

**ASSESSMENT OF HUMAN DEVELOPMENT INDEX OF MANGO
FARMERS IN ESAN SOUTH-EAST LOCAL GOVERNMENT AREA,
EDO STATE, NIGERIA**

BY

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CERTIFICATION

This is to certify that the research work on the Assessment of Human Development Index of Mango Farmers in Esan South-East Local Government Area, Edo State, Nigeria, Nigeria was carried out by ORUKPE GREAT with the Mat. No AGR2000043 under the supervision of Dr(Mrs) J.E Oboh of the department of Agricultural Economics and Extension Services, Faculty of Agriculture, University of Benin, Edo State, Nigeria.

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Date

DEDICATION

This project is dedicated to God Almighty who has seen me through my studies and whose love has been undying

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ABSTRACT

This study assessed the Human Development Index (HDI) of mango farmers in Esan South-East Local Government Area, Edo State, Nigeria, with a focus on their socioeconomic characteristics, income sources, constraints, and the contribution of mango farming to household welfare. Using a two stage sampling procedure, 94 mango farmers were surveyed through structured questionnaires. Descriptive statistics, Likert-scale analysis, and the UNDP HDI methodology were employed for data analysis. Results revealed a predominantly male (72.3%), middle-aged (mean 45 years) farming population with moderate education (mean 9 years) and experience (mean 18 years). Mango farming was the primary income source (mean ₦297,414.89 annually), contributing 38.21% to household welfare, particularly in savings, food, and education. The estimated HDI was 0.665 (medium), with high longevity (0.862), low education (0.503), and medium standard of living (0.681). Major constraints included poor road networks (mean 3.81), high input costs (3.66), and postharvest losses (3.59). Findings align with studies showing that human development indices significantly influence agricultural output in Nigeria, where investments in health and education yield long-term productivity gains. The study recommends enhanced extension services, credit access, and infrastructure development to improve mango farmers' HDI and livelihoods.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

Agriculture remains a cornerstone of Nigeria's economy, contributing significantly to national GDP, employment, and rural development. According to the National Bureau of Statistics (2023), over 70% of Nigeria's rural population depends on agriculture for their livelihood. Despite the rise of crude oil as a dominant economic sector, farming continues to be the primary source of income for millions of Nigerians, especially those in rural communities. Among the various crops cultivated, mango stands out as a high-value fruit with strong economic and nutritional importance. In Esan South-East Local Government Area of Edo State, mango farming plays a vital role in supporting household income, enhancing food security, and stimulating local trade (Olufunmi *et al.*, 2023).

Mango farming in Esan South-East is more than a seasonal occupation, it is a livelihood strategy that sustains families during critical periods of the year. The income generated from mango sales helps households meet essential needs such as feeding, education, healthcare, and shelter. Beyond individual families, mango farming contributes to the wider local economy by creating jobs for harvesters, transporters, market vendors, and processors (Musyoka *et al.*, 2020). The fruit is also a source of vitamins and minerals, making it important for nutritional security in rural communities.

However, despite its importance, the actual income levels of mango farmers in this region remain poorly documented, leaving a gap in understanding how much farmers truly benefit from the crop. This lack of data makes it difficult for stakeholders to design effective interventions that address the specific needs of mango farmers. While mango farming has the potential to lift rural households out of poverty, several structural and operational challenges continue to hinder its full economic impact.

One of the most pressing issues is market access. Farmers often face unstable prices, exploitation by middlemen, and limited opportunities to sell in more profitable urban markets (AgriNews Nigeria, 2024). The absence of organized marketing systems and cooperatives means that individual farmers have little bargaining power, leaving them vulnerable to price manipulation. In many cases, mangoes are sold at farm gate prices that do not reflect the true value of the produce.

Post-harvest losses are another major concern. Poor handling, lack of storage infrastructure, and pest infestation significantly reduce the quantity of marketable produce (Anda & Anda, 2023; VMJSTE, 2023). A study in Kwara State found that poor post-harvest practices led to significant income losses among mango farmers (Adebayo & Yusuf, 2020). These losses are often compounded by inadequate transportation systems, which result in delays and spoilage during transit. In Esan South-East, many rural roads are unpaved and become impassable during the rainy season, further limiting farmers' access to markets.

Climate change and pesticide use have also emerged as serious threats to mango production. Declining pollinator populations due to extreme heat and chemical exposure are causing mango scarcity and reducing yields across Nigeria (African Climate Reporter, 2024). Erratic rainfall patterns and prolonged dry spells affect flowering and fruiting cycles, leading to unpredictable harvests. These environmental challenges require urgent attention, especially in regions like Esan South-East where farming is rain-fed and highly vulnerable to climate variability.

Access to agricultural inputs and extension services is another factor that influences income. Many mango farmers in Esan South-East rely on traditional farming methods and lack access to improved seedlings, fertilizers, and pest control measures. According to Ogunleye & Salami (2023), farmers who receive regular extension support tend to earn higher incomes due to better farm management practices. Unfortunately, extension coverage in rural Edo State remains limited, and many farmers are unaware of best practices for mango cultivation.

Gender dynamics also play a role in income disparities. Women are actively involved in mango farming, especially in harvesting and marketing, yet they often face barriers to land ownership, credit access, and decision-making. Empowering women through targeted programs can significantly boost household income and improve food security. Studies have shown that when women have control over agricultural income, it leads to better outcomes for children's education and health (FAO Nigeria, 2022).

Despite the economic importance of mango farming, there is limited research focused specifically on the income dynamics of mango farmers in Esan South-East. Most existing studies address general agricultural challenges or broader fruit production trends, without zooming in on the financial realities of smallholder mango growers. This study seeks to fill that gap by assessing the income levels, sources, and constraints faced by mango farmers in the region. The findings will provide valuable insights for policymakers, development agencies, and agricultural stakeholders aiming to improve rural livelihoods and promote inclusive economic growth (NBS, 2023).

1.2 Statement of the Problem

Mango farming is a vital economic activity for many rural households in Esan South-East Local Government Area of Edo State. It provides seasonal income, supports food security, and creates opportunities for employment and trade. However, farmers in this region continue to face persistent challenges that limit the income they earn from mango cultivation.

One major issue is price instability and the dominance of middlemen, which often reduce farmers' profit margins. Many are forced to sell their produce at unfavorable prices due to limited bargaining power and poor access to formal markets (Eze & Nnamdi, 2021; Nigerian Queries, 2025). The lack of organized cooperatives and market infrastructure means that farmers cannot negotiate better prices or access

premium buyers. This results in income volatility and discourages long-term investment in mango farming.

Inadequate access to credit facilities also prevents farmers from expanding production or investing in improved technologies that could enhance yield and profitability (Adejo *et al.*, 2021). Most rural farmers rely on informal lending sources, which are often unreliable and come with high interest rates. Without access to affordable credit, farmers cannot purchase inputs such as fertilizers, pesticides, or improved seedlings. This limits productivity and reduces the overall income potential of mango farming.

Post-harvest losses caused by poor handling, lack of storage infrastructure, and pest infestation significantly reduce the quantity of marketable produce (Anda & Anda, 2023). In Bauchi State, mango farmers reported that over 30% of their harvest was lost due to inadequate packaging, poor grading, and decay during transit (VMJSTE, 2023). These losses are not only economic but also discourage farmers from expanding their operations. In Esan South-East, similar challenges exist, especially during peak harvest seasons when supply exceeds local demand.

Poor road networks and high transportation costs further restrict access to profitable urban markets, compounding income challenges (Akinyemi & Ojo, 2022). Many rural roads in Edo State are in poor condition, making it difficult for farmers to transport their produce to cities like Benin or Lagos. This forces them to sell locally at lower prices, reducing their earnings and discouraging youth participation in agriculture.

Recent studies have also highlighted the impact of climate change and pesticide misuse on mango yields. In 2024, researchers reported that declining pollinator populations and erratic weather patterns were contributing to mango scarcity across Nigeria, further threatening farmer income (African Climate Reporter, 2024). These environmental factors are especially critical in Esan South-East, where mango farming is largely rain-fed and vulnerable to climate shocks.

Despite these challenges, there is limited research focused specifically on the income of mango farmers in Esan South-East. Most existing studies emphasize general agricultural production or broader development indicators, leaving a gap in knowledge about farmers' actual income levels, sources, and constraints. Without such localized data, policies and interventions risk being generic and ineffective. Therefore, this study seeks to provide a detailed assessment of the income of mango farmers in Esan South-East, Edo State. The findings will help inform targeted development programs, improve agricultural planning, and enhance the welfare of smallholder farmers in the region (Ogunleye & Salami, 2023; Emam, 2021; Osabohien *et al.*, 2020).

This study therefore seeks to answer the following questions:

- i. What are the socio-economic characteristics of mango farmers in the study area?
- ii. What are the sources and levels of income of mango farmers in Esan South-East?
- iii. what is the estimated longevity, education level and income of the mango farmers
- iv. What are the major challenges affecting income generation from mango farming?

v. How does mango farming income contribute to household welfare in Esan South-East

1.3 Objectives of the Study

The main objective of this study is to evaluate the human Development Index of mango farmers in Esan South-East Local Government Area of Edo State.

The specific objectives are as follows:

- i. to describe the socio-economic characteristics of mango farmers in the study area.
- ii. to identify the sources and levels of income of mango farmers.
- iii. to estimate the HDI of mango farmers using Longevity, Education and standard of living indices among mango farmers.
- iv. to examine the major challenges limiting income generation from mango farming.
- v. to evaluate the contribution of mango farming income to household welfare in the study area.

1.4 Justification of the Study

Income is one of the most direct and meaningful indicators of economic well-being, especially for rural households whose livelihoods depend heavily on agriculture. In Esan South East Local Government Area of Edo State, mango farming is not just a seasonal activity. It is a key source of income that enables families to meet essential

needs such as food, education, healthcare, and shelter. Understanding the income dynamics of mango farmers in this region is therefore critical to evaluating how agriculture contributes to rural welfare and identifying practical ways to improve farmers' livelihoods.

While agriculture remains a major driver of rural development in Nigeria, income levels among smallholder farmers are often unstable and insufficient. This is due to a combination of structural, environmental, and market-related challenges. Mango farming, despite its economic potential, is no exception. Farmers in Esan South East face persistent issues such as price fluctuations, poor access to profitable markets, postharvest losses, and limited access to modern inputs and credit (Olufunmi *et al.*, 2023; Chiebonam, 2019; Stathers *et al.*, 2024). These constraints reduce profitability, discourage investment, and perpetuate cycles of poverty among farming households.

A study focused specifically on income provides a clearer picture of the financial realities mango farmers face. It helps uncover the constraints that prevent them from maximizing their returns and offers insights into how these challenges can be addressed. For example, inadequate storage and processing facilities often lead to significant postharvest losses, especially during peak harvest seasons when supply exceeds local demand (Anda and Anda, 2023; VMJSTE, 2023). Without proper infrastructure, farmers are forced to sell at low prices or watch their produce spoil. Similarly, the dominance of middlemen in the marketing chain limits farmers' bargaining power and reduces their share of profits (AgriNews Nigeria, 2024).

Access to credit is another critical issue. Many mango farmers in Esan South East rely on informal lending sources, which are often unreliable and come with high interest rates. Formal credit schemes are either unavailable or inaccessible due to bureaucratic hurdles and lack of collateral. This limits farmers' ability to invest in improved seedlings, fertilizers, pest control, and other inputs that could boost productivity and income (Adejo *et al.*, 2021). Extension services are also limited, and many farmers lack the technical knowledge needed to adopt best practices in mango cultivation (Ogunleye and Salami, 2023).

Climate change adds another layer of complexity. Erratic rainfall patterns, prolonged dry spells, and rising temperatures affect flowering and fruiting cycles, leading to unpredictable harvests. In addition, the misuse of pesticides has contributed to the decline of pollinator populations, which are essential for mango production (African Climate Reporter, 2024). These environmental challenges are particularly severe in rainfed farming systems like those found in Esan South East.

Beyond these technical and economic factors, there is also a gap in localized data. While national and state-level agricultural statistics exist, they often fail to capture the lived experiences of smallholder farmers in communities like Ewatto, Okhuessan, and Illushi. This research fills that gap by providing community-specific evidence on income levels, sources, and challenges. The findings will be useful to policymakers, NGOs, extension agents, and farmer organizations in designing programs that are tailored to the actual needs of mango farmers in Esan South East (Musyoka, 2020; FAO Nigeria, 2022).

Importantly, this study goes beyond academic interest. It aims to generate knowledge that can help improve the welfare of rural households. By understanding the income situation of mango farmers, development efforts can be better aligned with the broader goals of poverty reduction, livelihood improvement, and sustainable agricultural growth in Edo State. The insights gained from this research can inform targeted interventions such as farmer cooperatives, market linkages, credit access, and climate-smart farming practices (MDPI, 2023; Ogundele, 2022).

In summary, the justification for this study lies in its potential to contribute to both academic knowledge and practical development outcomes. By focusing on the income of mango farmers in Esan South East, the research addresses a critical gap and provides a foundation for improving rural livelihoods through evidence-based planning and policy.

2.1 Literature Review

2.1.1 Concept of Human Development

The concept of human development evolved from the traditional notion of economic growth to a broader understanding of improving people's well-being. According to the United Nations Development Programme (UNDP), human development is fundamentally about expanding people's choices, enabling them to live long, knowledgeable, and productive lives (UNDP, 2023). It goes beyond income to include access to education, good health, and the freedom to participate meaningfully in society. This perspective aligns with Sen's capability approach, which views development as the expansion of people's capabilities to live the lives they value (UNDP, 2023; United Nations iLibrary, 2020). Thus, human development provides a multidimensional understanding of welfare, emphasising both material and non-material aspects of well-being.

2.1.2 Human Development Index (HDI): Definition and Components

The Human Development Index (HDI) is a composite measure created by the United Nations Development Programme (UNDP) to provide a broader understanding of development by focusing on people's overall well-being rather than economic growth alone (UNDP, 2023; UNDP, 2024). It incorporates three key dimensions of human

development—health, education, and standard of living—to capture how individuals live and the opportunities available to them. By combining these dimensions, the HDI offers a more comprehensive picture of human welfare across different populations.

The health component of the HDI is measured through life expectancy at birth, which reflects the general health status of a population and its access to healthcare, nutrition, and sanitary conditions. The education component includes mean years of schooling for adults and expected years of schooling for children, indicating both current educational attainment and future learning prospects. Standard of living is assessed using Gross National Income (GNI) per capita, which provides insight into the economic resources available to individuals and their ability to meet basic needs.

To compute the HDI, each of the three dimension indicators is normalised and then combined to produce a single index value ranging from 0 to 1. Higher values indicate better human development outcomes. The index has become a widely accepted tool for comparing well-being across countries, regions, and specific groups (WHO, 2024). Its multidimensional nature makes it particularly suitable for assessing welfare in rural agricultural communities, such as mango farmers, where income alone does not fully capture living conditions or quality of life.

2.1.3 Measurement of Human Development Index in Rural Farming

Communities

Measuring the Human Development Index (HDI) in rural farming communities often requires modifying the traditional indicators to suit the realities of local populations. Standard HDI components such as life expectancy, education, and income may not be fully captured in rural settings due to limited data availability and weak record keeping systems. As a result, researchers working in rural development frequently apply alternative measures or community level proxies such as access to basic healthcare, nutritional status, school enrolment rates, and literacy levels to reflect the true welfare conditions of farm households (Panakaje, 2025).

In addition to these basic human development dimensions, studies on rural livelihoods often integrate agricultural related indicators to provide a more comprehensive understanding of well being. Components such as agricultural income, access to extension services, years of farming experience, land ownership, and availability of farm inputs help capture the socio economic realities that shape farmers lives (Shaqiri, 2019). These indicators recognise that rural welfare is strongly influenced by farming productivity, access to agricultural support, and control over natural resources, all of which contribute to household resilience.

By incorporating these context specific variables, the HDI becomes a more accurate tool for assessing welfare in rural agricultural areas. This approach is particularly useful when studying communities like the mango farmers in Esan South East, where livelihoods depend heavily on farming activities and access to rural infrastructure. Adapting the HDI to local conditions therefore allows for a clearer understanding of disparities, development challenges, and opportunities for policy intervention among farming households (Abreu et al., 2021).

2.1.4 Mango Production in Nigeria

Mango production is an important horticultural activity in Nigeria, contributing to food security, domestic markets, and rural livelihoods. Nigeria is one of the major mango-producing countries in West Africa, with significant production taking place in the northern and southern agro-ecological zones (FAO, 2021). Reports from West African horticulture value-chain studies indicate that mango farming provides substantial income for smallholder farmers and plays a vital role in regional trade (WACOMP, 2022). However, production is often constrained by inadequate access to improved seedlings, pests and diseases, poor market structures, and limited processing facilities (Sultana, 2018). Despite these constraints, mango farming remains a major

source of livelihood in many communities and presents opportunities for expansion in both domestic and export markets.

2.1.5 Socio-Economic Characteristics of Mango Farmers

Socio-economic characteristics significantly influence farmers' productivity and human development outcomes. Studies consistently show that mango farmers in developing countries are predominantly middle-aged, possess moderate farming experience, and typically cultivate small farm sizes (Sultana, 2018; Rasmikayati, 2019). Education levels among mango farmers vary widely, with many possessing only basic or secondary education, which in turn influences technology adoption, productivity, and income levels (Olufunmi et al., 2023). Household size and access to productive resources such as credit, land, and extension services also play critical roles in determining farmers' welfare and livelihood outcomes (Ogunbode *et al.*, 2024). These socio-economic factors are closely linked to human development because they shape access to resources, decision-making capacities, and overall well-being of farming households.

2.1.6 Role of Agriculture in Human Development

Agriculture plays a central role in human development, particularly in rural economies where it forms the backbone of livelihoods. Empirical evidence indicates that agricultural growth stimulates improvements in income, health, nutrition, and

education, the core dimensions of human development (Diao *et al.*, 2007). In Nigeria, agriculture provides employment for a large proportion of the population and serves as a primary source of income, especially for rural households (FAO, 2023). Studies also show that improved agricultural productivity enhances household welfare by increasing purchasing power, improving access to healthcare, and enabling better educational outcomes (Ogunjobi, 2025). Thus, strengthening agricultural systems directly contributes to human development by fostering economic empowerment and improving quality of life among farmers.

2.2 Empirical Review

2.2.1 Studies on Human Development Index Among Farmers

Empirical research directly calculating HDI among farmers is somewhat limited, but there is related work connecting human development indicators to agricultural output in Nigeria. For example, Agbagwa *et al.* (2024) investigated how human development indices such as gross national income per capita (GNI), life expectancy at birth (LEB), death rate, and government health expenditure influence agricultural production in Nigeria over the period 1990–2021. Using an ARDL (autoregressive distributed lag) model, they found that in the short run, GNI, LEB, and health expenditure significantly influence crop, livestock, and fisheries output. In the long run, life expectancy and death rates were the dominant determinants of agricultural output,

suggesting that investments in health and human capital yield long-term returns in agricultural productivity.

Similarly, a more recent study covering 1999–2022 by Tuaneh, Agbenyi & Obenwaka (2025) used an ARDL error–correction model to examine the effects of HDI components on agricultural output in Nigeria, reporting that birth rate and life expectancy significantly influence output, while government education expenditure showed a negative long-run effect.

These studies suggest that broader human development measures are not only relevant for economic growth but are tightly linked to agricultural performance which, in turn, likely affects the welfare and development of farming households.

2.2.2 Empirical Studies on Mango Farmers' Welfare and Productivity

Though empirical literature specifically on HDI in mango farmers is scant, there are studies on mango farmers' income, technology use, and constraints. A study by Xie *et al.* (2024) examined the effect of digital agro-technical services on technical efficiency and incomes of mango farmers in Hainan, China, using endogenous switching regression and inverse-probability weighted regression. They demonstrate that adoption of digital technical services increases income by about 15.6% and

improves technical efficiency, evidencing the potential of technology to enhance welfare among mango producers. [OB]

In a Nigerian context, Olufunmi *et al.* (2023) surveyed 105 mango farmers in the southwest and assessed their knowledge and constraints related to integrated nutrient management (fertilizer sources). They found that a large share of farmers lacked awareness of nutrient sources and reported major constraints in using improved fertilizer technologies, which limit productivity and, by extension, farmer welfare.

Additionally, a value-chain study in southwestern Nigeria documented efforts to improve mango value (production, harvesting, processing, marketing) via innovation developed by a university farm, with the aim of boosting quality and income of mango producers.

Together, these studies illustrate that welfare and productivity challenges for mango farmers are linked to both technological adoption gaps and knowledge constraints.

2.2.3 Socio-Economic Determinants of Human Development Among Rural Farmer

There is a rich set of empirical findings on the socio-economic factors that shape development outcomes for rural farming households, which can be connected to human development. For example, a study on socio-economic drivers of food security in smallholder maize farms in Ogun State, Nigeria, by Social Indicators Research, showed that education, household size, extension contact, access to credit,

membership in associations, and gender of household head significantly influence food security. Since food security is closely tied to welfare (a component of human development), this suggests that these factors matter for broader development outcomes.

Similarly, Omotoso *et al.* (2021) investigated the determinants of poverty in farming households in southwest Nigeria, finding that age, household size, education, and income significantly shape poverty status.

On the institutional side, Kanu & Przezbórska-Skobiej (2025) examined socio-economic determinants of adoption of climate-smart agriculture among agritourism farmers in Nigeria, finding that education increased adoption of organic farming but decreased improved livestock management; extension services promoted adoption of farmer field schools; while access to credit and membership in cooperatives also played key roles.

Another study from South Africa by Oladele, Abiolu & Omotayo (2022) looked at female rural farmers' development using a probit regression and found that education, innovation capacity, and extension sources significantly predicted their economic empowerment.

These studies collectively underscore that human development among rural farmers is determined by a mixture of human capital (education), social capital (cooperatives), resource access (credit, extension), and demographic factors.

2.2.4 Constraints Affecting Farmers' Human Development Outcomes

Several empirical studies identify the constraints that limit farmers' human development, often by restricting their income, productivity, or ability to invest in health and education. A foundational analysis on agricultural development in Nigeria highlights systemic problems such as poor access to credit, underdeveloped infrastructure, limited access to modern inputs, environmental degradation, constrained land access, and weak extension services. [OBJ]

In extension services specifically, Aromolaran, Apantaku, and colleagues (in Oyo State) documented severe constraints: insufficient extension personnel, inadequate facilities, weak planning, and low motivation, all reducing the effectiveness of extension delivery to smallholder farmers.

Regarding credit, a study among rice farmers in Kogi State (Opaluwa *et al.*, 2024) used logistic regression to identify determinants of access to credit. They found that formal, semi-formal (like cooperatives), and informal credit sources are available, but many farmers are constrained by age, education, distance, and institutional factors when trying to access these financial services.

On the crop-specific side, Olufunmi *et al.* (2023) in their study of mango production noted that many farmers lack knowledge about integrated nutrient management and face barriers in accessing fertilizer sources, which undermines their capacity to improve yields and thereby limits income and welfare growth.

Finally, institutional cooperation also appears to matter: a study by Akinola (2023) found that membership in agricultural cooperatives positively influences yield among smallholder farmers in rural Nigeria, underscoring that limited cooperative access can be a constraint on productivity and development outcomes.

2.3 Theoretical Review

2.3.1 Human Capital Theory

Human Capital Theory provides a foundational lens for understanding how improvements in education, skills, and health directly enhance the productivity and welfare of smallholder farmers. Recent scholarship continues to reaffirm the centrality of human capital in agricultural development. For instance, Batista de Barros *et al.* (2022) demonstrate that investment in farmers' knowledge and skills significantly increases productivity and efficiency, especially in rural and frontier agricultural regions. Their study shows that better-educated farmers adopt improved technologies faster and manage resources more effectively, leading to higher output. This contemporary evidence aligns with broader studies in sub-Saharan Africa. Ogunjobi *et al.* (2025), in their investigation of human capital and agricultural productivity in Nigeria, found that farmers' access to extension services, health status, and educational attainment remains a strong determinant of agricultural value addition. Similarly, Deme and Doli (2025) argue that human capital formation, particularly

through improved training, rural education, and institutional support plays an essential role in boosting agricultural development and attracting foreign investment in West African economies. Collectively, these recent studies reinforce Human Capital Theory by showing that farmers' socioeconomic progress depends substantially on the quality of their knowledge, skills, and health. In the context of mango farmers in Esan South-East, stronger human capital can shape the adoption of modern agronomic practices, enhance productivity, and ultimately improve their Human Development Index (HDI) outcomes.

2.3.2 Sustainable Livelihoods Framework (SLF)

The Sustainable Livelihoods Framework (SLF) provides an asset-based approach to understanding how farming households combine and manage their livelihood assets—human, natural, social, financial, and physical capitals—to achieve improved wellbeing. Recent literature highlights the continued relevance of the SLF in analyzing smallholder livelihood outcomes. Amghani *et al.* (2025) apply the SLF to evaluate livelihood sustainability among smallholder farmers and report that access to financial credit, supportive institutions, social networks, and natural resources significantly influences livelihood resilience and long-term welfare. Their findings confirm that farmers with diversified and well-developed livelihood assets are better positioned to withstand shocks, adopt innovations, and pursue sustainable

development pathways. Morse (2025) further expands the theoretical debates by critically reviewing the strengths and limitations of the SLF, noting that while the framework remains highly influential, it must adapt to emerging issues such as climate stress, market volatility, and modern livelihood dynamics. In a related study, He *et al.* (2024) link livelihood resilience to climate adaptation and show that farmers with stronger social capital, access to credit, and cooperative membership are more capable of responding to environmental changes. These insights highlight the importance of the SLF for understanding the livelihood realities of mango farmers in Esan South-East, where variations in asset ownership, cooperative participation, land access, and financial capacity directly influence productivity, income, and overall development outcomes.

2.3.3 Capability Approach (Amartya Sen)

The Capability Approach by Amartya Sen provides a broader, people-centered theoretical foundation for assessing development among rural households. Instead of focusing solely on income or output, the approach emphasizes the extent to which individuals have the real freedoms, opportunities, and capabilities to live the kind of lives they value. Recent research strongly supports the relevance of this framework in agricultural and rural development analysis. Matthys (2023) applies the Capability Approach to smallholder farming systems and concludes that participation in high-

value agriculture enhances farmers' capabilities, not only by increasing earnings but also by expanding mobility, social participation, decision-making power, and educational opportunities. Boda *et al.* (2024) similarly argue that sustainable food systems and rural development should prioritize capability expansion, noting that improvements in farmers' wellbeing depend on access to resources, empowerment, and the freedom to pursue meaningful livelihood goals. Furthermore, Mishra *et al.* (2023) highlight how institutional support, farmer groups, and strengthened social and human capital contribute to enhancing farmers' capabilities and overall agency. Through this perspective, the development of mango farmers in Esan South-East can be evaluated beyond material measures, focusing instead on how farming improves their freedoms, such as the ability to access education, participate in cooperatives, improve health, and pursue stable and dignified livelihoods. This makes the Capability Approach especially relevant for assessing their Human Development Index (HDI) outcomes.

2.4 Summary of Literature and Knowledge Gap

The reviewed literature shows that human development among farmers is shaped by a wide range of factors, including education, income, health status, resource access, livelihood assets, and institutional support. Recent studies consistently emphasize the importance of human capital accumulation in enhancing agricultural productivity and wellbeing, demonstrating that farmers with higher educational attainment, better

health, and strong access to extension services tend to achieve superior development outcomes. Similarly, research grounded in the Sustainable Livelihoods Framework highlights the influence of livelihood assets such as credit access, land ownership, social networks, and physical infrastructure—on farmers’ resilience, productivity, and long-term welfare. Studies applying the Capability Approach further underscore that true development extends beyond income, involving the expansion of farmers’ freedoms and opportunities to live meaningful lives, participate in society, and pursue livelihood goals with dignity.

Despite these rich theoretical and empirical contributions, the literature reveals several important gaps. First, most studies have focused broadly on rural farmers, crop producers, or agricultural households in Nigeria and sub-Saharan Africa, without isolating the specific realities of mango farmers, who face unique production constraints, seasonal income fluctuations, and market volatility. Second, although recent agricultural research increasingly addresses welfare, livelihood dynamics, or productivity, very few studies explicitly apply the Human Development Index (HDI) to assess farmers’ wellbeing. A majority of existing work relies on income-based indicators or general poverty analysis, neglecting the multidimensional perspective offered by HDI, which captures education, health, and living standards simultaneously. Third, in the context of Edo State and Esan South-East in particular—empirical studies on mango farmers remain extremely limited, with existing agricultural studies

focusing mainly on crop yields, market channels, or production challenges rather than human development outcomes.

Therefore, a significant knowledge gap exists in the application of HDI to mango farmers in Esan South-East. No known study has comprehensively measured their human development levels, analyzed the socio-economic determinants influencing their HDI scores, or assessed how livelihood constraints shape their overall wellbeing. This gap justifies the present study, which seeks to provide a multidimensional assessment of human development among mango farmers in Esan South-East, identify the key factors affecting their development outcomes, and offer evidence-based recommendations for improving their welfare and productivity.

3.0 METHODOLOGY

3.1 Area and Scope of the Study

The study was conducted in Esan South East Local Government Area of Edo State, Nigeria, focusing on five selected communities: Ewatto, Illushi, Okhu Esan, Ohordua, and Ubiaja. The LGA lies approximately between latitude 6.7011° North and longitude 6.4036° East. It is located in the southern part of Nigeria and experiences a climate with a mean temperature of about 27°C and rainfall ranging between 2000

mm and 2500 mm. The rainy season typically spans from April to October, while the dry season lasts from November to March.

Esan South East is predominantly agrarian, with farming serving as the main source of livelihood. Mango is one of the major cash and food crops cultivated in the area, contributing significantly to household income and food security. The scope of this study includes all mango farmers actively engaged in cultivation, harvesting, and marketing within the selected communities.

3.2 Sampling Procedure and Sample Size

A two-stage sampling procedure was used to select respondents for the study;

- First stage: Purposive sampling will be used to select five communities known for active mango farming—Ewatto, Illushi, Okhu Esan, Ohordua, and Ubiaja. These communities were chosen based on their consistent mango production and accessibility for data collection.
- Second stage: Simple random sampling will be used to select twenty mango farmers from each of the selected communities, resulting in a total sample size of 100 respondents. This approach ensures that the sample captures a diverse cross-section of mango farmers in terms of age, farm size, income level, and market access.

The sample size is considered adequate for statistical analysis and generalization of findings within the study area.

3.3 Data Collection Methods

Data for the study will be obtained from primary. The primary data will be collected using a well-structured questionnaire and oral interviews. The questionnaire will be divided into sections covering socioeconomic characteristics of respondents, sources and levels of income from mango farming, farm size, average life span of family members, educational levels and constraints affecting income generation and contribution of mango income to household welfare.

However, secondary data will be sourced from textbooks, journals, government reports, and relevant online publications. These sources will provide background information, support the literature review, and help validate findings from the field.

3.4 Validity and Reliability of Research Instrument

To ensure validity, the questionnaire will be reviewed by academic experts in the Department of Agricultural Economics and Extension. Their input will help confirm that the questions align with the objectives of the study and accurately capture the income-related realities of mango farmers.

Reliability will be established through a pre-test of the instrument in a nearby community not included in the final sample. Feedback from the pre-test will be used to refine the questionnaire and improve its consistency.

3.5 Measurement of Variables

The variables for this study will be measured as follows:

- Age (measured in years)

- Farming experience (measured in years)
- Farm size (measured in hectares or number of trees owned)
- Household size (number of persons living and eating from one pot)
- Educational qualification (no formal education = 1, primary = 2, secondary = 3, tertiary = 4)
- Marital status (single = 1, married = 2, divorced = 3, widow = 4)
- Access to credit (yes = 1, no = 0)
- Source of labor (family = 1, hired = 2, both = 3)
- Secondary occupation (trading = 1, tailoring = 2, petty business = 3, others = 4)

3.6 Analytical Techniques

Objective 1: To describe the socioeconomic characteristics of mango farmers, descriptive statistics such as mean, frequency, and percentage will be employed.

Objective 2: To identify the sources and levels of income, descriptive statistics will be used to categorize income ranges and determine the proportion of farmers in each category.

Objective 3: to estimate the HDI of mango farmers using Longevity, Education and Standard of living indices among mango farmers, the UNDP HDI method will be used.

It is given as:

$$\text{HDI} = 1/3 (\text{INCOME}) + 1/3 (\text{LIFE EXPECTANCY}) + 1/3 (\text{EDUCATION INDEX})$$

The HDI has value got will be ranked as such:

Low human development index (0.0-0.499)

Medium HDI (0.5- 0.799)

High HDI -0.8-0.90) and

Very High (0.9-1.0)

The annual per capita income collected in Nigerian Naira (₦) was converted to Purchasing Power Parity (PPP) International Dollars using the World Bank's 2023 conversion factor of 185.19 ₦ per International \$ to accurately reflect local purchasing power before calculating the Income Index (World Bank, 2024).

Objective 4: To examine the major challenges limiting mango farming, a 5-point Likert scale ratings will be analyzed using mean scores to rank the severity of each constraint. The scale will be scored as:

- Not serious = 1
- least serious = 2
- Moderately serious = 3
- Serious = 4
- Very serious = 5

Objective 5: To evaluate the contribution of mango farming income to household welfare, descriptive statistics such as frequency and percentage will be used to assess how income supports feeding, education, healthcare, housing, and savings.

CHAPTER FOUR

4.0

RESULTS AND DISCUSSION

4.1 Socioeconomic characteristics

Table 1 presents the socioeconomic characteristics of the mango farmers surveyed in Esan South-East LGA.

4.1.1 Gender

As shown in Table 1, the majority of the respondents (72.3%) were male, while only 27.7% were female. This pronounced male dominance is a recurring pattern in Nigerian smallholder agriculture, particularly in tree crop production, where tasks such as pruning, spraying, and harvesting require considerable physical strength and are culturally assigned to men (Ajani and Igbokwe, 2014; Oluwatayo and Ojo, 2018). The low participation of women may limit the inclusiveness of agricultural development programmes and reduce household income diversity, as women often engage in value-addition activities such as processing and marketing (Ayinde *et al.*, 2020).

4.1.2 Age

The mean age of the farmers, as indicated in Table 1, was 45 years (SD = 11.074), with more than two-thirds (68.08%) falling within the economically active bracket of 36–55 years. This middle-aged profile suggests a relatively experienced labour force capable of adopting improved practices, yet it also signals an emerging ageing crisis

in Nigerian agriculture (Adebayo and Ojo, 2012). Younger generations are increasingly migrating

Table 1. Socioeconomic characteristic of the respondents in the study area

Variables		Frequency (N)	Percentage (%)	Mean (Std dev)
Gender	Male	68	72.3	
	Female	26	27.7	
Age	Below 25 years	2	2.2	
	26 – 35 years	14	14.89	
	36 – 45 years	34	36.17	45 years
	46 – 55 years	30	31.91	(11.074)
	Above 55 years	14	14.89	
Marital status	Single	21	22.30	
	Married	51	54.30	
	Divorced/Widowed	22	23.40	
Education	0	2	2.13	
	1 – 5	9	9.57	
	6 – 10	57	60.64	9 years
	11 – 15	18	19.15	(3.737)
	16 – 20	7	7.45	
Farming Experience	Above 20 years	1	1.06	
	1 – 5	7	7.45	
	6 – 10	22	23.40	18 years
	11 – 15	28	29.79	(10.521)
	16 – 20	18	19.15	
Household size	Above 20 years	19	20.21	
	1 – 3	16	17.02	
	4 – 6	56	59.57	5
	7 – 9	21	22.34	persons
Mango farming major occupation	Above 10	-	-	(1.857)
	Yes	51	45.70	
Secondary occupation	No	43	54.30	
	Tailoring	32	34.00	
	Trading	10	10.64	
	Petty Business	27	28.72	
	Civil Service	7	7.45	
	None	18	19.15	

Source: Field Survey, 2025

to urban areas in search of non-farm employment, raising concerns about who will replace the current cohort of farmers in the coming decades (Nmadu *et al.*, 2015; Ogunjimi and Onibokun, 2018).

4.1.3 Marital Status

Table 1 reveals that 54.3% of the respondents were married, 23.4% were divorced or widowed, and 22.3% were single. Marriage is often associated with greater household stability and availability of family labour, which is critical in labour-intensive mango production systems that rely heavily on unpaid household members (Ogunjimi and Onibokun, 2018; Babatunde and Qaim, 2009).

4.1.4 Educational Level

The average years of formal education, as presented in Table 1, was 9 years (equivalent to junior secondary school completion). Although this level is higher than in many remote rural areas, it remains insufficient for comprehending complex technical recommendations or accessing formal credit and market information (Oluwatayo and Ojo, 2018). Low educational attainment has been repeatedly identified as a major barrier to the adoption of improved orchard management practices and participation in value chains (Ayinde *et al.*, 2020; Nmadu *et al.*, 2015).

4.1.5 Farming Experience

Table 1 shows an average farming experience of 18 years (SD = 10.521). Farmers with extensive experience are generally better at recognising pest and disease symptoms, timing cultural operations, and managing risks associated with perennial crops (Nmadu *et al.*, 2015). However, without continuous training, long experience may also reinforce traditional practices that are no longer optimal under changing climatic and market conditions (Adebayo and Ojo, 2012).

4.1.6 Household Size

The average household size, as shown in Table 1, was 5 persons, with 59.57% of households having 4–6 members. Moderate household size provides a reliable source of family labour during peak periods (land preparation, harvesting), thereby reducing cash expenditure on hired labour (Adebayo and Ojo, 2012; Oluwatayo and Ojo, 2018).

4.1.7 Occupation

As indicated in Table 1, mango farming was the primary occupation for only 45.7% of respondents, with the majority (54.3%) treating it as a secondary activity alongside tailoring, petty trading, and other off-farm enterprises. This high level of occupational pluralism is a well-established risk-spreading strategy among rural households faced with the seasonality of mango production and price volatility (Babatunde and Qaim, 2009; Oluwatayo and Ojo, 2018).

4.2 Farm and Production characteristics

Table 2 presents the distribution of farm and production characteristics.

4.2.1 Farm Size

The average mango orchard size, as shown in Table 2, was only 0.53 hectares, with nearly 60% of farms below 0.5 ha. Such fragmented and small holdings severely restrict economies of scale, limit mechanisation possibilities, and hinder commercialisation of mango production in Nigeria (Oladipo *et al.*, 2017; Vayssières *et al.*, 2015).

4.2.2 Source of Labour

Table 2 indicates that hired labour was the most common source (40.43%), followed by combined family and hired labour. The reliance on hired labour reflects the inability of many households to meet peak labour demand internally, particularly as younger members migrate or attend school (Nmadu *et al.*, 2015; Ayinde *et al.*, 2020).

4.2.3 Access to Credit

As revealed in Table 2, more than half of the respondents (58.51%) had no access to credit, and those who did relied predominantly on informal sources with exorbitant interest rates. Credit constraint remains one of the most critical bottlenecks preventing

investment in quality planting material, fertilisers, and pest management (Oluwatayo and Ojo, 2018; Ayinde *et al.*, 2020).

4.2.4 Use of Improved Seedlings and Extension Contact

The adoption of improved mango varieties and contact with extension agents, as shown in Table 2, stood at only 37.23% and 25.53%, respectively. Weak extension systems and poor availability of certified planting material continue to perpetuate low orchard productivity across the mango belt of Nigeria (Vayssières *et al.*, 2015; Oladipo *et al.*, 2017).

Table 2: Farm and Production of the respondents in the study area

Variables		Frequency (N)	Percentage (%)	Mean (Std dev)
Farm size (ha)	0.0 – 0.49	56	59.57	0.53 ha (0.518)
	0.50 – 0.99	20	21.28	
	1.00 – 1.49	12	12.77	
	1.50 – 1.99	2	2.13	
	2.00 – 3.00	4	4.26	
Labour source	Family	29	30.85	
	Hired	38	40.43	
	Both	27	28.72	
Access to credit	Yes	39	41.49	
	No	55	58.51	
Source of credit	Cooperative	24	25.53	
	Microfinance	19	20.21	
	Informal lender	43	45.74	
Improved seedling	Yes	35	37.23	
	No	59	62.77	
	ADP/GOVT	11	11.70	
Source of improved seedlings	Market/ Local Nursery	13	13.83	
	Private nursery/IITA	6	6.38	
	Receive support	Yes	24	25.53

from agricultural extension	No	69	73.40
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Source: Field Survey, 2025

4.3 Sources and income level of mango farmers

The distribution of income sources, as presented in Table 3, shows that mango farming contributed the highest mean annual income (₦297,414.89), surpassing cassava, livestock, and trading. Despite being the leading earner, its seasonal nature compels farmers to maintain multiple income streams as a hedge against crop failure, price crashes, or prolonged off-seasons. This diversification strategy is widely documented as a key determinant of livelihood resilience among rural Nigerian households (Babatunde and Qaim, 2009; Oluwatayo and Ojo, 2018).

Table 3: Distribution of income sources and level of mango farmers

Source	Frequency (N)	Mean (₦)	Std Dev (₦)
Mango Farming	94	297,414.89	267458.2636
Cassava	27	247,407.40	237038.5005
Livestock	10	207,500.00	247770.6152
Trading	33	179,865.15	352876.0274
Civil servant	5	136,000.00	87635.6092
Others	19	138789.47	222672.0506
Average Annual Income		488,984.574	

*Multiple response; Source: Field Survey, 2025

4.4 Human Development Index of Mango Farmers

The Human Development Index (HDI) of mango farmers in Esan South East was computed using the three standard dimensions of human development: health or longevity, education, and standard of living. Each dimension was converted into an index based on the UNDP methodology, after which the geometric mean of the three indices was derived to obtain the overall HDI.

As presented in Table 4, the composite HDI for the respondents was 0.665, placing them in the medium human development category. Among the three dimensions, the health or longevity index was highest (0.862). This indicates that the farmers generally enjoy good nutrition, have access to basic healthcare services, and live in environments that support relatively long life expectancy.

In contrast, the education index was low (0.503), reflecting limited formal schooling among the farmers, with an average of nine years of education. This low level of educational attainment affects their ability to access agricultural information, adopt improved technologies, and participate in formal market and financial systems. As a result, the education dimension lowered the overall HDI.

The standard of living index (0.681), calculated using the PPP adjusted per capita annual income of the farmers, also fell within the medium development range. This value indicates a moderate level of economic welfare supported mainly by income from mango production, complemented by other livelihood activities.

Overall, the HDI findings show a developmental imbalance, where strong health outcomes exist alongside limited educational achievement. This highlights the importance of targeted interventions such as adult literacy programmes, vocational training, and enhanced access to agricultural extension services to improve farmers' skills, productivity, and overall wellbeing (Oluwatayo and Ojo, 2018; UNDP, 2022).

Table 4: Estimated Human Development Index (HDI) of Mango Farmers in Esan South-East

This table summarizes the calculated values for the three HDI dimensions and the composite index.

Dimension	Indicator(s) Used	Calculated Index Value	Human Development Category
Health and Longevity	Average Lifespan of Fathers/Grandfathers	0.862	High
Education	Mean Years of Schooling (9 yrs)	0.503	Medium
Standard of Living	Annual Per Capita Income (\$9,074.63 PPP)	0.681	Medium
Composite HDI	Geometric Mean of Three Indices	0.665	Medium

Source: Field Survey, 2025; **Note:** The HDI and its dimensions are classified as: Low (<0.550), Medium (0.550–0.699), High (0.700–0.799), Very High (>0.800)

4.5 CONSTRAINTS

This section examines the major challenges affecting mango production in the study area. Farmers rated each constraint using a five-point Likert scale to indicate its level of severity. The mean scores for the identified constraints, which show the extent to which each factor limits productivity and income generation, are summarised in the table below.

Table 5: Constraints faced by mango farmers in the study area

S/N	Constraints	Mean	Std. Deviation
1.	Poor road network	3.81	0.998
2.	Lack of credit access	3.44	1.160
3.	Postharvest losses	3.59	1.195
4.	Pest infestation	3.49	1.114
5.	Exploitation by middlemen	3.19	1.229
6.	Lack of storage facilities	3.59	1.222
7.	High cost of inputs	3.66	1.001
8.	Climate variability	2.20	1.206

Source: Field Survey, 2025; *Mean ≥ 2.0 – Serious; ≤ 2.0 – Not Serious

4.6 Contribution of Mango Farming Income to Household Welfare

4.6.1 Household Expenditure Pattern

The annual household expenditure pattern, as summarised in Table 7, reveals that food and savings received the largest shares, followed by children’s education, clothing, and medical care. This expenditure profile reflects a rational allocation strategy prioritising immediate consumption needs while building financial buffers against shocks (Oluwatayo and Ojo, 2018).

Table 7: Summary Statistics of House welfare expenses

Expenses	Mean (₦)	Std Dev (₦)	Minimum	Maximum
Food items	73,019.32	50,323.69	3,200.00	250,000.00
clothes	21,246.03	32,143.06	1,000.00	200,000.00
Rent	46,253.97	83,251.89	2,500.00	350,000.00
Medical Bill	13,811.32	12,613.04	1,500.00	50,000.00
Utilities	15,138.46	15,242.44	1,000.00	75,000.00
Children	59,318.97	78,629.86	2,500.00	500,000.00
Entertainment	11,956.52	18,447.77	2,000.00	125,000.00
Savings	99,584.62	133,044.74	2,000.00	800,000.00
Miscellaneous	66,476.19	73,122.07	1,000.00	275,000.00
Total	406,805.39			

Source: Field Survey, 2025

4.6.2 Contribution of Mango Income to Household Welfare

The contribution of mango farming income to various welfare items, as presented in Table 8, averaged 38.21% of total household expenditure. The largest proportions were directed towards savings (12.39%), food security (9.08%), and children's education (7.38%). This substantial contribution demonstrates that mango production is not merely a commercial activity but a critical instrument for poverty reduction, food security enhancement, and intergenerational human capital development in rural communities (Babatunde and Qaim, 2009; Msuta and Urassa, 2015).

Table 8: Contribution of Mango Farming Income to Household Welfare

Item	Percentage of Total Income (%)	Percentage of Mango income (%)	Average Contribution from Mango Income (₦)
Food items	14.93	9.08	44,412.51
clothes	4.34	2.64	12,922.47
Rent	9.46	5.75	28,133.03
Medical Bill	2.82	1.72	8,400.45
Utilities	3.10	1.88	9,207.66
Children	12.13	7.38	36,079.55
Entertainment	2.45	1.49	7,272.31
Miscellaneous	13.59	8.27	40,432.79
Total Spent	79.63	38.21	186,860
Savings	20.37	12.39	60,570.31

Source: Field Survey, 2025

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study evaluated the Human Development Index (HDI) of mango farmers in Esan South-East Local Government Area, Edo State, Nigeria, aiming to describe their socioeconomic characteristics, identify income sources and levels, estimate HDI, examine constraints, and assess mango income's contribution to household welfare. Primary data were collected from 94 farmers using structured questionnaires, analyzed via descriptive statistics, Likert-scale rankings, and UNDP HDI methodology.

Key socioeconomic findings indicated a male-dominated (72.3%) sector with an average age of 45 years, 9 years of education, 18 years of farming experience, and household size of 5 persons. Mango farming served as the primary occupation for 45.7%, supplemented by secondary activities like tailoring and trading. Farm characteristics showed smallholdings (mean 0.53 ha), reliance on hired labor (40.43%), limited credit access (58.51% without), low adoption of improved seedlings (37.23%), and minimal extension support (25.53%).

Income analysis revealed mango as the dominant source (mean ₦297,414.89), followed by cassava and livestock, with an average monthly income of ₦488,984.57.

The HDI was computed at 0.665 (medium category), driven by very high

health/longevity (0.862), medium education (0.503), and medium standard of living (0.681, based on PPP-adjusted per capita income of \$9,074.63).

Constraints were ranked as serious for poor road networks (3.81), high input costs (3.66), postharvest losses (3.59), lack of storage (3.59), pest infestation (3.49), credit access (3.44), and middlemen exploitation (3.19), while climate variability was not serious (2.20). These align with broader challenges in Nigerian mango production, such as postharvest losses and market exploitation. Mango income contributed 38.21% to household welfare, primarily supporting savings (12.39%), food (9.08%), and children's needs (7.38%), underscoring its role in poverty alleviation and resilience.

Overall, the study highlights mango farming's economic significance amid structural barriers, providing baseline data for targeted interventions in Edo State's rural agriculture.

5.2 Conclusion

Mango farming in Esan South-East remains a vital livelihood strategy, contributing substantially to income and welfare despite persistent challenges. The medium HDI (0.665) reflects strengths in health but underscores education gaps that hinder innovation and productivity, consistent with research linking low HDI components to reduced agricultural output in Nigeria. Socioeconomic profiles indicate an experienced but resource-constrained workforce, with small farms and limited inputs perpetuating subsistence-level production.

Income diversification mitigates seasonality, yet constraints like infrastructure deficits and postharvest losses erode potential gains, mirroring nationwide issues in mango value chains. Mango's 38.21% welfare contribution affirms its role in enhancing food security and human capital, aligning with studies on non-timber products' impact on rural incomes.

In conclusion, improving HDI requires addressing educational and infrastructural barriers to unlock mango farming's full potential for sustainable rural development in Edo State.

5.3 Recommendations

Based on the findings, the following recommendations are proposed:

Results revealed a predominantly male (72.3%), middle-aged (mean 45 years) farming population with moderate education (mean 9 years) and experience (mean 18 years). Mango farming was the primary income source (mean ₦297,414.89 annually), contributing 38.21% to household welfare, particularly in savings, food, and education. The estimated HDI was 0.665 (medium), with high longevity (0.862), low education (0.503), and medium standard of living (0.681). Major constraints included poor road networks (mean 3.81), high input costs (3.66), and postharvest losses (3.59). Findings align with studies showing that human development indices significantly influence agricultural output in Nigeria, where investments in health and education yield long-term productivity gains. The study recommends enhanced extension

services, credit access, and infrastructure development to improve mango farmers' HDI and livelihoods.

1. the male folks should encourage the females to be more involved in mango farming to increase the productivity and income in their families
2. Farmers should increase their knowledge by forming training groups and inviting experts to tutor them on innovations about production practices. They Farmers should also invest more on education for their dependents.
3. Self-help groups or co-operatives could be formed to help the farmers improve on their infrastructures and manage post-harvest losses.

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APPENDIX I

Questionnaire for Mango Farmers in Esan South East, Edo State

My name is Great Orukpe, a student of Faculty of Agriculture, University of Benin. I am carrying out a research project titled; Assessment of Human Development Index of Mango Farmers in Esan South-East. I kindly request your participation by answering a few questions. Your responses will be kept confidential and used only for academic purposes.

Yours faithfully,

Great Orukpe

Section A: Socioeconomic Characteristics of Respondents

1. Age (in years): _____
2. Gender: Male Female
3. Marital Status: Single Married Divorced Widowed
4. Number of years of schooling: _____
5. Household Size (number of people living and eating from one pot): _____

6. Farming Experience (in years): _____

7. Is mango farming your major occupation? Yes No

8. Secondary Occupation (if any): Trading Tailoring Petty Business Civil Service Others (specify): _____

Section B: Farm and Production Characteristics

1. Farm Size (in hectares): _____

2. Source of Labor: Family Hired Both

3. Do you have access to credit for mango farming? Yes No

4. If yes, what is the source of credit? Cooperative Microfinance Informal lender Others (specify): _____

5. Do you use improved mango seedlings? Yes No

6. If yes, where did you get the Improved mango seedlings? _____

7. Do you receive any agricultural extension support? Yes No

Section C: Human Development Index from Mango Farming

Living Standards/Income

1. Is mango farming your primary source of income? Yes No

2. How many mango trees do you currently own? _____

3. What is your monthly income from mango farming during harvest season?

4. What is income from other business you engage in?

S/No	Sources of income	Amount
1	Cassava	
2	Livestock	
3	Trading	
4	Others! Please specify	

5. How much of your income do you spend on the following?

S/N		
1	Food items	
2	Clothes/ Body care items	
3	House rent/Maintenance	
4	Medical bills	
5	Utilities	
6	Children education	
7	Entertainment	
8	Savings	
9	Others	

6. How many of your children enrolled in primary school? _____
7. How many of your children finished primary school? _____
8. How many of your siblings start primary school? _____
9. Did your father /mother go to any school? Yes No
10. Did your grandfather /grandmother go to any school? Yes No

Longevity

11. Do you still have a father? Yes No
12. if yes, how old is he? _____
13. if no, how old was he when he passed?
14. Do you still have a grandfather?
15. if yes, how old is he? _____
16. if no, how old was he when he passed?

Section E: Constraints Affecting Income

1. Rate the seriousness of the following constraints using this scale:

1 = Not serious 2 = least serious 3 = Moderate serious 4 = Serious 5 = Very serious

S/N	Constraints	5	4	3	2	1
	Poor road network					
	Lack of credit access					
	Postharvest losses					
	Pest infestation					
	Exploitation by middlemen					
	Lack of storage facilities					
	High cost of inputs					
	Climate variability					