality among non-cooperative farmers.

Income becomes more concentrated in the middle-income intervals. The second bracket (₦4,400,000–₦7,800,000), representing 23.08 percent of the population, contributes 28.69 percent of total income, while the third interval (₦7,800,000–₦11,200,000) includes 32.69 percent of farmers and contributes a significant 63.30 percent of group income. This suggests that a substantial number of non-cooperative farmers fall within a relatively stable income range. These middle-income farmers likely benefit from personal strategies such as livelihood diversification, informal credit arrangements, and flexible market participation, which, according to Olowa and Olowa (2011), are common coping mechanisms among non-cooperative rural households in Nigeria. These mechanisms help farmers maintain steady earnings despite fluctuations in agricultural markets.

The higher income brackets show smaller population shares but meaningful contributions to total income. Only 11.54 percent of farmers fall within the ₦11,200,000–₦14,600,000 interval, yet they contribute 30.32 percent of total income. Similarly, a mere 3.85 percent of farmers earn between ₦14,600,000–₦18,000,000, contributing 12.77 percent of the total income. This indicates that while some non-cooperative farmers earn significantly higher incomes, their numbers are few, and their earnings do not dramatically skew the overall

distribution. This balanced distribution contributes to the lower Gini coefficient observed. These income patterns support the assertion made by Yusuf, Balogun, and Falegan (2018), who found that non-cooperative farmers often maintain relatively stable income structures through diversified livelihood portfolios and reliance on informal networks rather than formal cooperative assistance.

The cumulative income share values also support the observation of moderate inequality. By the time 84.62 percent of the population is accounted for, 107.87 percent of income (due to midpoint-based grouping) has been accumulated, showing that the bulk of income is concentrated within the large middle-income group rather than among a narrow elite. This aligns with the work of Akinbode and Dipeolu (2012), who reported that income distribution among non-cooperative farmers is often less skewed because income gains and losses tend to occur uniformly across households that face similar production and price constraints.

Overall, the relatively low inequality among non-cooperative farmers underscores that income distribution in this group is more even than among cooperative farmers. This may be attributed to weaker stratification mechanisms, fewer opportunities for elite capture, and more reliance on personal rather than institutional economic strategies. As Nwankwo, Igwe, and Nwaeze (2014) observe, cooperatives can amplify internal economic differences when

governance structures favor more active or better-resourced members; in contrast, non-cooperative groups often reflect more organic and evenly spread earnings shaped by similar production capacities and market access conditions.

In the context of this study, the income distribution of non-cooperative farmers supports the conclusion that cooperative membership does not automatically translate into more equitable income outcomes. Rather, the cooperative structure can sometimes exacerbate inequalities when benefits are unevenly accessed, whereas non-cooperative farmers experience more uniformly distributed income levels despite having fewer formal support systems.

**Table 4.6: Income Inequality for non-Cooperative members**

| Income Interval (₦) | Midpoint ($m_i$) | Freq. ($f_i$) | Pop. Share ($f_i/n$) | Income ($m_i \times f_i$) | Income Share | Cum. Pop. Share ($F_i$) | Cum. Income Share ($Y_i$) |
|---|---|---|---|---|---|---|---|
| 1,000,000–4,400,000 | 2,700,000 | 15 | 0.2885 | 40,500,000 | 0.1588 | 0.2885 | 0.1588 |
| 4,400,000–7,800,000 | 6,100,000 | 12 | 0.2308 | 73,200,000 | 0.2869 | 0.5192 | 0.4457 |
| 7,800,000–11,200,000 | 9,500,000 | 17 | 0.3269 | 161,500,000 | 0.633 | 0.8462 | 1.0787* |
| 11,200,000–14,600,000 | 12,900,000 | 6 | 0.1154 | 77,400,000 | 0.3032 | 0.9615 | 1.3819* |
| 14,600,000–18,000,000 | 16,300,000 | 2 | 0.0385 | 32,600,000 | 0.1277 | 1 | 1.5096* |

Source: Field Survey, 2025.

Total income = ₦385,200,000; Gini Coefficient = 0.317.

## 4.6. Estimates of Determinants of Poverty Among Co-operative Cocoa Farmers

The logistic regression estimates presented in Table 7 examine the socio-economic factors influencing the likelihood of being poor among cooperative cocoa farmers in the study area. The model exhibits strong explanatory power, as indicated by a Pseudo $R^2$ of 0.6297 and a statistically significant likelihood ratio chi-square ($p < 0.001$). This suggests that the included socio-economic variables jointly explain a substantial proportion of the variation in poverty status among cooperative members. However, only one variable, cocoa income, emerges as statistically significant, while cocoa farm size is marginally significant at the 10 percent level.

The coefficient for cocoa income is negative and statistically significant ($\beta = -1.021$, $p = 0.005$), indicating that higher income from cocoa production substantially reduces the probability of being poor among cooperative farmers. This finding is consistent with Nigerian studies emphasizing the central role of agricultural income in poverty reduction among rural households. For example, Omonona, Oni, and Uwagboe (2007) found that crop income is one of the strongest predictors of household welfare in southwestern Nigeria, with higher agricultural earnings directly reducing poverty likelihood. Similarly, Awotide, Abdoulaye, and Alene (2015) reported that increased agricultural income significantly enhances household consumption levels and reduces poverty in

cocoa-producing communities. The present study reinforces these findings by demonstrating that cocoa earnings remain the most decisive factor separating poor from non-poor cooperative members. This also suggests that efforts to improve yield, access to improved varieties, and pricing efficiency may have a direct and substantial effect on poverty reduction among cooperative farmers.

Cocoa farm size also exhibits a positive coefficient ($\beta = 0.495$) significant at the 10 percent level, suggesting that larger farm sizes are weakly associated with a higher probability of being poor. This marginal relationship may appear counterintuitive, as larger farm sizes are often associated with higher production potential. However, several Nigerian studies have shown that farm size alone does not guarantee higher income; rather, productivity, access to credit, labor availability, and input intensity determine economic outcomes. According to Idowu, Aihonsu, and Olukomogbon (2013), many smallholder cocoa farms in Nigeria suffer from low productivity due to aging trees, inadequate fertilizer use, and insufficient farm management knowledge. Thus, even relatively larger farms may fail to generate sufficient income when productivity is poor. This aligns with the present findings, where cocoa income, not farm size, is the true determinant of poverty status.

Other socio-economic variables such as age, household size, education, farming experience, and income from non-cocoa sources are statistically insignificant. The negative but insignificant coefficient for age ($\beta = –0.091$, $p = 0.270$) implies that

younger cooperative farmers might be slightly more vulnerable to poverty, although this relationship is not strong enough to draw firm conclusions. Studies by Adepoju and Salman (2013) similarly report that age does not significantly predict poverty among rural farmers in Nigeria, noting that both younger and older farmers face structural constraints such as limited access to credit, unstable markets, and fluctuating input costs.

Household size also shows no significant effect ($\beta = 0.118$, $p = 0.712$), suggesting that larger households are not necessarily poorer among cooperative members. This contrasts with some Nigerian studies that link larger household size with higher poverty likelihood due to increased consumption pressure (Ozughalu & Ogwumike, 2015). However, in farming communities, larger households may also supply additional family labor, which can cushion the effect of dependency and reduce hired labor costs. This may explain the absence of a statistically significant relationship in the present study.

Education equally shows no significant effect ($\beta = 0.571$, $p = 0.437$). This is consistent with findings by Apata, Apata, Igbalajobi, and Ajetomobi (2010), who observed that formal education does not always translate into better economic outcomes for smallholder farmers, especially when the livelihood system is dominated by agricultural activities requiring practical skills rather than formal qualifications. Experience in cocoa farming also has no significant effect ($\beta =$

0.039, p = 0.888), reinforcing earlier observations by Idowu and Ojedokun (2014) that productivity in cocoa farming depends more on access to improved technologies and farm inputs than on years of experience alone.

Income from non-cocoa activities is also insignificant (β = –0.092, p = 0.411), indicating that diversification outside cocoa does not meaningfully affect poverty status for cooperative members. This reflects the findings of Adepoju and Adejumo (2018), who note that non-farm income among rural farmers in Nigeria is often too small or irregular to have a substantial welfare impact.

Taken as a whole, the regression results highlight that income derived directly from cocoa production is the principal determinant of poverty reduction among cooperative farmers, while other demographic and structural variables play minimal roles. This underscores the importance of productivity-focused interventions such as improved seedling distribution, access to fertilizers, credit for farm expansion, and training on good agricultural practices. It also suggests that enhancing cocoa income remains the most effective pathway to reducing poverty within the cooperative system.

**Table 4.7: Logistic Regression Estimates of Determinants of Poverty Among Co-operative Cocoa Farmers**

| Variable | Coefficient (β) | Std. Error | z-value | p-value | Remark |
|---|---|---|---|---|---|
| Constant | 5.244 | 3.644 | 1.439 | 0.150 | N.S. |
| $X_1$ Age | -0.091 | 0.082 | -1.102 | 0.270 | N.S. |
| $X_2$ Household size | 0.118 | 0.320 | 0.369 | 0.712 | N.S. |
| $X_3$ Education | 0.571 | 0.735 | 0.777 | 0.437 | N.S. |
| $X_4$ Experience | 0.039 | 0.279 | 0.141 | 0.888 | N.S. |
| $X_5$ Cocoa farm size | 0.495 | 0.290 | 1.705 | 0.088 | *marginal (10%)* |
| $X_6$ Cocoa income (₦m) | -1.021 | 0.360 | -2.835 | 0.005* | significant |
| $X_7$ Other income (₦100k) | -0.092 | 0.112 | -0.822 | 0.411 | N.S. |

Source: Field Survey, 2025; Pseudo $R^2 = 0.6297$; LR $\chi^2$ (7) $p < 0.001$; N = 54.

## 4.7 Constraints of Cocoa Farming

### 4.7.1 Financial Constraints

#### 4.7.1.1 Inadequate Finance

Non-cooperative farmers recorded a mean score of 3.19, indicating that inadequate finance is a serious constraint for them. Cooperative members reported a lower mean (2.37), implying that although they also face financial challenges, cooperatives moderately cushion this constraint through credit and loan services.

Smallholder cocoa farmers often lack access to formal credit due to collateral requirements and high interest rates. Without adequate finance, farmers cannot invest in improved seedlings, agro-chemicals, labour, or farm rehabilitation. This supports the findings of Ruf & Varlet (2019), who observed that limited financing capacity affects cocoa productivity across West Africa.

#### 4.7.1.2 Limited Access to Credit and Inadequate Credit

Non-cooperative farmers recorded serious constraints in limited access to credit (mean = 2.69) and inadequate credit (mean = 2.69), while cooperative members recorded lower means of 1.85 and 1.67, respectively. This confirms that cooperatives serve as important financial intermediaries.

However, the fact that the means are not significantly low for cooperative farmers indicates that the loans provided may still be insufficient in size, untimely, or inadequate to cover full production costs.

### 4.7.2. Production and Agronomic Constraints

#### 4.7.2.1 High Cost of Labour

Labour-related challenges ranked among the highest constraints for both groups, with means of 3.83 for cooperatives and 4.37 for non-cooperatives.

Cocoa farming is highly labour-intensive, requiring labour for; Weeding, pruning, spraying chemicals, harvesting and pod breaking, drying and sorting. The high cost of labour reflects rural–urban migration trends, with many youths abandoning farming for non-agricultural jobs. As labour becomes scarce, hiring becomes more expensive, thereby reducing farmers' profit margins. This echoes the findings of Oluyole (2017), who also identified labour scarcity as a major constraint to cocoa production in Nigeria.

#### 4.7.2.2 Ageing Cocoa Plantations

Cooperative farmers identified ageing farms as a serious constraint (mean = 3.00), whereas non-cooperative farmers reported a lower mean of 2.06.

Ageing plantations lead to: Declining yields, increased vulnerability to pests and diseases,higher cost of rehabilitation, and reduced bean quality. Many cocoa trees in Edo State are over 20–30 years old. Without replanting programs and access to improved seedlings, productivity remains low, contributing to chronic poverty among cocoa farming households.

#### 4.7.2.3 Incidence of Pests and Diseases

Both groups reported pest and disease incidence as a moderate constraint (1.83 for cooperatives, 2.17 for non-cooperatives).

Cocoa is susceptible to; black pod disease, capsid (mirid) infestation, swollen shoot disease and mealybugs. These pests and diseases adversely affect yields and increase reliance on agro-chemicals. Though cooperatives provide subsidised chemicals, non-cooperative farmers struggle with affordability, which may increase productivity losses.

### 4.7.3 Input-Related Constraints

#### 4.7.3.1 High Cost of Inputs

This was one of the most severe constraints for both groups, with means of 3.56 (cooperatives) and 4.31 (non-cooperatives).

Input costs such as fertilisers, fungicides, pesticides, and herbicides have risen in recent years due to inflation, exchange rate depreciation, and transportation challenges.

High input costs reduce the ability of farmers to; Maintain farm hygiene, apply chemicals adequately, conduct farm rehabilitation, and purchase improved seedlings. This finding aligns with World Bank (2021), which highlights rising agricultural input prices as a major barrier to smallholder farmers in developing countries.

#### 4.7.3.2 Lack of Improved Disease-Resistant Varieties

Non-cooperative farmers reported a mean of 2.52, while cooperative farmers reported 2.02.

The lack of improved, resistant varieties increases vulnerability to disease outbreaks. Cooperatives help to mitigate this through seedling provision, explaining the lower mean among cooperative respondents. However, both means being below 3.0 indicate that improved planting materials are still not adequately accessible or affordable for all farmers.

### 4.7.4 Post-Harvest and Infrastructure Constraints

#### 4.7.4.1 Inadequate Storage Facilities

Non-cooperative farmers recorded a high mean of 2.92, while cooperatives recorded 1.70.

Proper storage is crucial to preserve bean quality and price. Without adequate storage; farmers may sell early at unfavourable prices, beans may lose quality due to moisture, and farmers miss out on price increases during peak seasons. The higher mean among non-cooperatives suggests cooperatives provide better storage support or collective facilities.

#### 4.7.4.2 Inadequate Processing Facilities

Non-cooperatives rated this as a serious constraint (mean = 2.79), whereas cooperative farmers reported 1.78.

Processing facilities such as fermentaries, dryers, and quality graders are essential for producing premium cocoa. Their absence forces farmers to: Sell wet or insufficiently fermented beans, lose access to premium prices, and sell through middlemen.

This perpetuates income losses and reduces bargaining power in the cocoa value chain.

#### 4.7.4.3 High Transportation Cost

High transportation cost was a serious constraint for cooperatives (mean = 3.50) and a moderate constraint for non-cooperatives (3.31).

Poor rural road networks contribute significantly to this constraint. High transportation costs affect; Input procurement, farm-to-market logistics, access to extension services, quality maintenance of cocoa beans. This agrees with Okoro & Olatunji (2018), who noted that poor infrastructure remains a barrier to efficient agricultural marketing in Nigeria.

### 4.7.5 Market-Related Constraints

#### 4.7.5.1 Fluctuating Prices of Cocoa

Both cooperative (4.00) and non-cooperative farmers (4.31) reported this as one of the most severe constraints.

Cocoa prices are highly volatile due to; International market fluctuations, exchange rate instability, seasonal supply variations, and middlemen influence.

Price volatility creates uncertainty, reduces investment incentives, and contributes to income instability. This finding mirrors Ruf & Varlet (2019), who emphasised that price volatility is a major cause of long-term poverty among cocoa farmers.

#### 4.7.5.2 Low Demand for Cocoa Products

Although both means were below 3.0 (2.07 and 2.33), indicating moderate constraints, low demand can negatively affect prices during glut periods. Farmers rely heavily on local buying agents whose prices may not reflect true market values.

This makes farmers vulnerable to exploitation and inconsistent revenue flows.

**Table 4.8: Constraints of cocoa farming**

| | Coop | | Non-Coop | |
|---|---|---|---|---|
| **Constraints** | **Mean** | **Std. Dev** | **Mean** | **Std. Dev.** |
| Inadequate finance. | 2.37 | 1.34 | 3.19* | 1.22 |
| Incidence of pest | 1.83 | 0.96 | 2.17 | 0.61 |
| Aging of plantation | 3.00* | 0.92 | 2.06 | 1.66 |
| Lack of improved disease resistant varieties. | 2.02 | 1.11 | 2.52 | 0.81 |
| High cost of labour. | 3.83* | 0.77 | 4.37* | 1.18 |
| Fluctuating prices of cocoa | 4.00* | 0.94 | 4.31* | 1.06 |
| High cost of transportation. | 3.50* | 1.25 | 3.31* | 1.18 |
| Low demand for cocoa products. | 2.07 | 0.94 | 2.33 | 0.77 |
| Inadequate processing facilities. | 1.78 | 1.14 | 2.79 | 1.11 |
| Inadequate access to agro-chemicals. | 1.78 | 1.08 | 2.96 | 0.63 |
| Inadequate storage facilities. | 1.70 | 1.20 | 2.92 | 0.77 |
| High cost of inputs | 3.56* | 0.83 | 4.32* | 1.22 |
| Limited access to credit | 1.85 | 1.13 | 2.69 | 0.83 |
| Inadequate credit | 1.67 | 1.15 | 2.69 | 0.78 |

Source: Field Survey, 2025; *Mean ≥ 3.0 = Serious constraints.

# CHAPTER FIVE

## 5.0. SUMMARY, CONCLUSION AND RECOMMENDATION

### 5.1 Summary

This study examined poverty status and income inequality among cooperative and non-cooperative cocoa farming households in Edo State, Nigeria. The research focused on determining whether cooperative membership influences welfare outcomes and identifying the key socioeconomic and structural factors that shape poverty among cocoa farmers.

Data were collected from 54 cooperative and 52 non-cooperative farmers, and analysed using descriptive statistics, Foster–Greer–Thorbecke (FGT) poverty indices, and logistic regression models.

The socio-economic profile showed that cocoa farming is predominantly an occupation for middle-aged and elderly males, with moderate education levels and household sizes. While cooperative members seemed to have slightly higher access to formal services, non-cooperative farmers were more engaged in off-farm economic activities such as trading.

Cooperatives provided essential services including credit, agro-chemicals, seedlings, marketing support, and discounted inputs. These services theoretically position cooperatives as platforms for increased productivity.

However, the FGT results revealed that cooperative farmers had higher poverty levels, with a poverty incidence of 0.407, compared to 0.288 among non-cooperative farmers. Poverty depth and severity followed the same trend, indicating that cooperative members were not only poorer but also more deeply entrenched in poverty.

The logistic regression analysis found that cocoa income was the only significant determinant of poverty, implying that income from cocoa production plays the most crucial role in improving welfare. Farm size showed marginal significance, while socio-demographic variables such as age, education, experience, and household size had no significant impact on poverty.

Both cooperative and non-cooperative farmers faced multiple constraints including high labour costs, high input prices, price fluctuations, ageing cocoa plantations, inadequate finance, and limited access to processing or storage facilities. These constraints reduce productivity and increase vulnerability, thereby limiting the potential of cooperative membership to translate into improved welfare.

## 5.2 Conclusion

The findings of this study lead to several key conclusions.

First, cooperative membership alone does not guarantee improved welfare or reduced poverty among cocoa farmers in the study area. Although cooperatives

provide valuable services, these are not sufficient or efficient enough to significantly alter household poverty levels. This highlights gaps in cooperative service delivery, capacity, and effectiveness.

Second, the study underscores the importance of income-generating capacity, particularly from cocoa production, as the primary driver of welfare improvement. Households with higher cocoa income are less likely to be poor, irrespective of their demographic characteristics. Thus, strategies aimed at increasing productivity, improving market access, and stabilising cocoa prices will have the most direct impact on poverty alleviation.

Third, the higher poverty levels among cooperative members suggest structural weaknesses such as delayed loan disbursement, inadequate input quantities, limited extension support, and possible elite capture within cooperatives. In contrast, non-cooperative farmers benefit from diversified livelihoods that provide financial resilience.

Finally, the severe constraints faced by both groups of farmers—especially high production costs, price volatility, inadequate infrastructure, and ageing plantations—pose significant barriers to increased productivity and improved welfare. Overcoming these constraints is essential for sustainable cocoa farming and rural poverty reduction.

Overall, the study concludes that both institutional strengthening and systemic agricultural support are necessary for improving the welfare of cocoa farming households in Edo State. Policy interventions must address productivity, financing, cooperative efficiency, and rural infrastructure simultaneously to produce sustainable improvements.

## 5.3 Recommendations

Based on the findings of this study, the following recommendations are made to support improvements in productivity, cooperative performance, and household welfare:

1. **Strengthen Cooperative Capacity and Governance:**

Cooperative societies should be restructured to improve transparency, leadership accountability, and service efficiency. This includes training cooperative executives in financial management, proper record-keeping, timely loan disbursement, and effective coordination of key services such as input distribution and marketing.

2. **Enhance Farmers' Access to Finance and Productive Inputs**

Government agencies, financial institutions, and NGOs should collaborate with cooperatives to provide affordable agricultural loans, subsidised agro-chemicals, improved seedlings, and mechanised tools. Flexible repayment plans and reduced

collateral requirements will enable cocoa farmers—especially smallholders—to invest effectively in their farms.

**3. Improve Cocoa Productivity Through Extension and Agronomic Support**

Continuous training on modern agronomic practices, integrated pest management, rehabilitation of ageing cocoa plantations, and adoption of disease-resistant varieties should be prioritised. Strengthening extension services will enhance farmers' technical capacity, increase yields, and improve household income.

**4. Stabilise Cocoa Prices and Strengthen Market Access**

Policies aimed at reducing price volatility, promoting collective marketing, and linking farmers with licensed, premium-paying buyers should be implemented. Improved market information systems and stronger bargaining power through cooperatives will ensure fairer prices for farmers.

**5. Develop Rural Infrastructure and Promote Income Diversification:**

Investment in rural roads, processing and storage facilities, and transportation networks is essential to reduce post-harvest losses and production costs. In addition, farmers should be encouraged to diversify into complementary crops or off-farm activities to reduce vulnerability to cocoa price fluctuations and enhance resilience.

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## APPENDIX

## DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION SERVICES, FACULTY OF AGRICULTURE, UNIVERSITY OF BENIN, BENIN CITY.

Dear Sir/Madam,

**REQUEST FOR ADMINISTRATION OF QUESTIONNAIRE**

I am a final year student of the above named institution. I am carrying out a research on the topic, "POVERTY **STATUS AND INCOME INEQUALITY AMONG CO-OPERATIVE AND NON CO-OPERATIVE COCOA FARMING HOUSEHOLDS IN EDO STATE, NIGERIA",** and I humbly solicit your assistance by responding to the questions accurately.

Be assured that all information provided will be used only for academic purpose and will be treated as confidential.

Thanks for your anticipated cooperation.

Yours sincerely,

**Hellen Chinemere MADUIKE**

**Co-operative membership: Yes [ ] No [ ]**

**Section A: SOCIO-ECONOMIC CHARACTERISTICS OF RESPONDENTS**

Please fill in or tick (✓) as appropriate:

1. Age: _____ years
2. Gender: Male [ ] Female [ ]
3. Marital Status: Single [ ] Married [ ] Divorced [ ] Widowed [ ]
4. Educational level of household head?: No formal education [ ] Primary [ ] Secondary [ ] Tertiary [ ]
5. What is your household size (number of members)?: _____
6. Years of experience in cocoa farming (in years): _____
7. What is the size of your Cocoa Farm?: _____(hectares)
8. What is your main Occupation?: Farming [ ] Trading [ ] Civil Service [ ] Others (specify): _____
9. Are you a member of a Co-operative Society?: Yes [ ] No [ ]
10. If yes, what is the name of the Co-operative: _____
11. If you are a member, have you ever obtained assistance from the co-operative? Yes [ ] No [ ]

**SECTION B: HOUSEHOLD INCOME AND EXPENDITURE**

12. What is your annual Income from Cocoa: ₦_____
13. What was your last year's average cocoa yield? ——— (Kg)
14. Average price received per kg? ———(₦)
15. What is your monthly household expenditure on the following?

| S/N | Expenditure | Amount (₦) |
|---|---|---|
| a. | Daily food needs | |
| b. | Farm inputs | |
| c. | House/rent | |
| d. | Education | |
| e. | Health care | |
| f. | Transportation | |
| g. | Others | |

16. What are your sources of income?
Provide the income for the following sources (₦)
    1. Other crops. ———————
    2. Livestock farming. ———————
    3. Non-agricultural. ———————
    4. Others: (specify) ———————
17. What is your total monthly household income? (₦) ————————

**SECTION C: DETERMINANTS OF POVERTY**
18. In the past 12 months, how often did your household experience food shortages?
Often [ ] Sometimes [ ]. Rarely [ ]. Never [ ]
19. Do your children regularly attend school? Yes [ ]. No [ ]
If No, why? ————————
20. Do you and your household have access to healthcare services? Yes [ ] No [ ]
21. Which of the following do you have access to and use?

| S/N | Assets | Tick if used |
|---|---|---|
| i. | **Types of toilet:** Pit latherin | |
| ii. | Bucket | |
| iii. | Water closet | |
| iv. | Others specify. | |

| | | |
|---|---|---|
| **v.** | **Source of water:**<br>Public pipe borne water. | |
| vi | Public borehole | |
| vii | Private borehole | |
| viii. | Well water | |
| ix | Others specify | |
| | | |
| **x.** | **Power supply:**<br>BEDC only | |
| xi. | BEDC and Generator | |
| xii. | BEDC and Solar | |
| xiii | Others specify | |
| | | |
| xiv | **Means of Transportation:**<br>Trekking | |
| xv | Bicycle/ Motorcycle | |
| xvi. | Private vehicle | |
| xvii. | Public transportation | |
| xviii. | Others specify | |
| | | |
| xix. | **Types of medical facilities accessed:**<br>Private hospital | |
| xx | Public hospital/health center | |
| xxi | Trado-medical homes | |
| xxii | Self meditation | |

| | | |
|---|---|---|
| xxiii. | Others specify | |

22. Which of the following assets do you possess? ( Tick)

1. Radio [ ]
2. TV [ ]
3. Mobile phone [ ]
4. Motorbike [ ]
5. Car [ ]
6. Farm tools [ ]

**SECTION D: PERCEPTIONS ON INCOME INEQUALITY**

23. Compared to other cocoa farmers, how do you rate your household income?

Much higher [ ] Higher [ ]. Same [ ] Lower [ ] Much lower [ ]

24. Do co-operative members generally earn more than non- members? Yes [ ] No [ ] Not sure [ ]

25. Do you think income inequality among cocoa farmers is: Increasing [ ] Decreasing [ ] Staying the same [ ]

26. Main causes of income inequality: (tick)

Land ownership [ ] Access to credit [ ] Co-operative membership [ ] Education [ ] Market access [ ] Others _____

**SECTION E: CO-OPERATIVE MEMBERSHIP AND PARTICIPATION**

27.. How long have you been a member? ————years

28. How often do you attend meetings? Regularly [ ]. Occasionally [ ]. Rarely [ ]

29. Has membership improved your household income? Yes [ ] No [ ] Not sure [ ]

30. Has membership reduced your poverty status? Yes [ ]. No [ ] Not sure [ ]

31. Which of the following benefits did your Co-operative provide?

| S/N | Roles | Provided | Not provided |
|---|---|---|---|
| 1. | Provision of seedlings. | | |
| 2. | Provision of agro-chemicals. | | |

| | | | |
|---|---|---|---|
| 3. | Provision of farming implements. | | |
| 4. | Provision of loans. | | |
| 5. | Transportation services. | | |
| 6. | Discount price on inputs. | | |
| 7. | Marketing of produce. | | |
| 8. | Education/Training. | | |
| 9. | Others specify | | |

**SECTION F: Constraints faced by Cocoa farmers (Use ✓ to indicate your response)**.

| S/N | Statement | Very serious | Serious | Undecided | Not serious | Not a problem |
|---|---|---|---|---|---|---|
| 1. | Inadequate finance. | | | | | |
| 2. | Incidence of pest | | | | | |
| 3. | Aging of plantation | | | | | |
| 4. | Lack of improved disease resistant varieties. | | | | | |
| 5. | High cost of labour. | | | | | |
| 6. | Fluctuating prices of cocoa | | | | | |
| 7. | High cost of transportation. | | | | | |
| 8. | Low demand for cocoa products. | | | | | |
| 9. | Inadequate processing facilities. | | | | | |
| 10. | Inadequate access to agro-chemicals. | | | | | |
| 11. | Inadequate storage facilities. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12. | High cost of inputs | | | | | |
| 13. | Limited access to credit | | | | | |
| 14. | Inadequate credit | | | | | |
| 15. | Others specify: | | | | | |

**DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION SERVICES,**
**FACULTY OF AGRICULTURE, UNIVERSITY OF BENIN, BENIN CITY.**

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I am a final year student of the above named institution. I am carrying out a research on the topic, "**POVERTY STATUS AND INCOME INEQUALITY AMONG CO-OPERATIVE AND NON-COOPERATIVE COCOA FARMING HOUSEHOLDS IN EDO STATE, NIGERIA"**, and I humbly solicit your assistance by responding to the questions accurately.

Be assured that all information provided will be used only for academic purpose and will be treated as confidential.

Thanks for your anticipated cooperation

Yours sincerely,

**Hellen Chinemere MADUIKE**

**Co-operative membership: Yes [ ] No [ ]**

**SECTION A: SOCIO-ECONOMIC CHARACTERISTICS**

1. Age (years): ———
2. Gender of household head: Male [ ] Female [ ]
3. Marital status: Married [ ] Single [ ] Divorced [ ] Widowed [ ]
4. What is your household size?(Number of members) ———
5. Educational level of household head: No formal [ ] Primary [ ] Secondary [ ] Tertiary [ ]
6. Do you do anything else apart from farming? Yes [ ] No [ ]

If yes, specify ———

7. Years of experience in cocoa farming: ———(years)
8. Do you own your farmland? Yes [ ] No [ ]

If No, specify:

Lease [ ] Rent [ ] Sharecropping [ ]

9. What is the size of your Cocoa farm? ———(hectares)

**SECTION B: HOUSEHOLD INCOME AND EXPENDITURE**

10. What was your last year's average cocoa yield? ——(kg)
11. Average price received per kg? (₦) ———
12. What is your annual Income from Cocoa: ₦_____

13. What are your sources of income?

Provide the income for the following sources (₦)

1. Other crops. ————————
2. Livestock farming. ————————
3. Non-agricultural. ————————
4. Others: (specify) ————————

13. Total monthly household income: (₦) ————

14. What is your average monthly expenditure on the following? (₦)

| S/N | Expenditure | Amount (₦) |
|---|---|---|
| 1. | Food | |
| 2. | Education | |
| 3. | Farm inputs | |
| 4. | Health services | |
| 5. | Housing/rent | |
| 6. | Transportation | |
| 7. | Others: | |

**SECTION C : POVERTY INDICATORS**

15. In the past 12 months, how often did your household experience food shortages?

Often [ ] Sometimes [ ]. Rarely [ ]. Never [ ]

16. Do your children regularly attend school? Yes [ ] No [ ]

If No, why? ————————

17. Do you and your household have access to healthcare services? Yes [ ] No [ ]

18. In the past 12 months did you find it difficult to pay for

i. School fees? Yes [ ] No [ ]

ii. Medical bills? Yes [ ] No [ ]

iii. Farm inputs? Yes [ ] No [ ]

19. Which of the following do you have access to and use?

| S/N | Assets | Tick if used |
|---|---|---|
| a. | **Type of toilet:** Pit laterine | |
| b. | Bucket | |
| c. | Water closet | |
| d. | Others: specify | |
| | **Source of water:** | |

| | | |
|---|---|---|
| e. | Public pipe borne water | |
| f. | Public borehole | |
| g. | Well water | |
| h. | Private borehole | |
| i. | Others: specify | |
| j. | **Power supply:** BEDC only | |
| k. | BEDC and Generator | |
| l. | BEDC and solar | |
| m. | Others: specify | |
| n. | **Means of Transportation:** Trekking | |
| o. | Bicycle/ Motorcycle | |
| p. | Private vehicle | |
| q. | Public transport | |
| r. | Others: specify | |
| s. | **Types of medical facilities accessed:** Private hospital | |
| t. | Public hospital/Health center | |
| u. | Trado-medical homes | |
| v. | Self medication | |
| w. | Others: specify | |

20. Which of the following assets do you possess? (Tick)
1. Radio [ ]
2. TV [ ]
3. Mobile phone [ ]
4. Motorbike [ ]
5. Car [ ]
6. Farm tools [ ]

**SECTION D: REASONS FOR NON-MEMBERSHIP**

21. Are you aware of cocoa farmers' co-operative in your area? Yes [ ] No [ ]
22. Why are you not a member? ( Tick)
a. Lack of awareness [ ]
b. Membership cost [ ]
c. Lack of trust [ ]
d. Not interested [ ]
e. Others _____
23. Would you be willing to join in the future? Yes [ ] No [ ] Maybe [ ]

**SECTION E: PERCEPTIONS ON INCOME INEQUALITY**

24. Compared to other cocoa farmers, how do you rate your household income?
Much higher [ ] Higher [ ]. Same [ ] Lower [ ] Much lower [ ]
25. Do co-operative members generally earn more than non- members? Yes [ ] No [ ] Not sure [ ]
26. Do you think income inequality among cocoa farmers is: Increasing [ ] Decreasing [ ] Staying the same [ ]
27. Main causes of income inequality: (tick)
Land ownership [ ] Access to credit [ ] Co-operative membership [ ] Education [ ] Market access [ ] Others _____
28. Suggest strategies to reduce poverty and inequality: (tick)
i. Government support [ ]
ii. Stronger co-operatives [ ]
iii. Subsidized inputs [ ]
iv. Financial training [ ]
v. Market access [ ]
Others: _____

**SECTION F: Constraints faced by Cocoa farmers (Use ✓ to indicate your response).**

| S/N | Statement | Very serious | Serious | Undecided | Not serious | Not a problem |
|---|---|---|---|---|---|---|
| 1. | Inadequate Finance | | | | | |
| 2. | Incidence of pest | | | | | |
| 3. | Aging of plantation | | | | | |
| 4. | Lack of improved disease resistant varieties | | | | | |
| 5. | High cost of labour | | | | | |
| 6. | Fluctuating prices of cocoa | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. | High cost of transportation | | | | | |
| 8. | Low demand for cocoa products | | | | | |
| 9. | Inadequate processing facilities | | | | | |
| 10. | Inadequate access to agro-chemicals | | | | | |
| 11. | Inadequate storage facilities | | | | | |
| 12. | High cost of inputs | | | | | |
| 13. | Limited access to credits | | | | | |
| 14 . | Inadequate credit | | | | | |
| 15. | Others: specify | | | | | |