Agriculture-based Micro, Small and Medium Enterprises in Nigeria: Challenges and Opportunities in Achieving Sustainable Development Goals (SDGs) 2012-2022

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Certification

This is to certify that Adekunle Julius TOLUJU with matriculation number LCU/PG/002364 carried out this research work titled "Agro-based Micro, Small and Medium Enterprises in Nigeria: Challenges and Opportunities in Achieving Sustainable Development Goals (SDGs), 2012-2022" in the Department of Politics and International Relations, Lead City University, Ibadan, Oyo State, for the award of Doctor of Philosophy Degree (PhD) in Public Administration and that this has not been previously submitted.

Dr Modupe Albert **Date**

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Dedication

This research is lovingly dedicated to the memory of my beloved parents, High Chief Thomas Ologbonyo and Chief (Mrs.) Rhoda Ibiyemi Toluju who instilled in me the values of hard work and perseverance.

Acknowledgement

My appreciation and gratitude to Almighty God for guiding me through my course of study in this noble University, Lead City University, Ibadan. My unreserved gratitude to Lead City University, Ibadan, Nigeria for the opportunity to undergo this degree. My gratitude to the Head of Department, Dr Adebola Alade, for words of encouragement and academic support during the course of this study.

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Even though the above-mentioned institutions and persons have assisted in the process of this research work, I stand responsible for the errors, if any, found in the work.

Abstract

Agro-based Micro, Small, and Medium Enterprises (MSMEs) in Nigeria play a pivotal role in the nation's economic development, in achieving the Sustainable Development Goals (SDGs) from 2012-2022. These enterprises, which operate across various agricultural value chains, significantly contribute to food security, employment, and income generation, thereby supporting SDG 1 (No Poverty) and SDG 2 (Zero Hunger). The study adopted systems theory which is based on the belief that individuals do not operate in isolation, but rather grow and develop in interaction with their physical and social environment; and theories of agricultural development which posited that agriculture is a multi- sectoral business that support and promote positive change in the rural and urban areas. The research design was descriptive while the population were the micro, small and medium entrepreneurs in southwest Nigeria consisting of Oyo, Ogun, Ondo, Osun, Lagos and Ekiti States. Sample size was purposively random, selecting sixty MSMEs from each state. Questionnaire and unstructured interview were used to gather data, with a reliability value of 0.71. Statistical analysis was used to analyse the data obtained. Findings showed that access to finance remains a critical barrier, as many MSMEs struggle to secure loans due to stringent collateral and high-interest rates; majority of these agribusinesses are subsistence and barely catered to the basic needs of the owners; lack of storage facilities, outdated technology, significant post-harvest losses, and limited market access were major problems. In conclusion, strategic interventions and support can unlock the potential to drive and achieve the SDGs by 2030. The study recommended that capacity-building initiatives and technical training programs can equip MSME owners with necessary skills and knowledge, fostering innovation and productivity; Government and private sector collaboration in creating favourable policies and providing financial incentives can further support the growth and sustainability of agro-based MSMEs.

Keywords: Agriculture-based, SDGs, MSMEs, Economic development, Nigeria

Word Count: 296

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List of Acronyms

Abbreviation	Meaning
ACGC	Agricultural Credit Guarantee Scheme
ACGS	Agricultural Credit Guarantee Scheme
ACGS	Agricultural Credit Guarantee Scheme
ACGSF	Agricultural Credit Guarantee Scheme Fund
ACGSF	Agricultural credit Guarantee Scheme Fund
ACGSF	Agricultural Credit Guarantee Scheme Fund
ACSS	Agricultural Credit Support Scheme
AFA	Apex Farmers' Association
ATA	Agricultural Transformation Agenda
ATAP	Agricultural Transformation Action Plan
BIS	Bank of International Settlements
BoA	Bank of Agriculture
BoI	Bank of Industry
CAC	Commercial Agriculture Credit
CACS	Commercial Agricultural Credit Scheme
CACS	Commercial Agricultural Credit Scheme
CBN	Central Bank of Nigeria
CBOs	Community Based Organizations
CEMAC	Central African Economic and Monetary Community
ECLAC	Economic Commission for Latin America and Caribbean
FAO	Food and Agriculture Organization
FCPE	Free and Compulsory Primary Education
FEAP	Family Economic Advancement Programme
FSP	Family Support Programme

GDP	Gross Domestic Product
GEEP	Government Enterprise and Empowerment Programme
GR	Green Revolution
IMF	International Monetary Fund
LSETF	Lagos State Employment Trust Fund
MDGs	Millennium Development Goals
MSMEs	Micro, Small and Medium Enterprises
NAB	Nigerian Agricultural Bank
NACRDB	Nigerian Agricultural Cooperatives and Rural Development Bank
NAIC	Nigerian Agricultural Insurance Corporation
NAIS	Nigerian Agricultural Insurance Scheme
NALDA	National Agricultural Land Development Authority
NAPEP	National Poverty Eradication Programme
NDP	National Development Plans
NEEDS	National Economic Empowerment and Development Strategy
NEPC	Nigerian Export Promotion Council
NEXIM	Nigerian Export and Import Bank
NGOs	Non-governmental Organizations
NHGSFP	National Home-Grown School feeding Programme
NIRSAL	Nigeria Incentive-Based Risk Sharing System for Agricultural Lending
NSIP	National Social Investment Programme
OECD	Organization for Economic Cooperation and Development
OFN	Operation Feed the Nation
OPS	Organized Private Sector
PAP	Poverty Alleviation Programme
RFAEC	Refinancing Facilities for Agricultural Export Commodities
RFBSC	Rural Finance and Banking Support Scheme
SAP	Structural Adjustment Programme

SEC	Securities and Exchange Commission,
SIF	Social Investment Fund
SMEDAN	Small and Medium Enterprises Development Agency of Nigeria
SMEs	Small and Medium Enterprises
SMSICS	Small and Medium Scale Industry Credit Scheme
SURE-P	Subsidy Re-investment and Empowerment Programme
WAPA	Women Affairs and Poverty Alleviation

Chapter One

Introduction

1.1 Background to the Study

Governments all over the world have subscribed to the idea of sustainable development as a way to take care of the current generation without affecting the chances of incoming generations. Sustainable development ensures that the progress made today does not jeopardise the future and this jeopardy has been one of the major issues of government all over the world. Currently, the United Nations, a multilateral organisation consisting of all sovereign nations across the world has set what is called Sustainable Development Goals (SDG). The Sustainable Development Goals (SDGs) are a set of global objectives aimed at addressing various social, economic, and environmental challenges to achieve desired development. Promoted by the UN, it is a way to encourage and guide countries all over the world to work towards progress in eliminating poverty, improving access to education, healthcare and other essential services[1].

The sustainable development goals (SDGs) introduced by the United Nations was a project specifically designed that by the year 2030, all countries of world including Nigeria, should have made significant strides to, among others, reduce unemployment, increase food security, and achieve a certain level of economic development[2]. The sustainable development goals also outlined other targets such as capital development, health and well-being; achieving gender equality and women's empowerment[2]. In

addition, it was also projected that countries would have been able to solve environmental sustainability and climate challenges, engender peace, justice, and strong institutions as well as ensuring prosperity for all. Nigeria, like other government around the world, is not averse to development.

In the Nigerian context, the SDGs provide a framework for guiding the country's development agenda. One of the paramount issues in Nigeria is poverty eradication and economic growth[2]. With multidimensional poverty on the rise, the first goal (SDG 1) bordering on poverty alleviation is particularly important in the Nigerian context. Nigeria faces high poverty rates, and the SDGs provide a roadmap for poverty reduction through inclusive economic growth, job creation, and access to productive resources. In addition to poverty alleviation, Nigeria is also concerned with ensuring the health and wellbeing of its people[4].

The third goal (SDG 3) which focuses on good health and well-being of citizen is relevant in this aspect. Achieving health and well-being of the people is a priority of government at all levels in Nigeria. This is because the country face challenges such as high disease burden, inadequate healthcare infrastructure, and limited access to quality healthcare services. The country focuses on improving maternal and child health, combating infectious diseases, and strengthening healthcare systems. By investing in healthcare, Nigeria aims to improve the well-being of its population, reduce morbidity and mortality rates, and build a resilient healthcare system. Closely intertwined with poverty alleviation and wellbeing is the assurance of decent work for the people and economic growth for the country[3].

The SDG 8 is focused on “Decent Work and Economic Growth”. This goal is a key goal in the global development agenda, aiming to promote inclusive economic growth, job creation, and decent working conditions. In line with the United Nations' Sustainable Development Goals, SDG 8 holds particular significance in addressing the challenges and opportunities related to work and economic development. The goal emphasizes the need to generate quality employment opportunities, particularly for young people and vulnerable populations. In the Nigerian context, this goal aligns with the country's efforts to address high unemployment rates and create a conducive environment for entrepreneurship. By promoting entrepreneurship and supporting small and medium-sized enterprises (SMEs), Nigeria aims to stimulate economic growth, reduce poverty, and foster innovation.

SDG 8 also highlights the importance of sustainable economic growth that balances social, economic, and environmental considerations. In Nigeria, this means prioritizing sectors such as agriculture, manufacturing, and infrastructure development to create employment opportunities and diversify the economy. Sustainable economic growth also involves promoting responsible consumption and production patterns, resource efficiency, and green technologies[3]. Overall, the sustainable development goals emphasise the significance government effort to provide access to financial services, credit, and productive resources, especially for marginalized groups and aspiring entrepreneur who lack access to capital[4].

However, despite the clear-cut nature of the goals, Nigeria has yet to achieve significant milestones in overall development, particularly in the aspect of poverty alleviation, health and well-being, economic growth and food security. Several factors have been

identified as responsible for this poor growth. However, the attention of experts has shifted to the agricultural sector as a veritable tool in the achievement of the triple target of food security, poverty alleviation, health and well-being as well as economic development[4].

In Nigeria, effort to leverage agricultural productivity for national development dates back to pre-independence era. Among the initiatives that have been introduced include the National Accelerated Food Production Programme (NAFPP), Operation Feed the Nation (OFN) and Green Revolution Programme. In addition to these, there are several departments and agencies established to boost agricultural production in Nigeria. These agencies include; Directorate of Food, Road and Rural Infrastructure (DFRRI), River Basin Development Authority (RBDA), and National Agricultural Land Development Authority (NALDA)[5].

After the fallout of the Nigerian Civil war, the federal government instituted an agricultural development programme to boost food production. The programme comprised various projects to be funded under a tripartite agreement involving World Bank 66%, Federal government 20% and State government 14%. The objective of the project was to increase food production, reduce unemployment, and boost the income of small-scale farmers. The programme started three (3) pilot projects in 1975 covering an LGA in 3 States. The success of the pilot schemes leads to expansion to other LGAs and States in the late 70s and by 1984, all the states of the Federation were implementing the integrated approach[6].

However, it would seem government effort has not yielded the desired result as the country still face acute food shortage leading to spending large foreign exchange to

import basic agricultural products such as grain[7],[8]. Experts have contended that Nigeria can boost its chances of achieving the SDGs through agriculture[9]. It is opined that the current economic challenges facing Nigeria also offers opportunity to grow. For instance, the growing demands for increased agricultural production in Nigeria offers opportunities for government and other stakeholders to relief the negative impact of food shortage, unemployment and poverty, especially among rural dwellers.

An effective method to counteract this adverse effect is through the incorporation of Small and Medium Scale Enterprises (SMEs). Small and medium scale firms are seen as crucial factors for achieving integrated economic growth, poverty alleviation, and decrease of unemployment in the country. Given that small and medium-sized firms (SMEs) play a vital role in driving production, employment, and innovation, it is imperative to provide a conducive climate for agricultural SMEs in Nigeria. Small and Medium Enterprises (SMEs) hold a prominent position in almost every country or state. Due to the substantial contributions that small and medium-sized enterprises (SMEs) make to the expansion and advancement of different economies, they have been appropriately labelled as "the driving force of growth" and "agents for socio-economic transformation of any nation".

A growing body of research works on Micro, Small and Medium Enterprises (MSMEs) have continued to emerge in an attempt to avail the public with working templates needed for achieving Sustainable Development Goals (SDGs) Action plan. As clearly documented in the Sustainable Development Goals policy paper, noble efforts aimed at attaining food security are an integral part of poverty reduction campaign, and agricultural sector is the enabler for achieving the desired result. The sector plays a

pivotal role in food security, employment generation and wealth creation among others. Therefore, this study seeks to unveil challenges militating against the development of the sector as well as highlighting opportunities waiting to be tapped in a bid to achieving sustainable development goals initiatives[4].

Majority of Nigerian involved in the agricultural sector of the Nigerian economy operate within the band of MSME. MSMEs are defined as business organizations whose variables of employees and turnovers fall below certain limit[10]. The definition of MSME varies from country to country. However, the International Labour Organization defines micro enterprises as those having (1-10) employees and small-scale enterprises as those having (11-50) employees, and but the spread of business and capital base is not mentioned. Incidentally, at the council meeting of the National Council on Industry held in July 2001 Micro, Small and Medium Enterprises (MSMEs) were defined by the Council as micro industry, small scale industry, medium scale industry and large-scale industry[11].

The micro industry is made up of enterprises with asset base not more than =N=1.5 million, excluding cost of land but including working capital and a staff strength not more than 10; the Small Scale Industry: consist of enterprises with asset base more than =N=1.5 million but in excess of =N=50 million excluding cost of land but including working capital and of working capital and/or staff strength from 11 to 100; the medium Scale Industry include Enterprises with asset base more than =N=50 million but in excess of =N=200 million excluding cost of land but including working capital and of working capital and/or staff strength from 101 to 300; while Large Scale Industry is made up of enterprises with asset base more than =N=200 million but in excess of

=N=200 million excluding cost of land but including working capital and of working capital and/or staff strength more than 300[13].

In spite of the key role agriculture plays in the primary sector, its contribution to the Nigerian economy has not been significant. For instance, between 2011 and 2012, the oil and gas sector have continued to be a dominant economic hub, accounting for over 95% of export profits and nearly 85% of government income[12]. Nigeria's efforts at reducing poverty are fraught with debilitating realities. For instance, Nigeria has 70.8 million hectares of agriculture land area with maize, cassava, guinea corn, yam beans, millet and rice being the major crops[13]. Nigeria's rice production rose from 3.7 million metric tons in 2017 to 4.0 million metric tons in 2018. In spite of this, only 57 percent of the 6.7 million metric tons of rice consumed in Nigeria annually is locally produced, leading to a deficit of about 3 million metric tons, which is either imported or smuggled into the country illegally[14].

To facilitate a boost in local production, the Government banned importation of rice in 2019. In 2017 Nigeria produced 59 million tons of cassava, making it the world's largest producer (approximately 20 percent of global production). The economic potentials are limitless, with high revenue yields from domestic value addition and derived income as well as revenues for the government[15]. Animal production has remained largely underexploited. Livestock mostly reared by farm families in Nigeria are the small ruminants like Goats (76 million), sheep (43.4 million), and cattle (18.4 million)[16]. The ecology in the northern part of the country makes it famous for livestock keeping. In addition to small and large ruminants, poultry population stands at 180 million poultry. Here too, local demands far exceed supply despite several interventions by development

partners to improve production and safeguard against diseases including trans-boundary animal diseases.

Nigeria is the largest fish consumer in Africa and among the largest fish consumers in the world with about 3.2 million metric tons of fish consumed annually. Its fisheries and aquaculture are among the fastest growing subsectors in the country. With a coastline of 853km and over 14 million hectares of inland waters, total fish production per year is close to 1 million metric tons (313,231 metric tons from aquaculture and 759,828 metric tons from fisheries). Fishing is a vital livelihood for the poor as well as an important protein source at the household level in Nigeria[17].

Worthy of note also is the disturbing trends in forestry. According to FAO report, Nigeria's forest ecosystems are threatened by rapid population growth and economic activities with annual deforestation rate ranging between 0.72 and 2.38 percent. Agricultural expansion, heavy reliance on firewood and charcoal for energy, unsustainable timber extraction, urbanization, grazing, bush fires, infrastructure development are among the factors behind this trend. With the increasing population, estimated to reach 400 million by 2050, enhanced agriculture productivity through adaptation of new technologies and innovations is necessary to ensure food security and nutrition. Support from all partners to the efforts by the federal and state governments is central for achieving this goal.

Bolstering the growth of MSMEs is one of the cardinal objectives of Sustainable Development Goals Action Plan. The intervention agency is a creation of the United Development Programmes (UNDP). It was adopted in 2015 as a global call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and

prosperity[14]. The action plans are interlinked, implying that a deviation in one action plan may trigger effects on the other.

The first goal of the SDGs is to end poverty by 2030, and one of the best ways to achieve that is to empower the citizen - that is provide employment opportunities for them - and creating an enabling environment for businesses to thrive. This drive is in recognition of the catalytic role of Micro, Small and Medium Enterprises as drivers of economic development. Since food security is intrinsically tied to poverty eradication, developments in the MSMEs in the agricultural sector are in line with the first goal of the SDG[18],[19].

1.2 Statement of the Problem

The Micro, Small and Medium Enterprises in the agricultural sector of the Nigerian economy has rich and engaging array of productive activities lined up in its ubiquitous value chain. The dominant productive activities range from cultivation of arable lands, livestock production and processing of farm products into semi-finished or finished goods.

Despite their significant potential to drive economic growth, enhance food security, and reduce poverty, agriculture-based Micro, Small, and Medium Enterprises (MSMEs) in Nigeria face numerous challenges that hinder their ability to contribute effectively to the Sustainable Development Goals (SDGs). From 2012 to 2022, these enterprises have struggled with limited access to finance, inadequate infrastructure, lack of technical expertise, and regulatory obstacles. Additionally, the impacts of climate change and environmental degradation further exacerbate their vulnerabilities. This study seeks to

investigate the specific challenges faced by agriculture-based MSMEs in Nigeria, examine their impact on the achievement of SDGs, and identify opportunities for overcoming these challenges to promote sustainable development and economic growth.

1.3 Aim and Objectives of the Study

The aim of this study is to examine agriculture-based micro, small, and medium enterprises (MSMEs) as a government tool for achieving Sustainable Development Goals (SDGs) in South-West Nigeria. This study seeks to understand the contribution of these enterprises to economic growth, poverty reduction, job creation, and food security. Specifically, the objectives and intentions of the proposed study were to:

i. examine the current landscape of agriculture-based MSMEs in South-West Nigeria, including their distribution, types, and scale of operations;
ii. analyse the impact of agriculture-based MSMEs on local communities, focusing on income generation, job creation, and poverty alleviation in South-West Nigeria;
iii. to review existing government policies and interventions aimed at supporting agriculture-based MSMEs development in South-West Nigeria.
iv. examine the effectiveness of existing government policies and interventions aimed at supporting agriculture-based MSMEs in promoting sustainable development in South-West Nigeria.

1.4 Research Questions

The following research questions guided the study:

1. What is the current landscape of agriculture-based MSMEs in South-West Nigeria, including their distribution, types, and scale of operations?
2. What is the impact of agriculture-based MSMEs on local communities, focusing on income generation, job creation, and poverty alleviation in South-West Nigeria?
3. What are existing government policies and interventions aimed at supporting agriculture-based MSMEs?
4. How effective are existing government policies and interventions aimed at supporting agriculture-based MSMEs in promoting sustainable development in South-West Nigeria.

1.5 Significance of the Study

As the war between Russia and Ukraine rages, with the potential of escalating to a wider conflagration, there is no time in the world's recent history that humanity has been more exposed to the danger of food scarcity. Russia and Ukraine are the hub of food production in the world – they are the leaders in wheat and corn production – and food distribution to other countries is currently being hampered by war. This study was therefore timely and significant because Nigeria and other states who were signatories to the achievement of SDGs only have few years to achieve this. Nigeria needs to achieve food sufficiency to escape the looming effect of hunger.

For this reason, the study is profoundly significant because it provided answers the research questions raised. In addition to that, the study also contributed to the existing knowledge and literatures on Micro, Small, and Medium Enterprise and the opportunities and challenges of achieving specified goals in Nigeria and the South West.

The research outcome was immensely beneficial to government Ministries, Departments and Agencies who were charged with the responsibility of promoting sustainable development in all sectors of the Nigerian economy.

It is important to state that, this study benefitted the Ministry of Finance and the Office of the Senior Special Assistant to the President on SDGs (OSSAP-SDGs). Also, policymakers at the state and the federal level, State Government, and the Central Bank of Nigeria (CBN) found the outcome of this study useful as it provided a roadmap that guided them when preparing their intervention programmes for SME and MSME in Nigeria. Lastly, the outcome of this research was useful for notable international organizations and agencies whose work is aimed at the reduction of global poverty.

1.6 Scope of the Study

The central focus of this proposed research identified and examined the challenges and opportunities of micro, small, and medium enterprises in achieving Sustainable Development Goals (SDGs) in Nigeria, particularly in the South West region. For this reason, the scope of this research confined to 2012-2022 taking into consideration the fact that the adoption of MDGs and SDGs fall within the period. In addition to this, the geographical location of the research was restricted to the South West region of Nigeria. The reason for this is because, South West States have one of the highest concentrations of agriculture based MSMEs in Nigeria.

1.7 Limitation of the Study

There could be biases in self-reported data from MSMEs, such as overestimation of benefits or underreporting of challenges. Differences in agricultural practices, climate, and cultural attitudes across different parts of South-West Nigeria might affect the generalisability of the study's findings.

1.8 Operational Definition of Terms

Economic Development: Economic development is the process of enhancing the well-being and quality of life of a nation, region, local community or individual in accordance with certain aims and objectives. In other words, they are sets of initiatives, policies, or actions aimed at improving a community's economic well-being and quality of life.

Development: Development is an occurrence that marks the beginning of a new stage in a changing situation. Growth, advancement, good change, or the addition of physical, economic, environmental, social, and demographic components is all examples of development. The goal of development is to improve people's living standards and quality of life, as well as to create or expand local regional income and job possibilities while preserving the environment's resources.

Poverty: Poverty is the state of being extremely poor. Poverty is a state of not having enough material possessions or income for a person's needs. It is a violation of human

dignity; it is also captured by when people are unable to make choices and have chances. It means lack of basic capacity to participate effectively in society.

Sustainable Development Goals: Sustainable Development Goals (SDGs) are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including poverty, inequality, climate change, environmental degradation, peace and justice.

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Chapter Two

Literature Review

In this chapter, the various sources of information related to knowledge sharing in the field of agriculture will be examined. The goal is to gather reliable and objective data to help answer the research questions. Through this analysis, the researcher aims to identify any gaps in current knowledge and understanding of agricultural production. To support the analysis, the various conceptual frameworks, models, and theories that are useful in explaining how to achieve sustainable development goals in agriculture by 2030, were discussed. These included concepts such as the micro, small and medium enterprises MSMEs, sustainable development Goals (SDGs), mechanization, and change management, which are often seen as key drivers of agricultural progress

2.1 Conceptual Review

2.1.1 Definition of MSMEs

Micro, Small, Medium Enterprises (MSMEs) are widely recognized as vital components of economies worldwide. They contribute significantly to job creation, innovation, and overall economic growth. Despite their importance, the definition and classification of MSMEs vary significantly across regions due to differences in economic structures and policy priorities. The criteria for defining MSMEs are often based on measurable parameters such as annual turnover, investment in assets, and employment size. This section explores both international and country-specific definitions[1].

Globally, organizations like the World Bank and OECD have set guidelines for defining MSMEs. For instance, the World Bank defines MSMEs as enterprises with fewer than

300 employees, an annual turnover of less than $15 million, and total assets below the same threshold. Similarly, the OECD adopts a broad guideline, considering enterprises with fewer than 250 employees as MSMEs, though additional criteria such as turnover and balance sheet totals are used to delineate between micro, small, and medium enterprises[1].

The definition of MSMEs varies significantly between countries to reflect local economic conditions. In India, for example, the classification of MSMEs was revised under the MSMED Act of 2006 in 2020. Micro-enterprises are defined as having an investment in plant and machinery or equipment of up to ₹1 crore and a turnover of up to ₹5 crore. Small enterprises can have an investment of up to €10 and a turnover of €50, while medium enterprises can have an investment of up to €250 and a turnover of €250. The European Union, on the other hand, categorizes micro enterprises as those employing fewer than 10 people with turnover or balance sheet totals of up to €2 million. Small enterprises have fewer than 50 employees and a turnover of up to €10 million, and medium enterprises employ fewer than 250 people with a turnover of up to €50 million[2].

2.1.1.1 Classification of MSMEs

MSMEs are classified based on factors such as scale of operation, nature of activity, ownership structure, and geographic focus. Each classification highlights a distinct aspect of these enterprises.

The scale of an MSME refers to the size and extent of its operations. Micro-enterprises are typically small-scale, often family-run businesses or informal setups with limited resources and local markets. Small enterprises have slightly larger operations with some

regional or national reach. Medium enterprises, in contrast, are more formalized and structured, with the capacity to compete in broader markets and engage in diversification[3].

MSMEs are also categorized by the type of activity they perform. Manufacturing MSMEs engage in the production of goods, often using small-scale machinery. For example, a micro-enterprise might produce handmade jewellery, while a medium-sized enterprise may manufacture auto parts. Service-oriented MSMEs provide services such as IT solutions, logistics, or consultancy. An example is an IT startup providing software development services.

The ownership structure of MSMEs varies widely and influences their operational dynamics. They can operate as sole proprietorships, partnerships, cooperatives, or private limited companies. Micro-enterprises often rely on simpler structures like sole proprietorships, whereas medium enterprises may adopt corporate structures to support larger operations[4].

Geographical location also plays a significant role in classifying MSMEs. Urban-based MSMEs often engage in technology-driven industries such as IT or e-commerce, leveraging urban infrastructure and consumer bases. In contrast, rural-based MSMEs may focus on traditional crafts, agriculture-related industries, or other activities aligned with rural economies.

The classification of MSMEs is essential for several reasons. First, it aids in formulating targeted policies that address the specific needs of these enterprises. For example, micro-enterprises may require access to microfinance, whereas medium enterprises benefit

more from tax incentives for research and development. Second, banks and financial institutions use these classifications to design lending programs that align with the financial capacity and needs of different categories. Third, standardized classification allows MSMEs to participate in international trade and benefit from global value chains. Finally, categorization supports innovation and technology transfer, particularly for medium enterprises, which are often better positioned to adopt advanced technologies[5].

Despite the advantages of classification, several challenges exist. The dynamic nature of MSMEs, where businesses often grow or shrink, makes rigid classifications impractical. Informal enterprises, which form a significant portion of micro-enterprises, are difficult to include in official statistics and support programs. Moreover, definitions often fail to consider regional disparities, such as differences in costs of living or industrial structures between urban and rural areas, limiting the applicability of a one-size-fits-all approach.

MSMEs are critical to fostering economic resilience and innovation. To maximize their potential, governments must ensure that definitions and classifications are periodically reviewed to account for inflation, technological advancements, and changing economic contexts. Regional and sectoral nuances should also be incorporated into definitions to ensure inclusivity. Harmonizing definitions across countries can further facilitate global trade and cross-border collaboration, enhancing the competitiveness of MSMEs on the world stage[6].

2.1.1.2 The Role of Micro, Small, and Medium Enterprises (MSMEs) in Economic Development: Global and Nigerian Context

Micro, Small, and Medium Enterprises (MSMEs) play a critical role in driving economic growth and development worldwide. They are vital for fostering innovation, generating employment, reducing poverty, and contributing to GDP. This analysis examines the role of MSMEs globally and highlights their specific contributions and challenges in Nigeria.

Globally, MSMEs are significant employers. According to the International Labour Organization (ILO), MSMEs account for more than 70% of employment globally, particularly in developing countries. These enterprises provide jobs to diverse demographics, including low-skilled workers, women, and youth, thereby reducing unemployment and enhancing income distribution[7].

MSMEs contribute significantly to the GDP of both developed and developing nations. For instance:

- In the European Union, MSMEs contribute about 56% to GDP.

- In developing economies, they account for around 40% of GDP, as per World Bank statistics.

MSMEs are a key driver of innovation, especially in sectors such as technology, manufacturing, and services. By leveraging flexible structures and niche expertise, MSMEs often introduce disruptive innovations that redefine industries. The adaptability of MSMEs allows them to contribute to economic resilience during global crises. For

example, during the COVID-19 pandemic, many MSMEs pivoted to producing essential goods like personal protective equipment (PPE) and sanitizers, maintaining economic activity amidst disruptions. MSMEs are instrumental in poverty alleviation by creating inclusive opportunities for marginalized groups, such as rural populations and women, enhancing their financial independence and social inclusion.

In Nigeria, MSMEs constitute over 96% of businesses and employ about 84% of the workforce, according to the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN). They play a pivotal role in reducing poverty by creating jobs, especially in rural and underserved areas. MSMEs contribute approximately 48% to Nigeria's GDP. Their activities span across various sectors, including agriculture, trade, manufacturing, and services, driving economic diversification. Nigerian MSMEs are actively engaged in value addition and the production of goods tailored to local needs. This is evident in the agro-processing industry, where MSMEs enhance the value chain by processing raw agricultural produce into consumable products[8].

By operating in rural areas, MSMEs in Nigeria help bridge the urban-rural development gap, promoting balanced regional development. For example, small-scale farming cooperatives enhance agricultural productivity and create sustainable livelihoods for rural populations. MSMEs are engines of economic growth and social development, playing a pivotal role globally and within Nigeria. While their contributions are immense, they face numerous challenges that require strategic interventions. With the right support mechanisms—ranging from financial inclusion to policy reforms—MSMEs can significantly enhance their role in driving sustainable development[9].

2.1. Agriculturally Based Small and Medium Enterprises in Nigeria

Value chain encompasses the full range of activities designed to bring commodities from its conception to the end users. Value chain can also be described as the "entire process needed to bring a product or service from conception, through the intermediary of production, delivery to consumers, and final disposal after use"[10]. Value chains include all the vertically linked, interdependent processes that generate value for the consumer as well as horizontal linkages that provide intermediate goods and services. Vertical integration generally refers to a firm's ownership or control of vertically related activities (backward linkages). Vertical integration can be achieved between upstream and downstream firms when there is a high level of integrated systems and information sharing. A firm becomes vertically integrated when it gets more involved in the activities that take place within its value chain.

Vertical integration is more noticeable if the business is seeking to ensure supply or control inputs, capture more value, achieve economies of scale or ensure access to information. By implication, value chain becomes more integrated through the decisions of the actors. Vertical integration also occurs at the value chain level when more stages are brought into the country's value chains. Implied is that a nation's agricultural sector is taking on more of the activities within the global value chain, which adds value, provides more market and creates employment, and even more. Vertical integration focuses on the implementation of horizontal collaboration mechanisms and linkages

among businesses to overcome problems stemming from small-scale activity by some individual producers or enterprises.

By contrast, horizontal integration offers excellent opportunities for value chain participants to obtain advantages inherent in large scale production by linking with other firms. By combining resources, horizontal integration allows participating firms and producers to achieve improved quality through increased access to inputs, more leverage in sales negotiations and greater ability to design initiatives[11]. Horizontal collaboration also creates a platform that could later allow the chain to move toward forward or backward integration or achieve improved quality. In the implementation of horizontal linkage, it is however imperative to identify areas of joint operation with increased efficiency and effectiveness. In all, the overriding goal of a value chain is to deliver the most value at the least cost in order to create a competitive advantage.

In agreement with this, another scholar emphasized that value chain approaches have been used by individuals and firms to guide product and process innovations that have created value for the final customers. Some studies recognize that value chain should focus on at least, achieving the following: offering products of higher unit value, increased number of products of the same value, a different mix of products and/or and delivery of a given set of products into more diverse markets. From the foregoing, a well-developed value chain should be able to consider all the major stakeholders and their contribution towards creating value[12].

Within the context of value chain, the key stakeholders are called clusters. Clusters can be described as collections of firms and institutions that perform the functions segmented

in both the value chain and supply chain. Clusters display horizontal and vertical links among firms that produce a single or closely related product or service, which in turn may combine to meet the demand of a particular value chain[13]. To improving clusters, it is required that emphasis should be on the local environment and context in which they operate.

Value chain analysis sheds light on the size of the firms participating in each link, how they are participating or could be participating in the chain, and opportunities to facilitate or improve those linkages. The framework provides an important means to understand the inter-relationships between or among firms, mechanisms for increasing efficiency and ways of adding value. It also provides a channel for improvement in supporting services and the business environment and contributes to pro-poor initiatives and better linking of small businesses with the market[14]. At the heart of value chain development is the effort to strengthen mutually beneficial linkages for firms to work together and take advantage of market opportunities, create and build trust among participants.

In recent times, realizing that upgrading the performance of individual firms may have little impact**,** governments and donor agencies have shown significant interest in value chain analysis and implementation. In the agricultural sector, while buy-sell transactions approach has been adopted over time, it has become clear that the approach did not adequately respond to the desire of developing countries to have a continuous and consistent supply of high-quality products[15]. Arising from this, attention have shifted to improving access to and participation in more profitable and higher value chain, both as a means to achieving food security and achieving longer-term growth. Without further improvement in agricultural value chain, many developing countries face the risk of

being trapped into producing low-value products and continue to struggle to obtain a significant value-added share in global trade[16]. It follows therefore that optimizing agricultural value chain is basic to the success for developing countries to generate growth, improve welfare and reduce poverty[17]. To lend credence to this, other scholars assert that agricultural value chain leads to cost reduction, increase revenue, improve access to agricultural technology, information, and capital, through which production marketing processes are improved to acquire greater value and quality[18].

Agricultural value chain entails the assessment of specific area of an agricultural sector where upstream agents in production and distribution processes are linked to downstream partners by technical, economic, territorial, institutional and social relationships. It involves the analyses of chain actors and functions as to their performance, process, and linkages, identifying areas for interventions to improve or upgrade those that need interventions. The decision of where to intervene in a value chain should be primarily driven by the end goal of sustainable economic growth with poverty reduction[19]. For effective performance of the agricultural value chain, every stakeholder creates value which depends to a large extent on the following: factor input net value added rather than overall revenue, cost build-up and the distribution of burden or benefit, collaboration between agricultural sector and other supporting agencies, the dynamic relationship between the business and the environment, inter-relations between physical and information flows, constraints and opportunities within each segment and human capital investment[20].

This approach has emerged as a necessary framework in assessing the contribution of agricultural value chain to welfare. In effort to devise interventions that will reposition

the economy and spur economic growth, government can use agricultural value chain as robust tool to protect threatened links, facilitate upgrading of others to generate greater returns and promote foreign direct investment. Over the past decades, the Nigerian agricultural sector has undergone a multiplicity of transformations following a number of interventions. Despite these initiatives, several challenges remain in the optimization of agricultural value chains[21].

Agricultural Value chain can be defined as the full range of value added activities and participants involved in transporting agricultural products from input suppliers to farmers' fields, and ultimately, to consumers[22]. Value chain approach is a value creating experience. Value chain analysis helps in identifying as well understanding of connection among participants in the chain and the way they do business. An agricultural value chain is considered as an economic unit of analysis of a particular commodity or group of related commodities that encompasses a meaningful grouping of economic activities that are linked vertically by market relationships[23].

The first step in value chain analysis is mapping of the core processes and activities in the chain[24]. Value chain mapping is the process of developing a visual depiction of the basic structure of the value chain. Value chain map illustrates the way the product flows from raw material to end markets and presents how the industry functions[25]. Visualizing networks will give a better understanding of connections between actors and processes in a value chain, demonstrate interdependency between actors and processes in the value chain and create awareness of stakeholders to look beyond their own involvement in the value chain.

Nigerian agricultural sector is blessed with diverse crops[26]. Also, about seven livestock products are produced as poultry. There are also the artisanal and coastal brackish water catches, artisanal inland rivers and lakes catches and fish farming in the fishery sub-sector However, efforts so far to develop value chains has been limited to the following areas:

(i) Rice Value Chain. The rice value chain starts with paddy production which could go to cottage millers or commercial mills for processing and to the domestic rice market (consumers). There could also be sub-chains such as the farm gate buyers who supply the local paddy market, where the commercial mills can also buy to process.

(ii) Cotton Value Chain. The cotton value chain comprises fibre production, spinning, weaving and knitting, dyeing and finishing, garment production and sale to consumers. The cotton value chain can be broken down into sub-value chains depending on its final product which serves as an input into another value chain. The product could be raw fibre which is obtained directly from the producers. It is then an input for the spinners whose product is yarn. This serves as input for the Weaving and knitting sector as well as the dyeing and finishing sector whose products are fabrics. The fabrics constitute the input for the garments industry[27].

(iii) Cassava Value Chain. Majority of producers of cassava are majorly small-scale. The cassava is taken off by the processors who process fresh cassava into products like gari and fufu which are sold to local consumers. There are also some commercial scale activities in the area of processing of cassava into animal feed for feeding ruminants, poultry and fishes. The processing of cassava into flour, starch and glucose for use in the industrial sector (such as food industry, the brewing industry, the pharmaceutical

industry and the textile industry) is beginning to gain grounds. Potential areas that be explored in the cassava value chain include; on-farm/rural processing of cassava to into chips and ethanol production for both export and local markets.

(iv) Tomato Value Chain. The tomato value chain comprises the producer who supplies the tomato paste, factory that processes it and sells to local consumers and export market. Along the tomato value chain, there could be wholesalers who take the tomato off the producers and sell to retailers. There could also be agents who buy fresh tomatoes from the producers or wholesalers and supply the tomato factory. Finally, we also have wholesalers/agents taking off the processed tomato paste from the factory and selling to retailers who eventually sell to the final consumers.

(v) Cocoa Value Chain: Processing of cocoa into cocoa derivatives is the maximum value activity in the cocoa value chain. But presently, only about 30% of the cocoa beans in Nigeria is processed with remaining exported by the merchants. The main actors in the cocoa value chain include small and medium scale farmers, local buying agents, cooperatives, merchants, processors and few local users, including manufacturing farms that produce beverages.

(vi) Cattle Value Chain. The cattle value chain is made up of inputs, production, processing/distribution and marketing. The inputs component constitutes the feed, breeding and veterinary services which are needed to produce the calf and cow for fattening and dairy. The output is processed into milk, beef, butter, cheese and leather. Marketing is done through local markets, restaurants, supermarkets, and even exports to reach the final consumers.

(vii) Dairy Value Chain: The main actors in the value chain include pastoralists and commercial dairy producers, local and commercial processors, retailers and consumers. Within the value chain, storage and preservation of milk is vital due to the perishable nature of the product.

(viii) Oil Palm Value Chain: Products include cooking oil, margarines, baked foods, soap, bio-diesel.

2.1.4.1 Government Interventions in Agricultural Value Chain

Notable programmes and projects implemented in this regard covered various areas of agricultural development such as in production, marketing, storage and financing.

To aid agricultural value chain in Nigeria several interventions have been introduced by successive administrations:

(i) NEED I and II Implementation (2001 – 2007) – it gave birth to the preparation of the food security strategy document in 2009 that started to emphasize the need for a value chain approach to agricultural development.

(ii) The National Policy on Integrated Rural Development - was also formulated to integrate the rural economy into the mainstream of the national development process. The essence of this was to reduce rural-urban drift, redress the past neglect in the agricultural sector through provision of infrastructure and empower the rural population to create wealth and mitigate poverty

(iii) The NV20 2020 Implementation Plan - also contained specific programmes for developing the agricultural sector. Large scale processing of cassava and rice was

targeted under the plan. Local fish seed production was expected to increase from 5 million to about 20 million annually.

(iv) Nigerian Incentive based Risk Sharing System for Agricultural Lending (NIRSAL) –it was established in 2010 by the Central Bank of Nigeria to address the weakness of existing agricultural financing schemes. It was meant to meet the financial needs of smallholder farmers, agro-processors, agribusinesses as input suppliers in the agricultural value-chain.

(v) The Agricultural Transformation Agenda (ATA) – it was launched in 2012 was designed to make the agricultural sector the driver of development and make Nigeria a key player in food market. Africa Lead-IFPRI (2012) reports that the ATA improved deposit money banks' lending to agriculture from 0.1% in 2011 to 5% in 2014, reduced the 2014 food import bill by N466billion and boosted agricultural output by 11% between 2011 and 2014.

(vi) Agricultural Promotion Policy - to improve food supply and improve output quality, the Economic Recovery and Growth Plan (ERGP) lay emphasis on self-sufficiency in tomato paste, rice and wheat by 2020[28].

Although evidence suggests that agricultural exports have improved, agricultural exports as a ratio of agricultural GDP decreased from 3.3% in 2015 to 3.0% in 2016; and from an average of 4.5% in 2011-2013 to 2.9% in 2014-2016. This performance is far below the target set for 2016 (9% for all exports)[29].

2.1.4.2 Challenges of Agricultural Value Chain

Despite government intervention efforts, several challenges remain in the development of agricultural value chains as they are often uncoordinated, lacking investment and failing to include vulnerable group and missing critical linkages between farms and markets[30]. Rather than working together to improve value chain supply, each of the components has its unique challenges and is not working to find a unified solution thereby slowing down the progress of agricultural production. Other factors militating against the growth of agricultural production include poor accessibility of improved seedlings, climate variation, and difficulty in acquiring land limits input supply[31]. Also, production suffers from poor irrigation system, under utilization of mechanized equipment, lack of research. Even after production, in most cases the chain is truncated because of lack/limited storage facilities, lack of power coupled with high cost of processing equipment. There is also limited market for produced products coupled with illegal food imports. In support of this, other scholars assert that attention is on production rather than on adding value across different value chain segments[32]. In cassava, a 26.9% of the value chain is *garri* and *fufu* while the remaining is in other value chain products. This is similar across most agricultural products. Other studies also further reveal that Nigeria is losing about $10bn worth of export in agriculture annually due to the absence of value addition to agricultural produce[33]. More worrisome is that of the 20 million estimated cattle population, 2.3 million are utilized for dairy production while others are utilized for meat. Meanwhile, storage and preservation which are critical activities across the value chain segments are either insufficient or non-existent.

In a report on transforming Nigeria's agricultural value chain, it was revealed that 80% of the challenges in the meat value chain are in processing and storage[34]. The report had

it that Nigeria's agriculture value chain which is characterized by 80% small holder farmers, few commercial processors, low funding, inadequate research, weak institutions, limited storage facilities, requires massive investments to increase production and to create value addition across the most profitable segments of the value chain.

In effort to devise interventions that will reposition the economy and spur economic growth, government can use agricultural value chain as robust tool to protect threatened links, facilitate upgrading of others to generate greater returns and promote foreign direct investment.

Innovation can be defined as the entrepreneurs' specific tool to exploit change for a diverse business or service and can be presented as a discipline which can be learned and practiced[35]. In other words, innovation can also mean "an idea, practice, or object that is perceived as new by an individual or other unit of adoption"[36]. It can also be defined as a process of transforming an opportunity into fresh ideas and being widely used in practice[37]. Innovation can also bring out a new or enhanced process, service or products for marketing[38]. Innovation is "use of new technical and administrative knowledge to offer a new product or service to customers"[39].

Thus, many authors concluded that innovation is "any practices that are new to organizations, including equipment, products, services, processes, policies and projects"[40]. Other scholars also extended the conclusion where they said that innovation is one of major relevance for companies, as it can be the source of additional revenues from new products or services, can help to save costs or improve the quality of existing processes. However, in order to be innovative, the management team or any responsible individuals need to have innovativeness. When it comes to research, innovativeness can

be described as a positive attitude toward changes and an awareness towards the need to innovate[41].

Meanwhile, other scholars define defined innovativeness as "an organizations' overall innovative capability of introducing new products to the market, or opening up new markets, through combining strategic orientation with innovative behaviour and process". On the other side of the coin, innovativeness relates to the capacity of the firm to mesh together in innovation and managers use this innovativeness to solve business problems and challenges, thus resulting in providing survival and success pace for the firm, either for current or future. The scholar later added that innovativeness seemed to be useful in helping firms to compete with the competitors with those new or enhanced products and verify product lines, yet expanding the range of firm's activities generally[42].

2.1.4.3 Emerging Agricultural Innovations

In 2021, At the 12th annual Sustainable Innovation Forum (SIF), 10 innovative approaches to agricultural development were highlighted as shown below:

GreenWave Model

Bren Smith, owner of Thimble Island Ocean Farm and founder of non-profit GreenWave, is a pioneer in the development of regenerative ocean farming. His techniques use 3D ocean farming to create blue carbon – carbon that is captured by the world's ocean and coastal ecosystems[43].

The GreenWave Model is a sustainable, polyculture commercial farming system that regenerates ocean ecosystems by creating carbon and nitrogen sinks, helping to reduce the impacts of ocean acidification. Smith's model consists of vertical farms of scallops,

mussels, oysters, clams and seaweed, used for animal feed, fertiliser and to help reduce bioplastics.

Recent studies at the University of California found that California's agricultural emissions could be completely offset by growing seaweed in just 3.8% of federal waters off the state's coast. In addition, the World Bank estimates that 10 million tonnes of nitrogen and 135 million tonnes of carbon could be sequestered if only 5% of the nation's waters are farmed using seaweed.

As of 2019, Bren Smith accumulated a waiting list of over 4,000 farmers in 20 countries to develop his methods of ocean and coastal regenerative farming, with each farm costing between US$20,000 – 50,000. His sustainable farming successes will continue to expand globally as ocean restoration becomes more of a priority among farmers.

Symbrosia

It goes without saying that carbon dioxide has a significant impact on the climate. Methane, however, having around 84 times the global warming impact of CO2 over a 20-year period, and around 150 times the warming impact over a couple of years, represents itself as a fundamental driver of climate change.

The global livestock sector accounts for approximately 14.5% of all greenhouse gas emissions, of which 65% is emitted by cattle. This is where Symbrosia comes in.

Symbrosia is focusing on reducing the methane impact of cows by introducing seaweed into their diets. Scientific research, has found that replacing just 0.4% of a cow's feed with Asparagopsis taxiformis – a type of red macroalgae – can reduce livestock methane emissions by over 90%, as well as increase growth rate[44].

The company is scaling the innovative solution to reduce livestock methane emissions using aquaculture techniques. By using sustainable farming techniques like aquaculture, it avoids the degradation of its ecosystems. However, implementing this organic solution worldwide still requires further trials in research and production. Nonetheless, Asparagopsis taxiformis could take humanity one step closer to a zero emissions future.

AeroFarms

Founded in 2004 and based in New Jersey, AeroFarms grows over 800 different crops using an indoor vertical farming system. By using 95% less water than traditional arable farming, the soon-to-be public company has managed to raise more than $238 million in disclosed funding, positioning themselves as a leader in the vertical farming space[45].

Unlike hydroponic farming – a technique that replaces soil with nutrient-rich water - AeroFarms uses aeroponic technology. This process involves using a cloth made from recycled plastic to mist the roots with water, oxygen and nutrients. Combined with efficient, LED lights designed to have a specific intensity and spectrum, the stable indoor conditions disrupt the cycle of indoor pests, eliminating the need for pesticides, fungicides and herbicides.

The sustainable indoor agriculture company could be a progressive solution to the agriculture industry, especially as climate change continues to affect the stability of weather patterns and therefore crop growth.

Trapview

Trapview is an automated pest monitoring and forecasting system that provides farmers with near real-time data about the conditions of their crops. By forecasting potential pest outbreaks, the AI technology serves as a digital employee to help protect the survival rates of crops[45].

Farmers who use Trapview experience lower production costs, higher yields, better risk management and operate under a much more sustainable ecosystem.

Founded in Slovenia in 2007, Trapview now manages over 4,000 fields and claims to possess the largest database of algorithms and pest data in the world. In an interview with AFN, CEO Matej Štefančič stated that the company's algorithms have the potential to identify around 40 different species of insect in their forecasting models.

Trapview continues to receive investments from Japan's Kubota, Italy's Oltre Ventures and the Netherlands' Pymwymic and are likely to assert themselves as a technologically disruptive leader in the sustainable farming industry in the years to come.

Kray Technologies

Kray Technologies have designed the world's first fully digital and unmanned drone crop sprayer. Capable of autonomously spraying up to 1200 acres per day, the agricultural innovation hosts a variety of benefits for the average farmer[46].

The industrial drones serve as a replacement for agro planes, using less fuel, less maintenance and staffing, and operate at speeds of up to 70 mph, covering vast areas in little time. As a result, the highly efficient technology cuts applications costs by 90% to around $1 per acre.

Additionally, the growing ability to fertilise more frequently reduces yield losses. In fact, Kray has promised that their drones would increase yield output by 20-40% if adopted.

World Cover

Agriculture is a highly volatile industry, vulnerable to extreme weather conditions continuously exacerbated by our changing climate. For those who farm in harsh climates or within impoverished communities, insurance is scarce - often leaving financially burdened farmers to the mercy of the climate. World Cover, however, seeks to reduce this exposure and aims to speed up the process of claiming such notoriously laborious insurance.

Much of World Cover's target market already receives money via mobile payment services. This serves as the infrastructure for automated blockchain based insurance technology. Using this decentralised blockchain technology, they simplify the insurance payment process by developing smart contracts using distributed ledger technology[47].

The adoption of smart contracts allows insurance payments to be automatically triggered once certain conditions have been met. Subsequently, fraudulent requests are prevented, and the speed and efficiency of payments is significantly improved.

It offers this kind of insurance by using high-resolution satellite imaging. Using this imagery, World Cover analyses rainfall patterns to determine the level of compensation required. For example, a farmer with little education in remote India will understand that

if his crops suffer from a lack of rain for a few weeks, he will be directly compensated with an automated payment on the blockchain system[48].

Currently, World Cover only offers drought insurance. However, the company have announced plans to expand into crop diseases - an outcome directly correlated with extreme weather.

2.1.4.4 Agricultural Innovation in Nigeria

Towards poverty reduction, there is a need to generate agricultural technologies in order to increase agricultural productivity and reduce poverty and hunger among smallholders. But to develop agriculture, efforts must be made to embrace both generation of innovations and taking the innovations to scale. Scaling up of agricultural innovations has adopted different methods; scaling up requires a multi-stakeholder approach among national governments, donor agencies, NGOs, the private sector, research institutions, and extension workers among others[49].

Horizontal, vertical, and functional approaches are commonly listed for scaling up agricultural innovations; practices on the ground appear however to embrace combinations of the approaches. Technology generation through years of agricultural research in the various NARIs in Nigeria is believed to be way ahead of the rate of use of the various research outputs. If properly packaged, it will help potential beneficiaries of the wide array of the agricultural research outputs from the NARIs who includes processors, farmers, marketers, and allied agro-based businesses[50].

Cassava is a multiple utility commodity in Nigeria; it is used for food and as an industrial raw material. Among the challenges to cassava development in Nigeria relate to

production and post-harvest processing. Cassava Mosaic Disease (CMD) has led to yield losses and is a threat to the livelihood of cassava-growing families. CMD-resistant cassava varieties include NR8082, NR8083, TME 419, TME 98/0505, and TMS 30572. These varieties mature early, give high yields, and peel easily. Scaling up of agricultural innovation using an IP requires that the relevant stakeholders be linked and organised. Under the auspices of the Research into Use (RIU) Program in Nigeria, CMD-resistant varieties were introduced in Abia State through the joint effort of IITA, NRCRI, ARCN, and ADPs. The outcomes of the cassava IP to the farmers include larger farm sizes, access to improved varieties resistant to CMD, and higher productivity. Access to CMD-resistant varieties was generally easier within the IP. The access increased from fewer than 100 farmers in 2009 to over 450,000 farmers by 2010 in Abia State[51].

The Federal Government of Nigeria (FGN) has taken several steps over the years to use agriculture to alleviate poverty and attain food security. But the efforts faced significant constraints. Agricultural lands have been largely degraded in quality due to expansion of production by expanding cultivated area at the expense of intensive farming. Other factors in the low and declining productivity of the Nigerian agricultural sector include poorly developed irrigation potential, inadequate and poorly funded and maintained production and marketing infrastructure, poorly funded agricultural research and extension systems, inadequate availability and distribution of key inputs (fertilisers, chemicals, machinery, and improved seed), poor or lack of access to financial services for the procurement of needed inputs and services such as processing, storage, and transportation[52].

The Federal Government of Nigeria, under multi-lateral financial assistance (from mainly World Bank and AfDB) implemented the National Fadama Development Project in three phases between 1992 and 2015, as Fadama I, Fadama II and Fadama III, Fadama III AF, in that order. The Project Appraisal Document (PAD) for Fadama III intended to support the financing and implementation of five main components designed to transfer financial and technical resources to the beneficiary groups in: (i) institutional and social development; (ii) physical infrastructure for productive use; (iii) transfer and adoption of technology to expand productivity, improve value-added, and conserve land quality; (iv) support extension and applied research; and (v) provide matching grants to access assets for income generation and livelihood improvements[53].

Prior to the Fadama project, the target beneficiaries were disorganised and operated as individuals, widely dispersed across rural space. They lived in communities that are beyond the reach of financial institutions that may be willing and able to extend services to the poor. This facility, i.e., financial support for acquisition of group assets, thus serve as a mechanism to mobilise the formation of community groups, to give FCA members practical financial experience as well as revenue from small income-generating activities. Also, the arrangement made the beneficiaries more attractive to be financed as a group by mainstream financial institutions. This was the innovation or intervention. Fadama II project in 18 states was expanded to cover all the 36 states and the FCT as Fadama III project. The learning and lessons of the CDD were used to scale up the acquisition, ownership and maintenance of productive assets using the group approach.

A total of 64,347 FUGs were registered nationally, of which 48.6 percent owned the listed categories of assets. The productive assets for which at least 1 percent of all

nationally registered FUGs acquired included Animal Traction Unit, ATU (3867), tubewell (4409), sprayers (5569), fatten cattle (1220), cassava processing machine (1340), goatry (1076), rice processing machine (1282), tomato/pepper processing machine (1180), fish pond (2423), and poultry production units (2401). In line with the GIC commodity emphasis, our interest here is mainly a cassava processing machine and a rice processing machine[54].

The state-wise FUEF savings rates analysis shows that only 9 states out of 36 and FCT in the Fadama III project met the requirement of saving 10 percent or more of the replacement value of the assets in the group's possession. These states are: Adamawa (17.4 percent), Bauchi (13.6 percent), Gombe (13.9 percent), Kogi (10.3 percent), Nasarawa (21.2 percent), Niger (14.2 percent), Lagos (10.2 percent), Ogun (21.9 percent), and Plateau (16.6 percent). The national average savings by the group was 4.3 percent[55].

Fadama III AF was conceived for scaling up impacts on the ground and strengthening the development effectiveness of the well-performing Third National Fadama Development Project (Fadama III). FIII AF was designed to support clusters of farmers in selected states with comparative advantage and high potential to increase production and productivity of cassava, rice, sorghum, and horticulture value chains and link them to better-organised markets, including Staple Crop Processing Zones (SCPZs) once established. FIII AF was to facilitate linkages between the federation of producers and existing processors. FIII AF retained the development objective of the Fadama III Project.

As a departure from past government interventions, the Agriculture Transformation Agenda (ATA) adopted in 2011 was focused on making improvements along the value chains of a number of prioritised agricultural commodities and working with the private

sector. The ATA also differs from past efforts in that it pushes for badly needed policy reforms such as the fertiliser subsidy programme. FIII AF financed the procurement of advisory services to transfer know-how on proper utilisation of factors of production (fertilisers, improved seeds, and agricultural machinery), including advice on the associated downstream activities. The advisory services component comprises two subcomponents, advisory services and input supply. FIII AF used the same approach and strategy of Community Driven Development (CDD). The FIII AF supported critical production activities and organisation of farmers into clusters or out-grower groups in selected states with high potential. The priority value chains supported were rice, cassava, sorghum, and horticultural crops.

The outcomes of innovation scaling up include State-wide access to high-yielding and early-maturing varieties of cassava, namely, TME 419, TMX 30572, TMX 30555; State-wide access to high-yielding and early-maturing varieties of rice, namely FARO 44, FARO 52, FARO 54, FARO 62, FARO 60, FARO 61, FARO 57, with FARO 44 and FARO 52 most preferred/distributed across target states; Productive assets acquired for cassava production by the production groups include a sprayer, a wheelbarrow, a cassava lifter, and a First Aid box; Productive assets acquired for rice production and post-harvest value addition by the relevant groups include a sprayer, a water pump, a generator (for water pump), a milling machine, a de-stoner, and a thresher; and Fertilisers, seeds, and pesticides were accessed using the e-wallet approach proposed under the ATA.

It is defined as the replacement of strenuous and low efficiency work with the work of equipment and machineries which will reduce drudgery and allow for increased efficiency. It deals also with design and development testing and manufacturing,

marketing, operations, maintenance and repair of all agricultural tools, implements, machineries and equipment. According to Wikipedia This article explicates on the Problems and Prospects of Agricultural Mechanization in Nigeria. Agricultural Mechanization, "is the process of using agricultural machinery to mechanise the work of agriculture, greatly increasing farm worker productivity. In modern times, powered machinery has replaced many farm jobs formerly carried out by manual labour or by working animals such as oxen, horses and mules"

Agricultural Mechanization has been touted as the key to modernization and industrialism in developed countries. Agricultural Mechanization may include usage of trucks, harvesters, tractors, modern farming tools, and even aeroplane. The major objective for agricultural mechanization is to boost the productivity of the farm, support the production of large quantities, and better the quality of farm produce. This implies that agricultural mechanization is the path Nigeria must take to food sufficiency, but what are the problems and Prospects of agricultural mechanization in Nigeria?

2.1.4.5 Prominent Agriculture-Based MSMEs in Nigeria

This section highlights real-life examples of agriculture-based MSMEs in Nigeria, focusing on their operations, contributions, challenges, and potential.

1. **Psaltry International Company Limited**

Psaltry International Company Limited, based in Oyo State, Nigeria, is a key player in cassava processing, contributing significantly to the local agricultural value chain. Specializing in the production of cassava-based products such as starch, flour, and

glucose syrup, the company has established itself as a reliable supplier to multinational corporations like Nestlé Nigeria and Nigerian Breweries[56].

As a model of how agribusinesses can integrate local farmers into industrial value chains while fostering economic growth, Psaltry International Company Limited serves this purpose. However, addressing infrastructural and energy challenges is crucial for sustaining its growth trajectory. Continued collaboration with stakeholders, including the government, can further enhance its contributions to Nigeria's agricultural and industrial sectors[57].

In partnerships with global brands like Nestlé Nigeria and Nigerian Breweries, Psaltry exemplify its strategic positioning. These collaborations provide consistent demand for cassava-derived products, ensuring stable revenues and fostering brand reliability. Psaltry focuses on processing cassava into value-added products. These include:

- Starch: Widely used in food production, paper manufacturing, and adhesives.

- Flour: A versatile ingredient for baking and industrial purposes.

- Glucose Syrup: Essential for beverages, confectionery, and pharmaceutical industries.

The company's products meet international quality standards, positioning it competitively in both domestic and export markets. Psaltry provides a steady market for over 5,000 farmers, significantly enhancing rural livelihoods and encouraging cassava cultivation. Farmers benefit from extension services, including training on best agricultural practices and input support, which boosts productivity[58].

With a workforce exceeding 300, Psaltry supports both direct employment in its operations and indirect employment through its supply chain. This positively impacts local economies and reduces unemployment in Oyo State. By strengthening the cassava value chain, Psaltry contributes to food security and industrialization efforts, aligning with Nigeria's agricultural transformation agenda[59].

2. **Farmcrowdy**

Farmcrowdy is a pioneering digital agriculture and crowdfunding platform headquartered in Lagos State, Nigeria. Established in 2016, the platform connects small-scale farmers with investors, enabling collaborative funding of farming activities. In return, investors share the profits post-harvest. Farmcrowdy represents a significant shift in the agricultural sector by leveraging technology to address funding, training, and market-access challenges for smallholder farmers.

Through a user-friendly digital platform, Farmcrowdy facilitates individuals and entities to invest in specific farming projects. Support for Farmers (Provision of quality agricultural inputs such as seeds and fertilizers; Comprehensive training programs to enhance farming techniques; Insurance coverage to mitigate risks associated with farming).

Since its inception, over 25,000 smallholder farmers have benefited from Farmcrowdy's interventions. Farmers have experienced increased productivity and income due to better resources and market access. By digitizing key aspects of farming, Farmcrowdy has contributed to the modernization of Nigeria's agricultural industry.

Despite its success, Farmcrowdy faces several hurdles, some of which are limited internet connectivity in rural areas reduces the adoption of its platform by the farmers who need it most; Nigeria's crowdfunding regulations are still evolving, creating uncertainties for operations and compliance.

Farmcrowdy exemplifies the potential of technology-driven solutions in addressing systemic challenges in Nigeria's agricultural sector. Its approach aligns with global trends in agritech, offering a replicable model for other developing economies. Farmcrowdy has effectively used digital solutions to address traditional issues such as funding gaps and inefficient market linkages. Collaborations with financial institutions and other agritech firms have strengthened its operational capacity and scalability[60].

3. Chi Farms Limited

Chi Farms Limited, situated in Ogun State, Nigeria, is a prominent agribusiness entity specializing in poultry and aquaculture. The company has integrated operations that span from production to processing, supporting both local consumption and export markets. Its activities, impact, challenges, and key success factors make it a critical player in Nigeria's agricultural landscape.

The farm operates extensive poultry farms, producing broiler chickens and eggs. These products are processed in facilities equipped to meet both local and export market standards, ensuring compliance with food safety regulations. The company’s hatchery plays a crucial role, supplying high-quality day-old chicks for internal use and sale to external farmers.

The aquaculture segment focuses on catfish farming. Catfish are cultivated, processed, and distributed to meet the protein needs of urban and rural populations, contributing significantly to Nigeria's fish supply chain. Chi Farms operates a feed mill, producing specialized feed for poultry and aquaculture. This vertically integrated approach ensures quality control, supports its operations, and provides feed to external clients, reducing dependence on imported feed.

By producing fresh protein sources such as broiler chickens, eggs, and catfish, Chi Farms addresses the growing demand for animal protein in Nigeria. The company's operations reduce dependence on imported protein products, enhancing food security and fostering self-sufficiency.

The company generates over 1,000 direct and indirect jobs, from farm workers and processing plant operators to logistics and retail staff. This contributes significantly to local economic development, particularly in Ogun State and surrounding regions. Being located in Ogun State, near Lagos—Nigeria's largest commercial hub—offers Chi Farms direct access to a vast market.

The proximity to major transportation networks facilitates efficient distribution of its products to urban centers and export destinations. Chi Farms Limited exemplifies an integrated agribusiness model with a significant impact on Nigeria's poultry and aquaculture sectors. Despite challenges such as rising feed costs and disease risks, the company thrives through strategic location advantages and streamlined operations. Its contributions to food security, job creation, and import substitution make it an indispensable player in Nigeria's quest for agricultural sustainability.

4. Okomu Oil Palm Company

Okomu Oil Palm Company is a major player in Nigeria's palm oil industry, producing crude palm oil (CPO) and palm kernel oil (PKO). These products serve as essential raw materials for food processing, cosmetics, and biodiesel industries. CPO is particularly critical as a base ingredient in cooking oil and margarine, while PKO is used in soap production. Their focus on palm oil addresses Nigeria's push toward self-sufficiency in this critical commodity[61].

The oil palm company also specializes in cultivating industrial-grade rubber from latex trees. The processed rubber is used in the manufacturing of tires, footwear, and industrial goods. Nigeria, having a history as a significant rubber exporter, benefits from Okomu's contributions to reviving this once-booming industry.

Okomu operates some of the largest plantations in Nigeria, spanning thousands of hectares. These plantations enable the company to achieve high productivity levels, benefiting from economies of scale in planting, harvesting, and processing. Advanced farming technologies and agro-practices ensure the efficient use of resources and maximize yield.

Beyond its own plantations, Okomu engages with over 15,000 smallholder farmers, integrating them into its value chain. The company provides these farmers with seedlings, technical support, and market access. This partnership reduces production costs for Okomu while empowering rural communities economically[62].

By meeting a significant portion of the country's demand for industrial palm oil, Okomu reduces reliance on imported oils, which are often cheaper but come with quality and

sustainability concerns. This helps stabilize local markets and strengthens Nigeria's palm oil sector.

Okomu plays a vital role in rural development by creating jobs and improving livelihoods. The integration of smallholder farmers into its supply chain fosters inclusive growth, ensuring that the economic benefits of palm oil and rubber production extend beyond the company[63].

As the company expands its plantations, disputes arise over traditional land rights and access to resources. These tensions have sometimes escalated into protests or litigation, making land management a critical issue. Despite its local dominance, Okomu competes with cheaper imported palm oil, particularly from countries like Malaysia and Indonesia. These imports often flood the Nigerian market, undercutting local producers. This price competition forces Okomu to focus on efficiency and value addition to remain competitive[64].

The scale of Okomu's operations allows it to lower costs through bulk purchasing of inputs, mechanization, and efficient logistics. This gives the company a competitive edge over smaller producers who may lack such advantages. Okomu is recognized for its commitment to sustainable agriculture, a significant factor in gaining international certifications such as the Roundtable on Sustainable Palm Oil (RSPO). These practices include reducing deforestation, conserving biodiversity, and ensuring fair labour practices. Sustainability not only enhances Okomu's brand but also makes its products more attractive to global markets that demand ethical sourcing[65].

5. AgroEknor International

AgroEknor International is a Lagos-based agricultural enterprise specializing in the export of dried hibiscus flowers. The company bridges the gap between Nigeria's agricultural sector and the global market, operating as a critical link for smallholder farmers. Its core operations include sourcing high-quality hibiscus flowers from small-scale farmers, ensuring processing adheres to stringent international standards, and exporting to key markets in Europe, Asia, and the Americas.

The company's operations directly impact over 10,000 smallholder farmers across Nigeria, providing them with sustainable income and enhancing their economic stability. This contributes to rural development, reduces poverty, and promotes inclusive growth within agricultural communities. By focusing on the export of hibiscus, AgroEknor diversifies Nigeria's revenue base. This emphasis on agricultural exports supports the country's efforts to move away from heavy reliance on oil and fosters a more resilient economy.

As a agricultural export sector, AgroEknor International is a vital player in Nigeria, driving socio-economic impact while tackling challenges inherent in global trade. By leveraging its strengths in quality assurance and adaptability, the company is well-positioned to scale its operations, foster sustainability, and contribute significantly to Nigeria's non-oil economic diversification[66].

2.1.7.1 Farming Practices in Nigeria

The rate and quality of farming practices in Nigeria triggers poverty as recent surveys shows that 44% of male farmers and 72% of female farmers cultivate less than I hectare per household, despite the fact that about 34 million ha out of the 83 million ha – about

40.96% - of the agricultural land is currently cultivated. Reports indicate that about 90% of Nigerian foods are produced by small scale farmers cultivating small pieces of land[91]. Moreover, for more than 50% of agricultural land currently been cultivated, yield per hectare is low compared to other developing countries like Brazil and Thailand owing to the following factors:

Prevalence of rain – fed agriculture – the vast majority of farmers in Nigeria depend on seasonal rainfall for their cultivation such that agricultural production is suspended for almost half a year when rain does not fall. Only about 7% of irrigable land has been irrigated, at considerable higher cost than other African countries

Impact of environmental degradation – climate change and land degradation are the major causes of low yield and crop failure and the impact is higher in Africa where it is projected that crop yield may fall by 10% to 20%, or in some cases up to 50% by 2050. Climate change is known to bring about seasonal changes in rainfall and temperature, drought, and negative impact on land suitability for agricultural cultivation. Climate change is considered the most serious environmental threat to the fight against hunger, malnutrition and diseases[67].

Most of government interventions are not well thought as they are mere recycling ideas past by successive administration under different names. Top-down approach employed by policy makers shows there is little or no consultation with farmers rural dwellers or service users at the conception and design stage such that it is difficult for farmers to take ownership of this process and contribute their own ideas based on experience on ground. Corruption factor on the part of policy makers stymie unfettered access of funds needed

by the rural dwellers. Government intervention in agricultural development lack dept as farmers are not carried along in the formulation of agricultural policy[68].

One of the most talked about challenges militating against the development of MSMEs is finance. The lack of finance for MSMEs has been an issue discussed by the government, industry leaders and financial institutions at large. Most MSME businesses have challenges getting the required finances to improve and grow their businesses. In 2013, The CBN launched the MSME Development Fund with a share capital of N220 billion. The Fund was established in recognition of the significant contributions of the Micro, Small and Medium Enterprises (MSME) sub-sector to the economy and the existing huge financing gap. The broad objective of the Fund is to channel low-interest funds to the MSME sub-sector of the Nigerian economy through Participating Financial Institutions (PFIs)[69].

Also, Banks and Fintechs (financial technology companies) have also been filling the gap in the market by providing short-term financial loans to MSMEs in Nigeria. Banks often require a large amount of paperwork, including a business plan, as part of the application process compared to Fintechs who leverage data and technology to provide smooth and quick access to funds. In the past and recent times, the Nigerian Government has established numerous schemes and programs specifically targeted at MSMEs e.g. SMEDAN, YouWin, TraderMoni, N-Power, etc. All these efforts combined together form a great step at bridging the gap for MSMEs in Nigeria[70].

2.1.3 Concept of Sustainable Development

Since its inception, the notion of sustainable development has gone through several stages of development. Various groups were involved in the concept's historical development, and they are presently working hard to put it into practice. While the concept has been recognized in several fields of human activity, it has received various criticisms and interpretations over time, and the definition of sustainable development has become one of the most quoted definitions in the literature[71].

In its most basic form, sustainable development is a philosophy that attempts to meet human development goals while also conserving natural systems' capacity to access the natural resources, ecosystem services, and other benefits on which the economy and society are reliant. Sustainable Development can be described as development that fulfills the requirements of the present without risking the ability of the future generations to achieve their own demand in the future. There was a report called the Brundtland Report that came out in 1987. This report came up with the official definition of "sustainable development." Sustainable development is a way to make sure that society can last for a long time. This entails understanding both the needs of the present as well as those of future, such as protecting the environment and natural resources or making sure that everyone has a fair chance at a good job and a good life[72].

The concept of sustainable development is grounded in the concept of development (socioeconomic development in line with social constraint), concept of needs (redistribution of resources to ensure the quality of life of all) and future generation (the possibility of long-term usage to ensure the necessary quality of life for future generation)[73].

Sustainable development is the conservation of natural resources and a sense of obligation to future generations. It is also the means of looking after resources while maintaining present and existing activities[74]. Sustainable development concept is defined as the development that meets the needs of the present without compromising the ability of the future generations to meet their own needs, it can therefore be inferred that the ability to meet the compulsions of equity within generations of humans and also of inter-generational equity is sustainable equity[75]. It is the development that meets the needs of future and present generations. The Brundtland Report describes sustainable development as an idea that reaches beyond environmental protection, as it means a process of change in which exploitation of resources, direction of investments, orientation of technological development and institutional changes are made consistent with future as well as present needs. Sustainability development makes for a "balance between economic development—all the changes in the economy development both quantitative and qualitative and the ecological sustainability—both the quantitative and qualitative environmental strategies that improves the ecosystem and welfare"

The Brundtland Commission on Sustainable development is the most used definition of sustainable development as it does not limit the scope of sustainability, however, it does not make provision for the importance of intergenerational equities[76].

The key principle of sustainable development is that it integrates economic, social and environmental concerns into the aspects of decision making, the overall goal of sustainable development is the long-term stability of the economy and environment which is only achievable through the integration of the economic, environmental and social concerns throughout the decision-making process. Another principle of

sustainable development is the principle of conserving resources for future generations, this principle sets sustainable development apart from the traditional environmental policies that seeks to internalize the externalities of environmental degradation.

United Nations Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted in 2022 as a universal call to action for ending poverty, protecting the environment, and ensuring that all people live in peace and prosperity by 2030. The 17 Sustainable Development Goals (SDGs) are interconnected; they understand that actions taken in one area will have consequences in another, and that advancement must strike a balance between social, economic, as well as environmental protection. A number of countries have pledged to prioritizing advancement for people who are the most behind in their development. The Sustainable Development Goals (SDGs) are intended to put an end to hunger, starvation, AIDS, and inequality against females. To attain the Sustainable Development Goals in every setting, it is vital to draw on the creativity, knowledge, technology, as well as financial capacity of the entire society[77].

Sustainable development can be thought of in many different ways, but at its core, it is an approach to development that tries to find a balance between different and sometimes conflicting needs while also remembering that we all have an obligation to care, improve social well-being, and make sure that the economy is stable. Progress is often driven by a single need, rather than looking at the bigger or longer-term effects of that need, which can be hard to do. Because of irresponsible banking and fossil-fuel-based energy sources, we are already seeing the effects of this strategy on a world-wide scale. The more we go on with unsustainable development, the more likely its consequences will become more common and severe, requiring us to act quickly[78].

Sustainable development refers to economic planning in this manner. It aims to protect the environment for future generations while also expanding the economy. Sustainability has grown in popularity over time. It proved difficult to apply, however, because the conclusions of long-term sustainability evaluations are dependent on whatever resources are examined. It may be difficult for native birds to live in a region with a lot of forest, yet a mineral deposit that will eventually run out may nevertheless be able to support more or less stable people. Following the 2019 Earth Summit, many environmental research focused on how to keep things safe and healthy[79].

Ensuring that there is enough land of the correct type and in the right places at the right time to sustain development and innovation; and finding out, and then cooperating to plan and build new things. People that labour to safeguard the environment help to promote biodiversity, properly use resources, decrease waste and pollution, adapt to and help stop climate change, and seek to make the world a more ecologically friendly place.

When we think about social inclusion, we think about ensuring that there is enough housing to meet the needs of both current and future generations, as well as ensuring that there are high quality developments with accessible local services that reflect what the community needs and contribute to a good health, social, and cultural life[80].

17 SDGs (Sustainable Development Goals)

1. Put an end to poverty in all of its manifestations everywhere.
2. Put an end to hunger, ensure food security, increase nutrition, and promote sustainable agriculture.
3. Ensure healthy lifestyles and promote well-being for all ages·

4. Ensure inclusive and equitable quality education for everyone, as well as opportunities for lifelong learning for all.
5. Achieve gender equality and empower all women and girls.
6. Ensure the availability and long-term management of water and sanitation for everyone.
7. Ensure universal access to affordable, dependable, sustainable, and modern energy.
8. Promote long-term, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.
9. Invest in robust infrastructure, promote inclusive and sustainable industrialization, and encourage innovation.
10. Reduce intra- and inter-country inequalities.
11. Make cities and human settlements more inclusive, safe, resilient, and long-lasting.
12. Ensure long-term consumption and production patterns.
13. Take immediate action to address climate change and its consequences (noting agreements made by the UNFCCC forum).
14. Conserve and utilize oceans, seas, and marine resources in a sustainable manner for long term development.

15. Protect, restore, and promote the sustainable use of terrestrial ecosystems; manage forests sustainably; battle desertification; and prevent and reverse land degradation and biodiversity loss.

16. Promote peaceful and inclusive societies for long-term development, ensure equal access to justice, and construct Institutions that are successful, accountable, and inclusive at all levels.

17. Strengthen and revive the global partnership for sustainable development's implementation mechanisms[80].

In spite of government intervention endeavors in the agricultural sector, there still exist disturbing trends that give credence to belief in some quarters that actualization of the sustainable development goals by the year 2030 might just be a pipe dream.

The agricultural sector's contribution to the Nigeria's gross domestic product (GDP) is too insignificant to make appreciable impact on the economy as agricultural imports reach a feverish pitch. Like other sectors in the Nigerian economy, the agricultural sector has not enjoyed the benefits of innovation. Farm yields are still much lower than their counterparts in other climes and government intervention programmes in that regard seem not effective enough to make necessary impact. On the other hand, Nigeria's currency continues to slide on the downward trajectory against other world currencies and expectedly, prices of commodities have continued to skyrocket. This research study is aimed at beaming a search light on the South West agricultural sector to elicit answers to the research questions itemized in this study[81].

A key concern for agriculture is the continued presence of high rates of hunger and malnutrition (793 million people were chronically hungry in the world in 2014-2016) and the impact of unsustainable human activity on the Earth's carrying capacity. Agriculture would need to produce 60% more food globally in the same period in order to meet the increased food demand of the nearly nine billion people who will exist by 2050 and the predicted dietary changes. Also, around a third of all food produced is lost or wasted each year across the world's supply chain, totalling about 1.3 billion tons. This has huge economic and ecological repercussions.

Improvements in agriculture have been linked to dramatic results in the fight against hunger and poverty. The majority of people who are now living below the poverty line receive their primary source of income, employment, food, and other products and services from agriculture. Because of this, in low-income nations with scarce resources, GDP growth driven by agriculture is at least twice as successful as growth driven by non-agricultural sectors in decreasing poverty, and up to five times as effective.

Four of the five highest value agricultural products are livestock products (milk, pig meat, beef, chicken meat) 1.3 billion people (one in five of the world population) depend on livestock for their livelihoods. Livestock account for 40% of agricultural GDP in developing countries and the share is growing. Demand for milk and meat will triple in Africa by 2050. In many developing countries, up to 80% of the population is employed in agriculture. Agriculture is force to reckon with and must be given hundred percent attention, it must carry it centre stage in the action plan of the quest to eradicate poverty. Embracing agricultural activities reduce poverty by increasing incomes, improving nutrition, and building household resilience to external shocks[82].

Modern agriculture has achieved much over the past century. While the global population has grown from less than three billion people in 1950 to more than seven billion people today, global levels of hunger have not followed this trend, remaining largely constant over the same period. Tackling hunger is not only about boosting food production; it's also about increasing incomes and strengthening markets so that people can access food even if a crisis prevents them from growing enough themselves.

With a growing global population comes the pressing need to find new ways to sustainably raise agricultural output, enhance the global supply chain, cut down on food waste, and feed the world's hungry without wasting a single morsel. Many people around the world are committed to ending hunger in their lifetimes or within the lifetimes of their children.

The right to adequate food and the fundamental right of everyone to be free from hunger were both reaffirmed by world leaders at the 2012 Conference on Sustainable Development (Rio+20). At Rio+20, the UN Secretary-General issued a challenge to end hunger and eradicate the worst forms of malnutrition by uniting governments, civil society, faith communities, the private sector, and research institutions to achieve this goal. Since then, the Zero Hunger Challenge's popularity has grown, with many countries and organizations joining in on the effort. That means:

Children under the age of two with zero cases of stunting, Complete availability of food throughout the year for every person on the planet, infinitely sustainable food systems, Gains in productivity and income for small farmers increase by a factor of 100 and ensuring that there is no food loss or waste.

Supporting sustainable agriculture, empowering small farmers, promoting gender equality, eradicating rural poverty, guaranteeing healthy lifestyles, tackling climate change, and so on are all interconnected, as is the Sustainable Development Goal to "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" (SDG2). These are just some of the 17 Sustainable Development Goals outlined in the Post-2015 Development Agenda. A balanced diet and access to micronutrients are two aspects of nutrition that warrant study alongside caloric intake. The effects of maternal and infant malnutrition on child development can be devastating. Both developed and developing countries are experiencing an increase in the prevalence of noncommunicable diseases, which is strongly correlated with the adoption of unhealthy diets and lifestyles[82].

Particular attention should be paid to ensuring that pregnant women and young children have access to healthy foods and beverages throughout the 1,000 days that span their gestation and early childhood. Since its inception five years ago, the Scaling-Up Nutrition (SUN) Movement has made significant strides in incorporating strategies that link nutrition to agriculture, clean water, sanitation, education, employment, social protection, health care, and support for resilience.

Poverty and hunger are worst in rural areas, and smallholder farmers and their families make up a disproportionately large share of the poor and hungry in these areas. Thus, increasing food production, agricultural productivity, and rural incomes is crucial to ending poverty and hunger worldwide. The world's agricultural systems need to become more efficient and less wasteful. Sustainable agriculture and food systems, from production to consumption, require an all-encompassing and coordinated effort.

The growing scarcity of land, healthy soils, water, and plant genetic resources—all essential inputs in food production—makes it imperative to use and manage them sustainably. Reducing the need to cut down trees for farming could happen if sustainable agricultural practices were used to increase crop yields on already-cultivated land, as well as to restore degraded land. The productivity of drylands can be maintained through strategic use of available water, such as through the implementation of modern irrigation and storage systems, and the introduction of new drought-resistant crop varieties. To meet future food demands, it will be essential to halt and reverse land degradation. In the context of sustainable development, the Rio+20 outcome document urges a world free of land degradation. Land restoration has the potential to provide enormous benefits for food security and for mitigating climate change, especially in light of the current scale of land degradation worldwide. While the causes of desertification, land degradation, and drought are known to scientists, their knowledge is still developing[83].

Soil, land, water, nutrient, and pest management, as well as a more extensive use of organic fertilizers, are all aspects of farming that, when combined with the latest scientific knowledge, can help produce food systems that are both sustainable and productive. To realize synergies and adequately address trade-offs between agriculture, water, energy, land, and climate change, there needs to be a rise in integrated decision-making processes at national and regional levels.

In light of the fact that climate change is expected to cause shifts in global temperatures, precipitation patterns, and pest populations, it is imperative that the international community increase funding for R&D and demonstration of technologies that increase food security around the world. To avoid widespread food shortages in the future and

guarantee food security and adequate nutrition for all, it will be essential to strengthen local food systems' ability to adapt to changing conditions[84].

In Nigeria, serious strategies have been developed to combat the issue of hunger and poverty by coming with systems to help raise Agriculture as a mediator between the Nations government and the Sustainable Development Goals. With an estimated population of 200million people and a projection to 500million by 2050 (source), agriculture is seen as the alternative to oil and gas for employment generation and wealth creation in Nigeria. Agricultural sector is the major employer in rural areas and hires about 70% of the Nigeria workforce. However, the sector faces two key challenges which are inability to meet domestic food requirement and an inability to export at standards required for market success. These challenges are basically problems of productivity posed by an input system and farming model that is largely inefficient and archaic; and an inefficient system for setting and enforcing food quality standards and poor knowledge of the market[85].

In light of these difficulties, NDAS was developed to optimize the agricultural value chain by using innovative digital technologies to boost output, cut down on waste, broaden farmers' access to markets, and ultimately help Nigeria achieve food self-sufficiency and generate significant revenue for the improvement of the country's human and physical infrastructure[86]. To bring the industry up to date, the NDAS is not only focused on digitalization. To create well-paying jobs for the youth, connect products to markets, and generate revenue through a well-thought-out business model dubbed "Data as a Service (DAAS)," this initiative seeks to bring together all the agriculture stakeholders from different parts of Nigeria on a single platform for communication and

collaboration. The NDAS is founded on concepts from the Internet technologies of the Fourth Industrial Revolution (Industry 4.0). The modernization process would be driven by disruptive technologies and innovations like Block chain, Internet of Things (IoT), Artificial Intelligence (AI), Big Data Analytics, and Immerse Reality; and broadband connectivity, web-enabled smart phones, mobile applications, social media platform.

The strategy defines the vision, goals, objectives, and strategic pillars for digital agriculture in Nigeria. This report identifies the necessary and sufficient conditions for advancing digital agriculture and suggests solutions to these issues. The principles for digital development are also highlighted and emphasized to be strictly followed in all digital agriculture projects in Nigeria[87].

Furthermore, the digital agriculture framework is outlined, and the many different players in the agriculture industry are acknowledged. The Nigeria Smart Initiatives Policy Framework (NSIPF) was discussed, along with the ecosystem and core drivers of digital agriculture that it spawns in the form of strategic initiatives that propel the digital transformation of agriculture over the next ten (10) years. The Federal Ministry of Agriculture and Rural Development (FMARD) and the Ministry of Communications and Digital Economy will oversee the NSIPF's implementation within a governance framework designed around the NSIPF's own structure and with the National Information Technology Development Agency (NITDA) as its central pillar. All members of the ecosystem have their specific roles and responsibilities laid out for them. It would take the dedication of all parties involved in the implementation process to realize the desired results[88].

In order to ensure that the NDAS's strategic goals and objectives are met, a thorough monitoring and evaluation process has been developed, and policy recommendations on important issues have been made to help with the program's rollout. Between 2020 and 2030, NDAS aspires to see the Nigerian agricultural sector achieve the following goals by promoting the use and adoption of digital technologies and innovations.

2.1.3.1 Poverty and Poverty Alleviation

Poverty constitutes a grave challenge to human existence. In 2008, the share of human population living in extreme poverty in sub–Saharan African was 48%. Statistics on rural/urban poverty in Nigeria from 1980 onwards indicate that more and more people are now living below the poverty line and rural dwellers are much more affected than urban dwellers**.** This situation is vividly reflected in variables such as shortness of live span (51.9 years life expectancy at birth), lack of basic education (5.0 mean years of schooling) and reasonable nutrition[89].

What are the underlining causes of poverty in the rural communities in Nigeria. The major reason aside population explosion is disproportionate allocation of resources, discriminate attention of successive governments and consequent wide gap between the rural communities and urban centres. Rural farmers struggle to transport their products to larger markets in the urban areas because of poor road or non-existing roads. In addition, farmers in the rural areas lack access to credit facilities and hence continue to operate at primitive farming implements in the face of challenging environmental conditions and depletion of soil resources.

In order to fully have a comprehensive understanding of poverty, there is the need for a conceptual and etymological review of the root word of poverty. The concept of poverty does not have a universally agreed-upon definition because different people see it from different perspectives[90]. There are several definitions of poverty depending on the context of the situation it is placed in, and usually references a state or condition in which a person or community lacks the financial resources and essentials for a certain standard of living. Poverty is the same thing as hunger or the inability to provide shelter. Poverty is being sick and not being able to see doctor.

Etymologically speaking, the word poverty is said to have originated from the old French word *poverté* (modern French: *pauvreté*), from Latin *paupertas* from pauper which means poor. Basically, poverty is the failure of having possibilities as well as selections, an offense of human self-respect. It indicates absence of fundamental capability to get involved properly in culture. It suggests not having sufficient to outfit a household as well as feed, not having an institution or center to visit, not having the come down on which to expand one's food or a work to make one's living, not having accessibility to debt. It implies instability, powerlessness and also exemption of people, areas as well as families. It suggests vulnerability to physical violence, and also it usually suggests living in breakable or minimal settings, without accessibility to tidy water or sanitation[91].

From the global perspectives, poverty thrives in the following conditions: starvation, reduced revenue, failure to obtain fundamental products or solutions needed for survival, lack of wellbeing, no access to education or learning, inadequate accessibility to clean water, poor physical safety, and absence of voice and lack of capacity to better one's life. One of the world institutions defined poverty as the deprivation in well-being and

comprises many dimensions. It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity. Poverty also encompasses low levels of health and education, poor access to clean water and sanitation, inadequate physical security, lack of voice, and insufficient capacity and opportunity to better one's life[92].

Similarly, the World Bank conceive poverty as a living condition that have numerous elements, including a lack of access to basic requirements and a low income essential for human life. Poverty also entails deprivation of health and sanitation, an insufficient level of protection from the elements as well as a lack of chance to live a better life are all aspects of poverty that must be addressed Poor infrastructures, poor nutrition, poor health, low self-esteem and incapacity to express oneself are also viewed as contributing to poverty, as well as a lack of economic opportunity, poor social conditions, and a low income[93].

Defining absolute and relative poverty is possible. Relative poverty is defined as a situation in which a group of people is impoverished. Poverty is relative and subjective in this situation. As a result of this severe deprivation, absolute poverty is defined by significant deprivation of fundamental human necessities such as food and safe drinking water as well as sanitary facilities. Poverty is more understood because its victims are unable to meet their fundamental requirements. These requirements are lack of sufficient food and clean water, lack of proper shelter, and lack of water. Nigerians are malnourished, unclothed, uneducated, and in poor health. In a comparable interpretation, poverty is figured out by elements such as instructional degree, health and wellness, kid death, as well as various other group attributes. Poverty is as a result, the lack or

existence of those. Essentially, poverty is a problem in which an individual is incapable to offer himself as well as his family members due to financial, social, political, as well as emotional incapacitation.

The poverty situation in Nigeria is worrisome as over 70% of Nigerians are tagged as poor but what is much more disturbing is the fact that half of those classified as poor live in absolute poverty[32]. Similarly, The National Bureau of Statistics (NBS), in a report about poverty and inequality from September 2018 to October 2019, said 40 percent of people in the continent's most populous country lived below its poverty line of 137,430 naira ($381.75) a year. This represents 82.9 million people[94].

The statistics office said it did not include Borno, the state worst hit by the decade-long Boko Haram armed uprising, because many areas there were not safe to reach. Regardless of the nation is just one of the biggest globe oil manufacturers with a populace of over 180 million, two-thirds of which are poor, Nigeria is the 3rd nation with the greatest variety of bad individuals worldwide. The poverty problem in Nigeria is further compounded by poor and dilapidated infrastructures and mass illiteracy in addition to low access to formal financial services. It is not surprising; therefore, that Nigeria has paradoxically been among the 25 poorest countries of the world since 2006. Consequently, the need arises to embark on measures to address the problem[95].

The first of the seventeen goal aims to eradicate extreme poverty and reduce overall poverty rates by implementing social protection systems, promoting economic opportunities, and ensuring equal access to resources and services. SDG 1, also known as "No Poverty," is one of the 17 Sustainable Development Goals adopted by the United Nations. "No Poverty," aims to eradicate extreme poverty and reduce overall poverty

rates worldwide. By implementing comprehensive social protection systems, promoting inclusive economic growth, ensuring access to basic services, and addressing inequality, countries can make significant strides towards achieving this goal[95].

The primary objective of SDG 1 is to lift people out of extreme poverty, defined as living on less than $1.90 per day. This involves implementing social protection programs, promoting inclusive economic growth, and providing access to basic services such as healthcare, education, and clean water. The global Multidimensional Poverty Index (MPI) measures acute multidimensional deprivations in over 100 countries, covering 5.7 billion people in 2018, which represents over 90% of the population in lower- and middle-income countries and over three quarters of the world's population. Originally co-designed and launched in 2010 by the Oxford Poverty and Human Development Initiative (OPHI) at the University of Oxford and the United Nations Development Programme (UNDP) Human Development Report Office (HDRO), the global MPI was jointly revised by both institutions in 2018[96].

The global extreme poverty rate reached 9.3 percent, up from 8.4 percent in 2019, with the world's poorest people bearing the steepest costs of the pandemic. More than 736 million people, or one out of every ten people on the planet, currently live below this poverty threshold. However, poverty rates vary by country. For example, the 2021 poverty threshold in the United States is $26,246 for a family of four. Poverty entails more than the lack of income and productive resources to ensure sustainable livelihoods. Its manifestations include hunger and malnutrition, limited access to education and other basic services, social discrimination and exclusion, as well as the lack of participation in decision-making.

Poverty remains a significant challenge in Nigeria, with a considerable proportion of the population living in poverty. Despite efforts to address poverty through various policies and initiatives, the country continues to face significant socioeconomic disparities and high levels of deprivation.

According to recent estimates, Nigeria has one of the highest poverty rates in the world. The National Bureau of Statistics (NBS) reported that in 2020, approximately 40% of Nigerians were living below the national poverty line[36]. This translates to millions of individuals and households struggling to meet their basic needs, including access to adequate food, clean water, healthcare, education, and decent shelter. More importantly, poverty in Nigeria is multidimensional, encompassing various dimensions such as income, education, health, living standards, and social inclusion. Rural areas are particularly affected, with a higher prevalence of poverty compared to urban areas. Factors such as limited employment opportunities, inadequate infrastructure, low agricultural productivity, and insecurity contribute to the persistence of poverty in rural communities.

Income inequality worsens the poverty situation in Nigeria. A significant proportion of the country's wealth is concentrated in the hands of a few individuals, while many others face limited economic opportunities and income disparities. This inequality further widens the gap between the rich and the poor, making it challenging to reduce poverty effectively. Furthermore, Nigeria's rapid population growth adds to the complexity of addressing poverty. The high population growth rate outpaces economic development, making it difficult to achieve inclusive and sustainable growth that benefits all segments of society.

This is why the SGDs are so important to Nigeria. The UN advocates aggressive efforts targeted at eradicating extreme poverty and to reduce poverty rates in all forms. This includes addressing multidimensional poverty, which encompasses aspects such as lack of access to education, healthcare, adequate housing, and social protection. Efforts to alleviate poverty in Nigeria involve a combination of strategies, including social protection programs, job creation, improved access to quality education and healthcare, and targeted interventions to empower marginalized groups.

To achieve SDG 1, countries are encouraged to establish comprehensive social protection systems. These systems aim to provide support to vulnerable populations, including children, the elderly, persons with disabilities, and those facing temporary or chronic economic hardships. Social protection measures may include cash transfers, food assistance programs, healthcare coverage, and employment support. The government, in collaboration with development partners, is implementing various initiatives to tackle poverty, such as the National Social Investment Program (NSIP), which includes interventions like conditional cash transfers, school feeding programs, and microcredit schemes. Closely linked to poverty alleviation if the need to eliminate hunger through food security.

2.1.3.2 Concept of Food Security

Food security is a fundamental concept that encompasses the availability, access, utilization, and stability of food for individuals and communities. It is a multidimensional concept that goes beyond mere access to food and encompasses factors such as nutritional value, safety, and sustainability. Food security also refers to a state

where all individuals, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life[38]. It is a condition that ensures people can acquire food without compromising their dignity, and where the availability, access, and utilization of food are stable and sustainable. Food security encompasses factors such as food availability, access, utilization, and stability, and it is a fundamental aspect of promoting the well-being and prosperity of individuals and communities.

Food security begins with the availability of an adequate quantity and variety of food. It requires sufficient agricultural production, efficient distribution systems, and access to markets. Availability also includes factors such as crop yields, agricultural practices, climate resilience, and technological advancements that contribute to a stable and sustainable food supply.

Access to food refers to the ability of individuals and communities to obtain food in a dignified and affordable manner. It involves social, economic, and physical factors that influence a person's ability to acquire food. These factors include income levels, employment opportunities, market access, infrastructure, transportation, and social safety nets. Ensuring equitable access to food is essential for addressing food security challenges[39].

Food security extends beyond access to food; it also emphasizes the utilization of nutritious and safe food to meet dietary needs. Utilization involves practices such as proper food handling, storage, and preparation to maintain nutritional value and prevent foodborne illnesses. Additionally, it encompasses education and awareness programs that

promote healthy eating habits, nutrition knowledge, and the importance of a balanced diet.

Food security requires stability and resilience in the face of shocks and disruptions, such as natural disasters, conflicts, or economic downturns. Building resilience involves diversifying food production systems, developing early warning systems, establishing emergency preparedness measures, and implementing social protection programs. By enhancing stability and resilience, communities can mitigate the impacts of crises and maintain access to food[40].

Promoting food security necessitates sustainable food systems that consider environmental, economic, and social aspects. Sustainable practices involve responsible agricultural techniques, conservation of natural resources, reduced food waste, and support for local food production. By adopting sustainable approaches, food systems can meet present needs without compromising the ability of future generations to meet their own food needs.

Food security is a vital concept that encompasses the availability, access, utilization, and stability of food for individuals and communities. It goes beyond ensuring access to food and emphasizes the importance of nutrition, safety, and sustainability. By addressing the multiple dimensions of food security through agricultural development, equitable access, proper utilization, and resilient food systems, societies can ensure the well-being, health, and prosperity of their populations.

Food security is a critical issue in Nigeria, as the country faces challenges in ensuring that its population has access to sufficient, safe, and nutritious food. This discussion will

examine the current state of food security in Nigeria, the factors influencing it, and potential strategies for addressing the issue[40]. Despite being an agrarian nation, Nigeria experiences significant food security challenges. The country has a large population, rapid urbanization, and limited agricultural productivity. According to the Food and Agriculture Organization (FAO), Nigeria ranks among the countries with the highest number of undernourished people globally. Additionally, factors such as climate change, conflicts, and inefficient agricultural practices further contribute to food insecurity in certain regions[41].

Factors affecting food security in Nigeria include agricultural productivity, climate change, conflict and insecurity; poverty and inequality. Farm yield in Nigeria is notoriously low compare to other countries of the world. For instance, it was reported that Nigeria's average yield per hectare for soybeans is 1.1MT, Ethiopia's soybean average yield is 2.3MT, Kenya average is 1.6MT and South Africa's average is 2.1MT per hectare. Nigeria has the lowest yields per hectare globally. Similarly, Nigeria's maize yield per hectare is estimated to be around 1.5-2.5 tons, which is relatively low compared to some other countries. For example, the average maize yield in the United States is around 9 tons per hectare.

Nigeria is one of the largest rice producers in Africa, but its average rice yield is still relatively low compared to some major rice-producing countries. The average rice yield in Nigeria is around 2-3 tons per hectare, whereas countries like China, India, and Vietnam achieve much higher yields, ranging from 4 to 7 tons per hectare or more[42]. This same is true for wheat production. Wheat cultivation is not as common in Nigeria due to climatic limitations. The average wheat yield in Nigeria is relatively low, ranging from 1

to 2 tons per hectare. In contrast, countries like the United States, Canada, and Russia achieve significantly higher wheat yields, often surpassing 3 tons per hectare[43].

Low agricultural productivity, resulting from inadequate infrastructure, limited access to credit and technology, and inefficient farming methods, hampers food production in Nigeria. This leads to lower availability of food and increased vulnerability to food shortages. In addition to lack of infrastructures, Nigeria is prone to climate change impacts, including erratic rainfall patterns, desertification, and flooding. These factors affect agricultural production, livestock rearing, and fishing activities, leading to reduced food availability and stability[44,45].

Widespread poverty and income inequality in Nigeria limit people's purchasing power and access to food. Many Nigerians struggle to afford a nutritious and balanced diet, resulting in malnutrition and food insecurity. In addition, in regions affected by conflicts, such as the Northeast and parts of the Middle Belt, food security is severely compromised. Displacement of populations, destruction of farmlands, and disruption of food supply chains exacerbate the already dire situation.

In recognition of the importance of food security to poverty alleviation, experts have recommended various strategies to improve food security in Nigeria. Foremost of the strategies is agricultural investment. It is opined that increasing investment in agriculture is crucial for enhancing food security in Nigeria. This includes improving infrastructure, providing farmers with access to modern technology, credit facilities, and extension services. Additionally, promoting sustainable agricultural practices and diversifying crop production can improve yields and strengthen food availability. Another strategy suggested is climate change adaptation. Implementing climate-smart agricultural

practices, such as conservation agriculture and agroforestry, can help farmers adapt to the changing climate. Investing in irrigation systems, water management, and early warning systems can mitigate the impacts of climate change on food production.

Food security remains a significant challenge in Nigeria, requiring comprehensive efforts to address the complex factors contributing to the problem. By enhancing agricultural productivity, adapting to climate change, reducing poverty and inequality, and implementing social protection programs, Nigeria can improve its food security situation. Additionally, promoting market access, trade, and nutrition education can further contribute to achieving long-term food security and ensuring the well-being of its population. This is why SDG 2 which focuses on 'Zero Hunger" is so relevant to Nigeria.

This goal focuses on ending hunger, achieving food security, improving nutrition, and promoting sustainable agriculture. It involves increasing agricultural productivity, supporting small-scale farmers, and ensuring access to nutritious and affordable food for all.

SDG 2, or Zero Hunger, is one of the 17 Sustainable Development Goals established by the United Nations in 2015. The goal is to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture worldwide by 2030. However, the world is losing progress in the fight for Zero Hunger due to a combination of conflict, the climate crisis, and the ripple effects of COVID-19. According to the United Nations, in 2020, between 720 million and 811 million persons worldwide were suffering from hunger, roughly 161 million more than in 2019[46].

To achieve this goal, there are several solutions that can be implemented. Some of these solutions include embracing Climate Smart Agriculture, responding to the refugee crisis, advocating for gender equality, reducing food waste, investing in smallholder farmers, promoting sustainable food production systems, and investing in climate-smart agriculture. Additionally, it is important to increase the concentration of traditional multilateral and bilateral investments to the countries in which food insecurity is highest. There are also several indicators that can be used to monitor progress towards achieving Zero Hunger, such as the prevalence of undernourishment, the prevalence of moderate or severe food insecurity in the population, the prevalence of stunting and wasting in children under 5 years of age, and the proportion of population below the minimum level of dietary energy consumption.

2.1.4 Lagos State Example of MSMEs

It is noteworthy that Lagos state government, a leading state in the south west is leading the way for the rapid development of MSMEs in the region through a number of key intervention projects and policies.

Amid debilitating development realities that are associated with urbanization, Lagos state is home to about 3,224,324 small scale businesses, according to a recent statement from the Lagos ministry for commerce, industry, and cooperatives[97]. This data may have been underreported especially against the backdrop of the large informal economy that exists in the state. This is not unexpected, as a former federal capital, the state inherits massive infrastructure though with attendant burden of maintenance.

2.1.4.1 Lagos Demographic Structure

By demographic analysis, Lagos State is the smallest state in Nigeria yet, it has the highest urban population, which is 27.4 % of the national estimate. According to the 2006 National Census, Lagos State has a population of 9,013,534 in relation to the National count of 140,003,542. However, based on the UN-Habitat and international development agencies' estimates, Lagos State is said to have about 24.6 million inhabitants in 2015. Of this population, Metropolitan Lagos accounts for over 85% on an area that is 37% of the land area of the State, and the fact that Lagos population is growing 10 times faster than that of New York and Los Angeles, and more than the population of 32 African nations combined, the State population is expected to hit the 35 million marks in 2020.

2.1.4.2 Challenges of SME Development in Lagos State

Small and Medium Enterprises in Lagos state face a number of challenges. Some of them include infrastructure deficits, inconsistencies in government policies, security issues, multiple taxations, regulatory burdens, lack of entrepreneurship skill on the part of operators and insufficient funding

The highlighted challenges require a coordinated strategy to surmount through the provision of enabling operating environment by the state government. The root causes of these challenges are summarized under two broad headings as shown below:

Status as a Former Federal Capital

Moving the federal capital from Lagos left in its wake a huge infrastructural maintenance cost. In Lagos state, there exist a network of federal assets like roads, bridges and massive housing structures. The Eko Bridge, Third Mainland Bridge, long stretch of road

from Berger to Badagry, Tafawa Balewa Square and Federal secretariat, are among the relics of federal government presence in the state.

Unlike Nigeria, most central governments that moved their national capitals continued to nurture and assist the former capitals. The global norm is for sovereign states to provide special annual grants to their former capital cities to maintain their infrastructure[98].

Topography and Population Explosion of Lagos State

Development of infrastructure in Lagos is constrained by its peculiar topography. Two types of wetlands are prevalent in the Lagos area namely: the swamps and mangroves. According to expert analysis the mangrove wetlands decreased from 88.51km2 to 19.95km2 at -3.12km2 annually while swamps decreased from 344.75km2 to 165.37km2 at - 8.15km2 annually both between 1984 and 2006. However, cost of providing essential services like road, drainages are much higher than if done on a plain land. The result of analysis also further shows that mangroves which were widespread in seven council areas around these lagoons in 1984, have dwindled to only four councils in 2006. These decreases are attributable to urban development pressures[98].

2.1.4.3 Lagos SME Development Strategy

In an avowed determination to grow SMEs, the Lagos state government has evolved several initiatives aimed at empowering the residents. The various initiatives are conceived, coordinated and implemented by a collaborative input from agencies such as the Ministries of Women Affairs and Poverty Alleviation (WAPA), Wealth Creation and Employment, Education, Agriculture, Youth and Social Development, Commerce, Industry and Cooperatives, Office of Civic Engagement, Office of Sustainable

Development Goals (SDGs), Lagos State Employment Trust Fund (LSETF) among others.

Few years ago, about 48,000 households have been rescued from poverty through WAPA's various social intervention programmes under which women got cash transfers and acquired skills. About 1,050 rural women received intensive training in boosting outputs in agricultural production and giving `the beneficiaries equal access to markets. Largely, the government has prioritized intervention programmes that support women in achieving gender equality, self-reliance, skill balance, inclusion in social security systems and stable means of livelihood.

Other proactive interventions by the Ministry of Women Affairs and Poverty Alleviation include Recently, over 3200 women and men including widows, vulnerable women, graduates of skill acquisition centers and senior citizens were also empowered through the State Government mega empowerment programme[99].

The ministry also provides effective training programmes in vocations such as Welding Fabrication, Refrigerator/Air Conditioner Maintenance and Repair, vulcanizing/Wheel Balancing and Alignment, Catering and Hotel management, and others, were placed on a three-month mandatory Industrial Training program with Julius Berger Plc, Eko Hotels and Suites, Kots Catering, and Lagos Airport Hotel among others, in order to expose them to practical knowledge in relevant industries. In 2016, the Ministry's SACs graduated a total of 6,105 students. Over 6,000 students are now enrolled in a variety of training programs at various locations throughout the state.

The Ministry of Women Affairs and Poverty Alleviation has empowered 250 retiring officers who were trained on 4- weeks short term Skills Acquisition Programme, as part of efforts to enhance their retirement lifestyles. Lagos State Ministry of Women Affairs and Poverty Alleviation (WAPA) have trained wives of Police Community Relations and Police Officers' Wives Association on various skills. The women, who were drawn from the Maryland community the state, were trained for four weeks on skills such as event centre decoration, tie and dye, Gele tying and make-up application, Ankara craft and leather works[100].

Other skills include hairdressing and wig making, fabric stoning and embellishments, and throw pillow. It is aimed to curb unemployment and empower citizens towards self-reliance in a bid to achieve a viable economy. Similarly, in a bid to help businesses recover from the COVID-19 pandemic, a N5 Billion "Lagos Economic Acceleration Programme (LSETF-LEAP)" was unveiled. The LSETF-LEAP is a sector-specific intervention programme aimed at supporting MSMEs businesses, driving growth and enabling job creation opportunities across targeted sectors that have been severely affected by the pandemic[97].

The ministry of agriculture in the state has also fashioned out an array of programmes to encourage the growth of SMES through the following intervention mechanisms:

- Launching of Agro-Processing, Productivity Enhancement and Livelihood Improvement Support (APPEALS) Project in Agege - A total of 2,691 farmers and small and medium enterprises (SMEs) have been supported directly by the Lagos State government with physical inputs and equipment across poultry, rice

and aquaculture and about 3,516 stakeholders have also benefitted from the programme indirectly;

- Regular training programme- practical training programmes for youth, retirees, entrepreneurs, graduates, retired armed forces, school leavers are organized in the important areas of poultry, crops, Pig production, fish farming, cattle, sheep and goat, rabbit /glasscutters farming, environmental studies as it affects agriculture, farm management;

- Provide effective link to relevant agricultural agencies – the state government provides linkages to agencies like Agric Agencies BOA (bank of Agriculture) Laisa, ADA, Cooperatives, Lascoda, Agric Services Dept, Agric business, Vet Dept, fisheries Dept, APPEALS Project. Etc.

- Development of agricultural roadmap – the state government has projected that the total investments in the agricultural sector in the State would run to $10B in the next five years with the formal launch of its five-year Agricultural and Food Systems Roadmap, adding that most of the investments would be private sector-driven. Implementation of the Roadmap would also lead to wealth generation, value creation, food security, the industrialization of the agricultural sector and the entrenchment of inclusive socio-economic development of the State[15].

- Development of FADAMA Projects – the state government has implemented several stages of Fadama projects through the LSADA system (1992 and 1999) with significant impact on crop farmers whose yield increased within the period and with significant increase in income. The emphasis in the first NFDP was on

provision of wash bores to crop farmers through simple credit arrangement aimed at boosting aggregate crop output.

- Building and maintaining farm settlements across the state - The Lagos State Government has mapped out 17 farm settlements in three Local Government Areas of the state, to boost food security and tackle poverty.

The state government has reiterated the commitment of the State Government towards changing the face of the various agricultural estates and farm settlements in the State in order to boost production and encourage youth participation in agriculture. There are about 17 farm settlements across the states which are located at Ikorodu, Epe, Badagry, Ketu, Odongunyan, Ajara, Imota, Agbowa, Agboye. etc.

- Collaboration with World Bank – the state is considering partnering with the World Bank to implement various Agric-based projects in the state, and it is expected that the Agro-Processing, Productivity Enhancement and Livelihood Support Project (APPEALS) is one of such projects which would empower no fewer than 10,000 farmers within the next four years.

Other strategies embarked by the Lagos state government to stimulate the growth of SMEs in the state include:

- Development of Lagos State Employment Trust Fund (L.S.E.T.F) Loan Programme – this is aimed at creating affordable access funding for small businesses to grow, expand and create wealth and put people to work. The loan scheme which attracts only 9% interest rate per annum is available to business owners who are registered residents of Lagos state;

- Establishment of vocational training centers – skill acquisition centers are established across all the local government areas in the state;

- Improved Road Network – the state government opened the rural areas to improve accessibility through massive road construction across the state. This facilitates unfettered access to the rural communities for ease of transporting agricultural commodities to urban centers. Hitherto remote locations like Ayobo, Ipaja, Imota and several others, are now effectively connected to the urban center through good road networks;

- Improved Transportation System - Under the Bus Rapid Transit (BRT) system, Lagos transportation "became faster, safer, predictable, relatively cheaper and more comfortable," reported *Vanguard*. The BRT itself created jobs for 2,500 people. Most of Lagos' notoriously old and dangerous commercial buses, called *Molues*, were replaced by swanky new ones that use designated bus lanes. With support of private operators, the government procured about 1,300 taxicabs to run in the city.

- Enhanced security – the state government drastically reduced crime rate by providing logistic support to the law enforcement authorities like the police. It also installs CCTV cameras in most parts of the city, including establishing skill acquisition programmes for the jobless who could have constituted nuisance to the society.

2.1.5 Agro-based MSMEs and Government Intervention for Sustainable Agricultural Development in Nigeria

Government intervention in Nigeria's agricultural sector is instrumental in fostering sustainable development, particularly through initiatives aimed at supporting Agro-based Micro, Small, and Medium Enterprises (MSMEs). The government has implemented various measures to foster the sector development, including;

1. Increasing access to funding and agricultural inputs, including fertilisers and plant seedlings.
2. Implementing price support mechanisms through protectionist policies on tariffs and taxes and
3. Promoting business sector engagement through public-private partnerships and land leasing programmes.

Additionally, presidential initiatives aimed at increasing production of staple and cash crops, coupled with fiscal incentives such as import waivers and tax exemptions, further stimulate agricultural growth and empower Agro-based MSMEs to thrive.

These interventions not only enhance the productivity, competitiveness, and sustainability of Agro-based MSMEs but also contribute to overall economic development. By providing financial support, input subsidies, and export incentives, the government aims to empower smallholder farmers and commercial farm holders, promote mechanized agricultural practices, and stimulate export-oriented activities. This collaborative effort between government interventions and Agro-based MSMEs not only addresses barriers to growth but also fosters an enabling environment for entrepreneurship and innovation, ultimately driving increased productivity, job creation, and economic growth in Nigeria's agricultural sector[1].

Furthermore, government agencies such as NEXIM, CBN, Bank of Industry (BoI), and Bank of Agriculture (BoA) play pivotal roles in providing credit to agro-based MSMEs in Nigeria through various programs aimed at facilitating access to finance for agricultural activities. These interventions, particularly those orchestrated by the CBN, includes interventions such as;

i. The Agricultural Credit Guarantee Scheme Fund (ACGSF)
ii. The Commercial Agricultural Credit Scheme (CACS),
iii. The Agricultural Credit Support Scheme (ACSS), and
iv. The Anchor Borrowers' Programme.
v. Nigerian Incentive-Based Risk Sharing system for Agricultural Lending (NIRSAL)

Each of these programs offers different interest rates and repayment terms tailored to meet the diverse needs of farmers and promote the growth of the agricultural sector. Additionally, the Nigerian Incentive-Based Risk Sharing system for Agricultural Lending (NIRSAL) stands out as a dynamic initiative launched by the CBN, aimed at de-risking agricultural lending and fostering confidence among financial institutions to lend to the agricultural value chain through risk-sharing, insurance, technical assistance, and incentives mechanisms. These concerted efforts not only enhance access to finance for Agro-based MSMEs but also contribute to sustainable agricultural development and economic growth in Nigeria[1].

i. The Agricultural Credit Guarantee Scheme Fund (ACGSF)

The Agricultural Credit Guarantee Scheme Fund (ACGSF) was started in 1978 by the Nigerian government and the Central Bank. Its goal is to help banks give loans to farmers by promising to cover some of the losses if the farmers can't pay back the loans[135]. Despite government efforts to bridge the credit gap in agriculture, challenges persist, such as the reluctance of banks to provide credit due to perceived risks, collateral constraints, and high default rates among borrowers. The ACGSF has undergone various innovations, including the Trust Fund Model (TFM) and the Interest Drawback Programme (IDP), aimed at enhancing efficiency and achieving its objectives.

The IDP, introduced in 2003, incentivizes loan repayment by offering beneficiaries a post-payment interest rebate of 40%, ultimately encouraging agricultural production and fostering economic growth[136]. The Agricultural Credit Guarantee Scheme Fund (ACGSF) extends a substantial guarantee of up to 75.0% for loans issued by commercial banks to support approved agricultural activities. Over its operational period, the ACGSF has guaranteed a total of 1,020,299 loans valued at N98.860 billion, highlighting its pivotal role in facilitating access to credit for agricultural endeavours and fostering growth within the agricultural sector[137].

ii. The Commercial Agricultural Credit Scheme (CACS)

In Nigeria, recognizing the pivotal role of credit in fostering Micro, Small and Medium Enterprises (SMEs) and agricultural production, the Commercial Agricultural Credit Scheme (CACS) was introduced in 2009 to promote commercial agriculture. The scheme targets various agricultural commodities, including rice, cassava, cotton, oil palm, wheat, rubber, sugar cane, jatropha carcus, fruits, vegetables, livestock (dairy, poultry, and piggery), and fisheries. Credit

support under the CACS encompasses the entire value chain, spanning production, storage, processing, market access, and enterprise development[138]. The interest rate under the fund remained at 9.0 percent throughout its duration. Over the period from inception to May 2016, a total of N364.477 billion was disbursed to the economy for 452 projects[139]. The Commercial Agriculture Credit Scheme (CACS) aims to help small farmers become bigger and more profitable. It also aims to increase the production of different goods and reduce poverty all over Nigeria[140].

The scheme aims to:

i. Help the agricultural sector grow quickly by offering loans to big commercial farmers at a low interest rate.

ii. Improve food security by increasing food production and lowering prices, which helps keep food inflation low.

iii. Lower the cost of borrowing for farmers so they can make the most of the agricultural sector's potential.

iv. Boost production, create jobs, expand Nigeria's income sources, increase foreign exchange earnings, and provide materials for manufacturing and processing in a steady and lasting way[8].

iii. The Agricultural Credit Support Scheme (ACSS)

The Agricultural Credit Support Scheme (ACSS) is a program created by the government and the Central Bank of Nigeria to help farmers and businesses in agriculture. It aims to make farming easier and more profitable, reduce the cost of food, increase exports, and

bring in more money for the country. The program is managed by committees at both national and state levels. Farmers and businesses involved in agriculture can get loans through their banks or local farming groups. The loans have a low interest rate of 8.0 percent, and if they're paid back on time, farmers get a discount, making the interest even lower[141]. Specifically, the ACSS offers loans at a 14.0 percent interest rate. However, borrowers who repay their loans on time receive a refund of 6.0 percent of the interest they paid which makes their loan facility at 8 percent[142].

iv. The Anchor Borrowers' Programme

The Anchor Borrowers' Programme (ABP) aims to link smallholder farmers with big processors to increase agricultural output and boost processor capacity. It also aims to increase bank funding to agriculture, decrease food imports, improve agricultural firm operations, create new farmers and jobs, encourage cashless transactions, reduce poverty among smallholders, and help them shift from subsistence to commercial farming. Smallholder farmers producing specific crops form groups and apply for loans through banks. Loans come from a fund managed by the Central Bank of Nigeria, with a low interest rate. Farmers repay loans with their harvest, which they sell to processors. The programme is overseen by committees, either led by the private sector or by state governments, ensuring farmers receive training, support, and access to inputs. Collateral includes guarantees from farmers and agreements between parties[143]. The CBN allocated N40 billion from the N220 billion Micro, Small, and Medium Enterprises Development Fund (MSMEDF) to provide farmers with loans at a low interest rate, capped at 9 percent per year[144].

v. **Nigerian Incentive-Based Risk Sharing system for Agricultural Lending (NIRSAL)**

NIRSAL was launched in 2011 and later incorporated in 2013 by the CBN, with a budget of USD500 million, as a comprehensive public-private initiative. Its main goal is to manage, assess, and share risks associated with agricultural lending. NIRSAL aims to strengthen the agricultural value chain, making banks more confident to lend to the sector, by providing incentives and technical support. It operates through five pillars: a risk-sharing facility of USD300 million to mitigate banks' perceived high-risk loans, a USD30 million insurance facility to expand insurance products for agricultural lending, a USD60 million technical assistance facility to enhance sustainable lending practices, a USD10 million holistic bank rating mechanism to evaluate banks' agricultural lending effectiveness, and a USD100 million bank incentives mechanism to encourage long-term lending to agriculture through cash awards.

2.1.7 Overview of Economic Growth and Development

Economic growth and development are intertwined but distinct concepts. Economic growth refers to an increase in the production of goods and services, while economic development encompasses broader objectives such as poverty reduction, social progress, and improved living standards. Achieving sustainable economic development requires not only promoting economic growth but also addressing social, environmental, and governance aspects to ensure a better quality of life for all individuals within a society.

Economic growth and development are interconnected concepts that play a vital role in shaping the prosperity and well-being of nations. While they share similarities, they have distinct characteristics and objectives. Economic growth refers to an increase in the production of goods and services within an economy over a specific period. It is commonly measured by indicators such as Gross Domestic Product (GDP) and Gross National Product (GNP). Economic growth is typically associated with rising incomes, expanding job opportunities, and higher standards of living for individuals.

Factors that contribute to economic growth include increased investment in physical and human capital, technological advancements, improved infrastructure, favourable business environments, and efficient resource allocation. Governments often implement policies that promote economic growth, such as providing incentives for private sector investment, fostering innovation and entrepreneurship, and creating a conducive regulatory framework.

On the other hand, economic development encompasses a broader set of goals beyond mere economic growth. It encompasses social progress, improvement in living standards, reduction of poverty and inequality, and the overall well-being of individuals and communities. Economic development involves not only increasing the size of the economy but also enhancing the quality of life for all citizens. To achieve economic development, a comprehensive approach is required, addressing various dimensions such as education, healthcare, social welfare, infrastructure development, environmental sustainability, and good governance. It emphasizes the importance of inclusive growth, where the benefits of economic progress are shared equitably among all segments of society[101].

From 2015 to 2023, Nigeria experienced a mixed picture of economic growth and development. This period was marked by various challenges and opportunities that impacted the country's progress. Nigeria's economic growth during this period was volatile and influenced by several factors, including fluctuations in oil prices, security concerns, policy reforms, and global economic conditions. As a major oil exporter, Nigeria's economy is heavily dependent on oil revenues. The decline in global oil prices, which began in 2014 and persisted during this period, significantly affected the country's economic performance. The volatility in oil prices had adverse effects on government revenues, foreign exchange earnings, and overall economic stability.

In 2016, Nigeria entered into a recession due to a combination of low oil prices, production disruptions, and foreign exchange shortages. The recession led to a contraction in GDP, rising inflation, job losses, and reduced investment. In subsequent years, Nigeria made efforts to recover from the recession and promote economic growth. The implementation of various economic reforms, such as diversification efforts, infrastructure development initiatives, and improvements in the business environment, aimed to stimulate non-oil sectors and attract investment.

The COVID-19 pandemic, which emerged in 2020, posed additional challenges to Nigeria's economic growth. The country faced disruptions in trade, reduced oil demand, and the implementation of measures to curb the spread of the virus, which impacted economic activities. Poverty and inequality remained significant challenges in Nigeria. The government implemented social intervention programs, such as the National Social Investment Program (NSIP), which aimed to alleviate poverty, provide social safety nets, and promote financial inclusion[102].

Nigeria took steps towards promoting sustainable development during this period. Initiatives focused on environmental conservation, renewable energy, and climate change mitigation. However, more comprehensive efforts are needed to address environmental challenges and achieve sustainable development goals. While the country made efforts to stimulate economic growth, address poverty, improve infrastructure, and enhance human development, there are persistent challenges that need to be addressed to achieve sustained and inclusive economic growth and development in Nigeria.

While economic growth is a vital component of economic development, it does not guarantee equitable distribution of wealth or improvements in human well-being. Therefore, policymakers often focus on strategies that promote inclusive growth, such as investing in education and skills development, expanding access to healthcare, implementing social safety nets, and promoting sustainable practices that protect the environment.

Gross Domestic Product (GDP) growth is an important indicator of economic performance and measures the change in the total value of goods and services produced within a country over a specific period. In the case of Nigeria, GDP growth has experienced fluctuations and varied trends in recent years. Prior to 2015, Nigeria witnessed a period of relatively high GDP growth, driven primarily by its oil-dependent economy. The country experienced robust growth rates, with GDP expanding at an average annual rate of around 6% during this period. However, the growth was largely driven by the oil sector, while other sectors, such as agriculture and manufacturing, lagged behind[103].

From 2016 onwards, Nigeria faced significant economic challenges, including a decline in oil prices, production disruptions, and foreign exchange shortages. These factors contributed to a decline in GDP growth and led to a recession in 2016. During this time, the country experienced negative GDP growth rates, indicating a contraction in the economy. Following the recession, Nigeria embarked on a path of economic recovery and implemented various reforms to diversify its economy away from oil dependency. As a result, GDP growth rates gradually improved. However, the growth remained volatile, influenced by fluctuations in oil prices, security concerns, and global economic conditions.

The outbreak of the COVID-19 pandemic in 2020 posed additional challenges to Nigeria's economy. The country experienced disruptions in trade, reduced oil demand, and the implementation of measures to contain the virus, which had adverse effects on economic activities. Consequently, Nigeria witnessed a contraction in GDP growth in 2020. It is important to note that the specific GDP growth rates vary from year to year. However, Nigeria's GDP growth rates in recent years have been relatively modest compared to its population growth rate. This implies that the growth has not been inclusive enough to adequately address poverty and unemployment challenges.

2.1.6.1 Development Agenda for Western Nigeria (DAWN)

The DAWN Commission (Development Agenda for Western Nigeria) is a regional organization established to drive the sustainable development and economic integration of the six southwestern states of Nigeria: Lagos, Oyo, Ogun, Ondo, Osun, and Ekiti. It was created in 2013 by the governors of these states to address shared challenges and

foster collaboration in key areas such as agriculture, education, healthcare, infrastructure, and cultural heritage.

1. Regional Integration: DAWN promotes unity and collaboration among the Southwestern states to enhance socio-economic growth and development.

2. Policy Development: The commission develops strategic policies tailored to the region's unique needs and coordinates their implementation.

3. Capacity Building: It strengthens institutional capacity in various sectors to ensure effective governance and service delivery.

4. Economic Growth: DAWN focuses on initiatives that stimulate economic activity, reduce poverty, and create jobs, especially through sectors like agriculture and industry[104].

DAWN's programs encourage the integration of smallholder farmers and MSMEs into broader value chains through cluster farming models, access to machinery, and strategic crop cultivation. MSMEs are key players in these strategies as they bridge gaps between small-scale producers and larger markets. The commission has worked on policies to ease access to land, enhance security in farming zones, and improve rural infrastructure such as roads and storage facilities. These initiatives create an enabling environment for MSMEs involved in the agribusiness sector to thrive.

DAWN advocates for technology adoption and data-driven approaches to enhance productivity and traceability in agriculture. This aligns with the needs of MSMEs, helping them modernize operations and expand their market reach. Overall, DAWN's initiatives reflect a strong recognition of the critical role MSMEs play in agriculture. This connection is part of broader efforts across Africa to empower MSMEs as pivotal players

in food systems transformation, as emphasized by reports from AGRA and other organizations.

2.1.6.2 Role of United Nations Development Programme (UNDP) in Supporting MSMEs in Nigeria

The United Nations Development Programme (UNDP) has played a significant role in supporting agriculture-based Micro, Small, and Medium Enterprises (MSMEs) in Nigeria. Their efforts focus on fostering sustainable development, improving market access, and enhancing entrepreneurial capacity. Here's an analysis of their key initiatives:

1. Capacity Building and Funding: UNDP collaborates with state governments and local agencies to provide financial and technical assistance. For instance, in Edo State, UNDP facilitated a ₦300 million grant to support 3,000 MSMEs, enabling innovation, expansion, and job creation despite socio-economic challenges. Through its partnership with Nigeria's development institutions, UNDP enhances skills and knowledge for small-scale agribusiness owners to improve productivity and access markets.

2. Empowering Women Entrepreneurs: UNDP launched the HerAfCFTA Initiative, specifically targeting women-led MSMEs to increase their participation in the African Continental Free Trade Area (AfCFTA). This initiative includes capacity building, market research, trade facilitation, and digitalization support. Women entrepreneurs involved in agriculture benefit from improved logistics and resources to scale their businesses across borders.

3. Facilitating Trade and Market Access: UNDP supports agribusiness MSMEs by simplifying trade processes, providing access to quality standard certifications, and

creating networking opportunities. These interventions aim to integrate Nigerian businesses more effectively into regional and international markets.

4. Promoting Innovation and Sustainability: Through its broader development framework, UNDP emphasizes sustainable practices in agriculture and rural enterprise development. These include resource-efficient methods and integrating digital tools to enhance value chains and reduce waste.

The combined impact of these programs fosters economic resilience, promotes gender equality, and aligns with Nigeria's Sustainable Development Goals (SDGs). For more details, visit or read about their specific projects like HerAfCFTA[105].

2.1.6.3 How Nigerian Institute of Social and Economic Research (NISER) Promotes MSMEs in Nigeria

The Nigerian Institute of Social and Economic Research (NISER) has been involved in promoting and studying Micro, Small, and Medium Enterprises (MSMEs) in Nigeria, focusing on policy recommendations and analysis to foster growth and overcome challenges. Below is an expanded analysis of their involvement in key areas:

1. Research and Policy Recommendations

NISER conducts extensive research on the challenges and opportunities for MSMEs in Nigeria. Its studies aim to address critical barriers such as poor access to finance, inadequate infrastructure, and weak regulatory frameworks. For instance, they emphasize policy alignment to support MSME growth in the context of national economic goals, including employment creation and poverty reduction.

2. Capacity Building and Training: NISER collaborates with other government agencies like SMEDAN (Small and Medium Enterprises Development Agency of Nigeria) to develop training modules aimed at building the capacity of MSME owners. These programs include financial literacy, business management, and leveraging technology for operations.

3. Advocacy for Financial Inclusion: NISER's studies have highlighted the need for improved access to finance for MSMEs, which are often constrained by high-interest rates, lack of collateral, and complicated loan processes. Their recommendations have influenced the design of financial products and schemes such as the National Guarantee Scheme and microfinance programs.

4. Collaboration on National MSME Policies: NISER plays a role in shaping and reviewing national policies on MSMEs, such as the National Policy on MSMEs, which seeks to enhance innovation, competitiveness, and growth within the sector. This collaboration also involves monitoring and evaluation mechanisms to ensure effective policy implementation.

5. Addressing Structural Challenges: Through its research, NISER has pointed out systemic challenges like inadequate electricity, poor infrastructure, and insecurity that hinder MSME development. They advocate for strategic public investments and infrastructure improvements to create a conducive environment for businesses[106].

NISER assesses the impact of government interventions, such as the MSME Survival Fund and the Economic Sustainability Plan, offering insights into areas for improvement. These evaluations help fine-tune initiatives to better meet the needs of MSMEs.

In summary, NISER contributes significantly to shaping the MSME landscape in Nigeria through research, policy support, and advocacy for better structural and financial frameworks. However, challenges like corruption, lack of awareness, and inefficiencies in implementation remain areas for improvement.

2.2 Theoretical Framework

Human activities need to keep pace with a dynamic and changing world to support sustainable contributions to achieve economic growth and other envisioned objectives. Here, theories can be valuable tools as they help to articulate ideas, or a set of principles to fast track actualization of such objectives. There are underlying theories that help to explain the activities of Sustainable Development Goals (SDGs) as well as Micro, Small and Medium Enterprises (MSMEs).

A theory is a systematic and organized postulation about a social phenomenon which can result from testing of an observation or phenomenon. The study intends to use four theories to explain the variables in this research out of which one will be used.

2.2.1. System Theory

Systems theory is the interdisciplinary study or approach of systems. A system is a cohesive conglomeration of interrelated and interdependent parts which can be natural or human-made. In other words, a system is also an entity, which is a coherent whole such that a boundary is perceived around it in order to distinguish internal and external

elements and to identify input and output relating to and emerging from the entity. Every system is bounded by space and time, influenced by its environment, defined by its structure and purpose, and expressed through its functioning[107].

A systems theory is hence a theoretical perspective that analyses a phenomenon seen as a whole and not as simply the sum of elementary parts. The focus is on the interactions and relationships between parts in order to understand an entity's organization, functioning and outcomes. Simply put, it is based on the belief that individuals do not operate in isolation, but rather grow and develop in interaction with their physical and social environment. There are many proponents of the theory because of the multidisciplinary approach but some notable scholars of the theory. System theory is derived from general systems theory, which explores the parts of a system that interconnect and interact to make a complete whole[108].

System theory describes a phenomenon be it physical, biological or social. It is conceived as an organized structure which is functional and identifiable through interrelated parts or sub-systems. System theory is delineated by identifiable boundaries from the supra-system, that is, the environment which it embedded. Thus, a system is situated within a larger context and environment with which it engages that involves inputs and outputs process which can be schematically represented[109].

Any organization is constructed upon various systems and subsystems. Human body is built on different systems like skeleton, nervous, muscles, digestive, excretion and reproduction. These systems and subsystems are inter-connected and inter-dependent and more results could be achieved if their relationships and inter-connectivity are strengthened. People who work in a conducive organizational environment say within the

system and sub systems have a definite goal to achieve. Therefore, in this systematic organization, all managers are to tend to work cooperatively.

In system theory, however, organization is visualized as a system consisting of interacting parts. There are main ingredients in a system through which system analysis also could be performed. These ingredients are parts of a system, interactions, links and communication, processes, and the goals of the systems. Parts of a system are individuals, formal organization, informal organization, status and roles and the physical setting. Hence, individual is the most significant element of the system.

While system theory has its appeal, applying it to current policy of SDGs has its difficulties. First, it requires great sacrifice, effective change management and political will in terms of selling it to fellow stakeholders. It also requires global agreement, something that prove challenging, given the withdrawal the US from many climate policies[109]. This can be an affront on the sustainability of development goals.

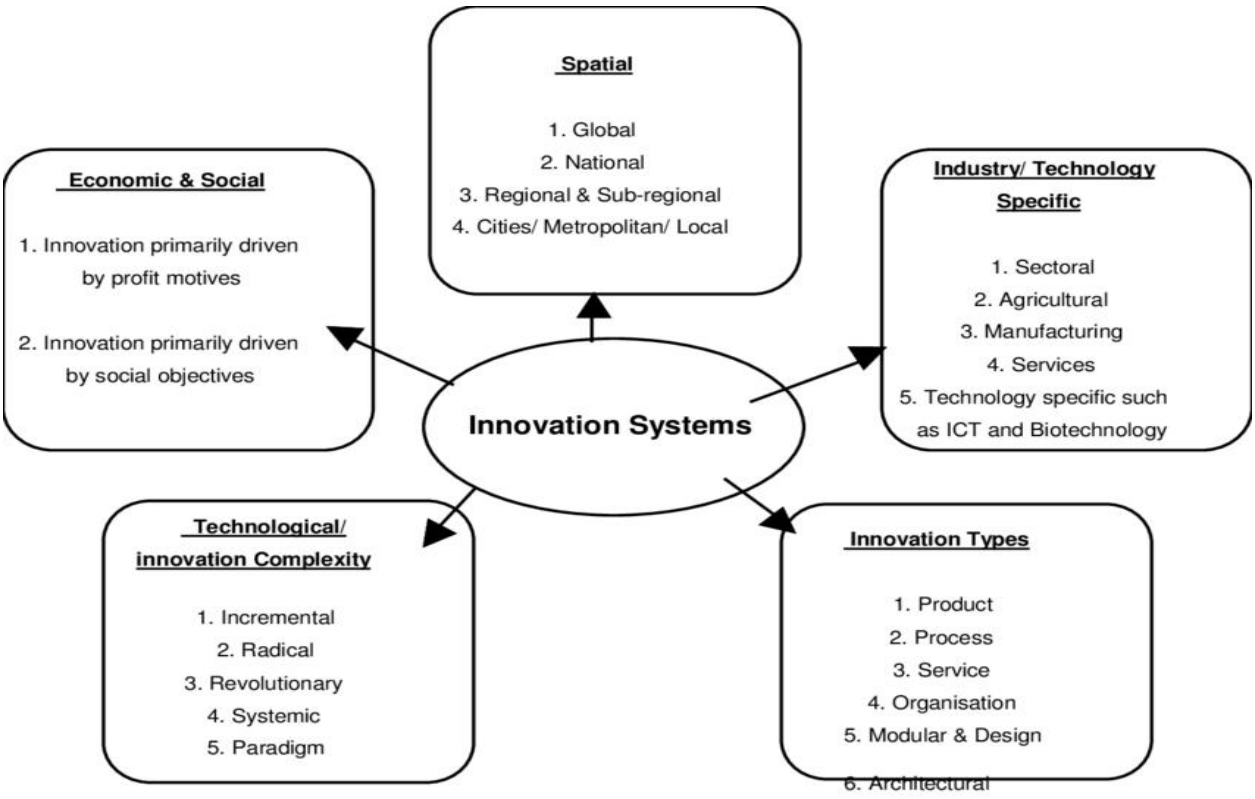

Figure 2.1: General Systems Theory (GST)

Source:[109]

The FAO arm of the United Nations asserted that Production systems and the policies and institutions that underpin global food security are increasingly inadequate. Sustainable agriculture must nurture healthy ecosystems and support the sustainable management of land, water and natural resources, while ensuring world food security. To be sustainable, agriculture must meet the needs of present and future generations for its products and services, while ensuring profitability, environmental health and social and economic equity. The global transition to sustainable food and agriculture will require major improvements in the efficiency of resource use, in environmental protection and in systems resilience. Sustainable agriculture requires a system of global governance that

promotes food security concerns in trade regimes and trade policies, and revisits agricultural policies to promote local and regional agricultural markets.

Situating the theory to the study, it is very clear that achieving the SDG come 2030 is largely reliant on the power of Agriculture to booster economic development and eradicate poverty as well as securing food security. It is therefore, imperative that all hands must be put on deck starting from global organization like United Nation, then to the Nations in particular, then cities and local areas. Since a system is a system by coordination.

It is therefore necessary to note that Sustainable development must be viewed as a process, rather than a fixed goal, if it is to help people adjust to the ever-increasing rate of change and the growing level of uncertainty they face. In turn, this calls for the creation of policy, governance, and funding structures to back agricultural producers and resource managers in a continuous cycle of innovation. In particular, we need policies and institutions that incentivize the adoption of sustainable practices, impose regulations and costs for actions that deplete or degrade natural resources, and improve access to the necessary knowledge and resources.

In order to be sustainable, agriculture practices must make extensive use of technology, research, and development, but also incorporate local knowledge to a much greater extent than in the past. The solution to this problem lies in the formation of brand-new and stronger alliances between technical and investment-oriented organizations;

Appropriate statistics, geospatial information and maps, qualitative information and knowledge are required for evidence-based planning and management of agricultural

sectors. Production systems and underlying natural and socioeconomic resources should be the primary focus of any analysis; issues involving stocks and utilization rates of natural resources often go beyond national boundaries. In order to protect natural resources and discourage collateral damage, international governance mechanisms and processes must encourage sustainable growth (and the equitable sharing of benefits) across all sectors of agriculture.

2.2.2 Theories of Agricultural Development

Agricultural production is an enabler for food security and economic development of a nation. Majority of rural dwellers rely on agriculture for their wellbeing and regrettably there is an upsurge in rural –urban migration in the face of ever-increasing world population. The consequence is a relative decline of rural farmers who are producing food. Agricultural development is a multi- sectoral business that support and promote positive change in the rural and urban areas. However, the main objectives of agricultural development are the improvement of social wellbeing of the people. That is why agriculture can be synonymous with rural development. Rural development cannot be achieved without a corresponding development in the rural agriculture because about 90% of the rural dwellers are engaged in agricultural businesses.

As Nigeria joins other developing economies to race against time to meet the sustainability development goals by 2030, the country needs to accelerate its economic growth through coordinated development strategies in vital sectors of the economy like education, energy agriculture and manufacturing. With the strategic importance of food

security, agriculture remains the sector that can enable the country to accelerate its development aspirations in the coming decades[110].

Requisite developments in the agricultural sector can also address gender issues. For instance, in some parts of the world, especially in south Asia and Sub-Saharan Africa, women are identifiable players in farm work, but because they have less access to vital resources like improved seeds, better techniques and technologies, and markets, yields on their plots are typically 20 to 40 percent lower than on plots farmed by men. This gap can be filled by helping households become more productive and reduce malnutrition within poor families. Economic growth is seen as a long-term rise in the capacity to supply increasingly diverse economic goods to its population. It also entails a sustainable rise in national output with a manifestation of economic growth[111]. The transformation potentials of agricultural production of the economy can be felt in the important areas of employment generation, food security and providing needed raw materials for the nation's manufacturing sector aside from being sustainable source of revenue for the government.

Some scholars posit that, a full developed economy, especially in agricultural sector, means an increase in the production of export crops with an improvement in the quantity and grades of such export crops. However, for a country to be industrialized, agricultural output will be said to have acquired growth if agriculture can supply enough materials to agro-allied industries and concluded that agricultural development can promote economic development of underdeveloped countries in four different ways:

a) By increasing the supply of food available for domestic consumption and release labour needed for industrial employment.

b) By enlarging the size of the domestic market for the manufacturing sector.

c) By increasing the supply of domestic saving and

d) By providing foreign exchange earned by the agricultural exports.

In effect, engendering a sustainable agricultural development implies activities like improving living conditions in rural areas, ensuring enough food for present and future generations and generating sufficient income for farmers. Supporting sustainable agricultural development also involves maintaining and sustaining productive capacity for the future without affronting the environment or destroying natural resources. Consequently, economic and environmental sustainability, adequate farmers' income, productive capacity for the future, improved food security and social sustainability are important elements of developing countries' agricultural development[112].

The central focus of agricultural development is people's wellbeing and it is often seen as a structured approach to improve the environment as well as the welfare of the people of the community[107]. Therefore, theories of agricultural development help to explain certain agricultural concepts as they relate to improvement and sustaining agricultural production. The major theories are:

2.2.2.1 The Frontier Model

This model is often called "resource exploitation model". The model holds the view that expansion in the areas of cultivated and grazed lands has been the main means of increasing agricultural production. This can be seen in the agricultural activities in North and South America, Australia even to Europe settlement during the 18th and 19th

centuries[108]. Although in slow pace in Asia and Africa, similar events also occurred. Population pressure resulting in the upsurge in land use in the existing villages was followed by pioneer settlement programs, the establishment of new villages, and the opening up of forest or Jungle land to cultivation with a series of changes from Neolithic.

The frontier model **is** based on the assumption that land is physically infinite and if not for transportation costs and problem of accessibility. In this model, transport cost and accessibility play a crucial role in determining the land rent and the agricultural frontier, and thereby land area under cultivation. Thus, land is assumed physically infinite. The reality is that there is, however, scarcity of good land that is land close to the cent (land with low distance cost). Where soil conditions were favourable, as in the great river basins and plains, the new villages gradually intensified their systems of cultivation, where soil resources were poor, as in many of the hill and upland areas, new areas were opened up to shifting cultivation or to nomadic grazing. Under conditions of rapid population growth, the limits to the frontier model were often quickly reached. Crop yields typically were low, measured in terms of output per unit of seed rather than in output per unit of crop area.

As regard to the above, where soil conditions were favourable, as in the great river basins and plains, the new villages gradually intensified their systems of cultivation. While where soil resources were poor, as in many of the hill and upland areas, new areas were opened up to shifting cultivation or to nomadic grazing. As a result of rapid population growth, the model did not last, the limits to the frontier model were quickly reached[108].

The 1960s saw the "closing of the frontier" in most areas of South East Asia, in Latin America and Africa, the opening up of new lands awaits the development of technologies

for all control of pests and diseases (such as the Tsetse fly in Africa) or for the relation and maintenance of productivity of problem soil.

In Africa especially Nigeria, the frontier model has obvious limitations. For instance, one of the major challenges hampering agricultural production in the South West Nigeria as well as other regions of the continent is problem associated with access to land for cultivation. Lands are owned by families and prospective farmer who need them often encounter difficulties in accessing them. Regrettably, the federal government has not developed or implemented any favourable agricultural policy that will facilitate unfettered access to land needed for agricultural production.

2.2.2.2 The Conservation Model

Advancements in crop and livestock husbandry associated with the English agricultural revolution and the concept of soil exhaustion suggested by the early German soil scientists provided the foundation on which the conservative model is built[113]. The model highlights the evolution of a sequence of increasingly complex land and labour-intensive cropping system, the production and use of organic manures and labour-intensive capital formation in the form of physical facilities to more effectively use land and water resources. This model was the only approaches to intensification of agricultural production that was available to most of the world's farmers.

The challenges associated with meeting food production quota occasioned by ballooning population renders this model ineffective as Agricultural development within the ambit of the conservation model, clearly was capable in many areas of the world of sustaining rate of growth in agricultural production around 1.0% per year over relatively long

periods of time. However, this rate is not compatible with modern rates of growth in the demand for agricultural output which typically fall between 3-5% in the developing countries[114].

2.2.2.3 The Diffusion Model

The diffusion model to agricultural development observes through empirical study the differences in land and labour productivity among farmers and regions and emphasizes effective dissemination of technical knowledge to bridge the productivity gap among farmers and among regions[115].

The diffusion of better husbandry practices was a major source of productivity growth even in pre-modern societies. Before the development of modern agricultural research systems' substantial effort was devoted to crop exploration and introduction. Even in nations with well-developed agricultural research systems a significant effort is still devoted to the testing and refinement of farmers' innovations and to testing and adaptation of exotic crop varieties and animal species.

Model was developed emphasizing the relationship between diffusion rates and the personality, characteristics and educational accomplishments of farm operators. Diffusion model provides the major intellectual foundation of much of the research and extension efforts in farm management and production economics since the emergence in the later of the 19th century of agriculture economics as a separate sub discipline linking the agricultural sciences and economics. The developments that led to the establishment of active programs of farm management research and extension occurred at a time when

experiment-station research was making only a modest contribution to agricultural productivity growth[116].

A further contribution to the effective diffusion of known technology was provided by the research of rural sociologists on the diffusion process. The limitations of the diffusion model as a foundation for the design of agricultural development policies became increasingly apparent as technical assistance and community development programs, based explicitly or implicitly on the diffusion model, failed to generate either rapid modernization of traditional farms or rapid growth in agricultural output[117].

2.2.2.4 The High Payoff Input Model

The inadequacy of policies based on the conservation, urban-industrial impact and diffusion model led to a new perspective in the 1960s. The key to transforming a traditional agricultural sector into a productive source of economic growth is an investment designed to make modern, high-pay off inputs available to farmers in poor countries. Peasants, in traditional agricultural systems were viewed as rational, efficient resource allocators. They remained poor because in most poor countries, there were only limited technical and economic opportunities to which they could respond. According to an author, the new high pay-off inputs were classified into three categories[118].

a) The capacity of public and private sector research institutions to produce new technical knowledge

b) The capacity of the industrial sector to develop, produce and market new technical inputs.

c) The capacity of farmers to acquire new knowledge and use new inputs effectives.

The enthusiasm with which the high pay off input model has been accepted and translated into economic doctrine has been due in part to the proliferation of studies reporting high rates of returns to public investment in agricultural research. It was also due to the success of efforts to develop new, high productivity grain varieties suitable for the tropic. New high-yielding wheat varieties were developed in Mexico, beginning in the 1950s, and new high-yielding rice varieties were developed in the Philippines in the 1960s. These varieties were highly responsive to industrial inputs such as fertilizer and other chemicals and to more effective soil and water management. However, the high returns associated with the adoption of the new varieties and the associated technical inputs and management practices have led to rapid diffusion of the new varieties among farmers in several countries in Asia, Africa and Latin America.

The model remains incomplete as a theory of agricultural development. However, education and research are public goods not traded through the market place. The mechanism by which resources is allocated among education, research and other alternative public and private sector economic activities are not fully incorporated into the model. More so, the model does not treat investment in research as the source of new high-pay off techniques. It does not explain how economic conditions induce the development and adaption of an efficient set of technologies for a particular society. Nor does it attempt to specify the process by which factor and product price relationships induce investment in research in a particular direction[119].

2.3. Review of Empirical Studies

Micro, small, and medium-sized enterprises (MSMEs) are recognized as a vital component in achieving sustainable development goals. In recognition of their global impact, the United Nations General Assembly has designated June 27 as International MSME Day, with the theme "Small Businesses, Big Impact." MSMEs can contribute to the achievement of these goals in several ways, including through employment, operational efficiency, corporate social responsibility (CSR) activities, and compliance with laws and regulations[120].

Researchers have divided the contributions of MSMEs in the attainment of those goals under four types of activity attributes namely: employment, operational efficiency, corporate social responsibility, and compliance with laws and regulations.

By hiring people at their businesses, MSMEs can directly contribute to the achievement of goals such as poverty alleviation (Goal 1), gender equality (Goal 5), decent work and economic growth (Goal 8), industry innovation and infrastructure (Goal 9), and reduced inequalities (Goal 10). In addition, MSMEs can contribute to the attainment of certain goals through their sector-specific operational efficiency, including zero hunger (Goal 2), affordable and clean energy (Goal 7), responsible consumption and production (Goal 12), and partnership for goals (Goal 17).

MSMEs can also contribute to sustainable development goals through their CSR activities, which can support goals such as good health and well-being (Goal 3), quality education (Goal 4), clean water and sanitation (Goal 6), and sustainable cities and communities (Goal 11). MSMEs can play crucial roles in achieving targets for some goals through ethical and lawful compliance with laws and regulations, and the responsible use of local resources. These contributions can support goals such as climate

action (Goal 13), life below water (Goal 14), life on land (Goal 15), and peace, justice, and strong institutions (Goal 16)[120].

For many years, oil has been the main driver of Nigeria's economy. However, some believe that agriculture has the potential to become a more sustainable foundation for the country's development, as it has the potential to increase the country's gross domestic product and even surpass oil as a source of revenue. This is especially true given Nigeria's vast arable land, which is suitable for the production of a wide variety of crops, including yams, maize, millet, sorghum, beans, potatoes, rice, onions, vegetables, and many others. In 1990, it was estimated that about 82 million hectares of Nigeria's total land area of 91 million hectares were arable, but only 42% of this cultivable land was farmed. Much of this land was farmed using the bush fallow system, in which land is left idle for a period of time to allow for natural regeneration of soil fertility. The Nigerian government promoted the use of inorganic fertilizers in the 1970s. Approximately 18 million hectares were classified as permanent pasture, but had the potential to support crops. Many of the 20 million hectares covered by forests and woodlands are believed to have agricultural potential[121].

According to a United Nations Development Programme report, the agricultural sector in Nigeria provides employment opportunities for about 70% of the population[122]. In recent years, the sector has been transformed by commercialization at the small, medium, and large-scale enterprise levels, largely due to the adoption of technology. While only 1% of Americans work in agriculture, the United States is the world's leading food exporter, according to the World Bank. This is in stark contrast to Nigeria, where farming accounts for nearly 73% of employment but the country still has to import food to meet domestic

demand. The International Food Policy Research Institutes (IFPRI) defines "food security" as "the condition in which all people always have ready access to sufficient, safe, and nutritious food that allows them to follow their diets of choice and promotes health[123]''.

The aforementioned definition of food security highlights five main features. Citizens' dietary needs are met when they have access to food that meets their preferences and meets their needs in terms of quantity and quality. The prevalence of hunger and undernourishment are indicators of a nation's food security. According to the World Food Programme's hunger map, Nigeria, along with other countries such as Mexico, Colombia, India, Thailand, etc., will have a hunger index of between 4 and 14.9 percent in 2020[124]. According to these numbers, Nigeria will not end hunger in the country by 2030. The prosperity of a nation can be traced directly to its citizens' ability to access nutritious food and maintain a healthy lifestyle. About 8.9 percent of the world's population, or 690 million people, will go hungry this year. The impact of the Covid-19 pandemic is expected to raise these numbers by 80–132 million, according to experts[125].

In a study on Agriculture 4.0: An Implementation Framework for Food Security Attainment in Nigeria's Post-Covid-19. Using data from six digital libraries, the Nigerian Bureau of Statistics, and other internet sources, the researchers conducted a Systematic Literature Review (SLR using PRISMA) on Nigeria's agriculture, food security, and agriculture 4.0[126]. From the study, according to the National Bureau of Statistics, the four main subsectors of Nigeria's agricultural sector are cropping production (87.6 percent), livestock production (8.1 percent), fish production (3.2 percent), and forestry (1.1 percent). More than 36% (over 28.9 million) of Nigerians are employed in agriculture,

the vast majority of whom are smallholder farmers. There are over a hundred million of these smallholder farmers in Nigeria, and they produce more than 90% of the country's food. Nigeria has a tractor density of about 0.27 hp/hectare, which is significantly lower than the FAO-recommended minimum of 1.5 hp/hectare. Crude oil contributed roughly 76.5 percent of total export in 2019, while agriculture accounted for less than 2 percent. In 2019, the Nigerian government plans to spend around 40 billion on agricultural R&D[127].

In 2020, agriculture was allocated roughly 1.8% of the total budget, or 183 billion. When looking at the total value of agricultural imports and exports from 2016–2019, we found that imports totalled around 803 billion, which is nearly four times higher than exports, which totalled around 335 trillion. Wheat, sugar, fish, and milk are Nigeria's top four agricultural imports, while sesame seeds, cashew nuts, cocoa beans, ginger, frozen shrimp, and cotton are the country's top five agricultural exports. Based on the average family's spending habits, food accounts for nearly 56.65 percent of all money spent (NBS)[128].

MSMEs help bring people out of poverty by creating jobs. 783 million people, or 11 percent of the world's population, were in severe poverty in 2013, according to a new worldwide estimate. The vast majority of the poor in emerging nations are either unemployed or underpaid. It has been shown that private sector job development has been a key factor in reducing poverty. During the past 30 years, the private enterprise has helped to reduce the percentage of people living in poverty from 52% to 22% in the developing world. Small and medium-sized businesses (MSMEs) play an important role in the private sector's effort to create jobs. MSMEs accounted for 90 percent of all new

jobs in developing economies, creating four out of every five new posts in the formal sector[129].

In a study titled, MSMES and employment generation in Nigeria that employed dataset for 473 enterprises across all sectors of the economy comprising 110 micro enterprises, 218 small scale enterprises, 116 medium scale enterprises and 29 large scale enterprises. The dataset was sourced from the 2014 World Bank Enterprise survey on Nigeria. The variables employed in this study as indicators of employment generation include gross job creation, net job destruction and net job creation for sampled firms. The non-parametric variance analysis that uses the locally-weighted scatterplot smoothing. The findings revealed that MSMEs performed better than large firms in term of employment generation, with small and medium size enterprises performing exceedingly[130].

To put it simply, the term "agribusiness" refers to the industry that deals with farming and the commercial aspects of farming. It entails producing, processing, and distributing an agricultural product to reach consumers. The agricultural sector contributes significantly to economies with fertile land because of the export potential of the items produced there.

The various facets of agricultural production are considered as a whole in the context of agribusiness. Modern farming practices, such as the use of global positioning systems for directing operations, have allowed farmers to successfully rear animals and produce fruits and vegetables. More and more sophisticated self-driving machinery is being produced by manufacturers. The optimum methods for cleaning and packaging cattle for transport are determined by processing factories. Although most sectors of the industry

don't deal directly with customers, they all care deeply about maintaining low costs through efficient operations[131].

In a study that used a bibliometric analysis of 110 scientific papers published between 2002 and 2022 to overview the publication trends and growth potential of sustainable agricultural development assessment studies. The findings showed that the collaboration between authors and institutions was not strong, the journals published were relatively scattered, the coverage of disciplines was wide, more papers were published in higher impact journals, and the authors of the sample articles were mostly from Asian and European countries, the co-citation analysis pointed out more influential authors and journals. The temporal evolution of the keywords identified that researchers focused more on the sustainable operation of agriculture and the methods to assess the degree of sustainability initially, as research progressed and more scientific methods were applied, recent agricultural sustainability research focused on environmental impacts and economic efficiency. This means that most of the authors in Africa countries of the world are yet to fully delve into the importance of agriculture to achieving sustainable development especially in the empirical studies[132].

Empirically, in a study on Agribusiness strategy and rural development: A case study of Ihunga Sub County, Ntungamo District, A sample of 395 respondents from 30,000 target population participated in the study by answering the questionnaire and took part in interviews. The key study findings were: lack of provision of food security strategy, poor policy articulation and lack of supply of agricultural inputs to farmers[133].

2.3.1 Agriculture-Based MSMEs and Poverty Eradication

Poverty refers to a condition where basic needs such as food, clothing and shelter are not met. It can be classified into absolute and relative poverty. Absolute poverty is the condition where people cannot afford resources to support minimum level of physical health, while relative poverty refers to the condition where people do not enjoy certain standard level of living recommended by Government. More than 60% of Nigerians live below the poverty line while 52.4% of urban dwellers live on a dollar per day. This could suggest that about 52% of urban dwellers live in absolute poverty, while about 61.8% live in relative poverty[134].

In a study on Agricultural Development's Influence on Rural Poverty Alleviation in the North Buton Regency, Indonesia—The Mediating Role of Farmer Performance. The study aimed to determine the influence of agricultural development on rural poverty alleviation. Data were obtained from farmers' groups in the North Buton Regency in 2019 using questionnaires and analysed using AMOS. The results showed that agricultural development improves farm business performance and influences rural poverty alleviation[135].

Farm business performance leads to rural poverty alleviation. The influence of agricultural development on rural poverty alleviation was magnified when supported by improved farm enterprise performance. Therefore, agricultural development is the flagship program for poverty alleviation of rural farmers in the North Buton Regency. The study found that constructing roads, dams, reservoirs, bridges, and piers and expanding agricultural land and the availability of fertilizers and medicines in rural areas increase agricultural production. This was indicated by the regression coefficients of 0.82, 0.81, 0.74, and 0.80[135].

The first positive effect was enhanced agricultural production facilities and infrastructure, enabling farmers to increase their farming land productivity. More so, the study shows that agricultural extension workers foster and train farmers and improve farm management. They contribute to improving farming skills and increasing agricultural production in the North Buton Regency, as shown by the positive regression coefficients of 0.74, 0.82, 0.76, and 0.79. The production also increases due to agricultural intensification and extensification programs supported by rural infrastructure development. This increases farmers' accessibility to capital and information resources, increasing production at reasonable prices at the farmer-level. The results showed that improving farming performance alleviates rural poverty. The variable indicator showed that farmers provide three meals daily for all members with a regression coefficient of 0.90. They buy cooking utensils, chairs, cupboards, and televisions with a regression coefficient of 0.90 and 0.91. Every year, farmers buy one new pair of clothes for all family members, indicating that the income is also increasing, as shown by the regression coefficient of 0.82. Furthermore, infrastructural development reduces transportation costs for agricultural production and increases farmers' accessibility to capital resources and production inputs. The development also facilitates the accessibility of extension workers, increasing production[135].

In another study on Aquaculture and poverty alleviation in Ben Tre Province, Vietnam. The researcher asserts that Aquaculture production is one of the fastest growing industries in the agricultural sector[136]. Global aquaculture production has increased at an alarming rate, 8.4% from 1980s to 2010, and at an annual growth rate of 6.3% in the 1990s. Of the 300 households that participated in the survey, 285 were considered

adequately completed for analyses. Of the 285 heads of households and spouses completing the survey, 51 (18%) were females and 234 were males. A total of 203 of the households indicated that their primary occupation was farming but only 144 were actually involved in farming and 144 were involved in fishing. The average age of farmer was 49 years, with the youngest 26 and the oldest 86. Heads of households had an average of 5.93 years of schooling. About 7.0% of the sample reported having no schooling, 51.7 had only received primary education, 29.7 had received some secondary education, 11.33 had some high school education and only 1.0% had attended college. Most farm households owned their homes and land. fishing would increase the living standard by 0.023, 0.045, 0.138 and 0.143, respectively. However, if the number of household members working outside the home were to increase by one unit the standard of living would fall by 0.104 units. If the household owned livestock, and an increase in the distance from the coastline by one unit, the standard of living was reduced by 0.175 and 0.0224 units, respectively. This shows that Aquaculture which is an aspect of Agriculture participation positively influenced the standard of living[137].

In another study on Urban Agriculture (UA) and Its Effects on Poverty Alleviation: A Case Study of Vegetable Farming in Ibadan Metropolis, Nigeria. Data were collected on socio-economics characteristics such as age, marital status, educational level, household size, income level and expenditure level. Data were analyzed using descriptive analysis, budgetary analysis, Foster, Greer, and Thorbecke (FGT) index; and Probit regression analysis. FGT index revealed that about 30% of the sampled vegetable farmers experience poverty. Only 3.4% experience extreme poverty, while 7.9% were moderately poor. Probit estimates further revealed that factors such as net income ($p<0.05$), cost of

labour ($p<0.05$), and household size ($p<0.01$) had significant effects poverty status of vegetable farmers in the study area. However, the study concluded that vegetable enterprise is profitable and could help to reduce poverty to a minimum level[138].

In a bid to Enhance Local Trade and Exports, the Nigerian government came up with initiatives knowing fully well that the place of MSMEs is inevitable even if agriculture is practiced to the maximum. We can summarize Nigeria's federal government's initiatives to enhance local agricultural trade and export capacity in the following five points[139].

Presidential Economic Diversification Initiative (PEDI) was launched in July 2017 by President M. Buhari's administration. PED aims to enhanced agricultural trade capacity through the facilitation of new investments, reducing regulatory bottlenecks, and enabling access to credit facilities. The Presidential Fertilizer Initiative (PFI): PFI was launched in December 2016 as a product of the partnership between Nigeria and Morocco[140]. Its implementation is a public-private partnership in Nigeria, led by the Nigerian Sovereign Investment Authority (NSIA) and the Fertilizer Producer and Suppliers Association of Nigeria (FEPSAN). The Presidential Initiative aims to 'disrupt' this import of blended Fertilizer status-quo by negotiating subsidized contracts directly to procure NPK Fertilizer's four constituent raw materials-locally-sourced Urea, locally-sourced Limestone Granules (LSG), Diammonium Phosphate (DAP) imported from Morocco, and Muriate of Potash (MOP) sourced from Europe-and blending these locally to produce NPK Fertilizer at a reduced cost.

Youth Farm Lab (YFL): This is an initiative of the Federal government of Nigeria (FMARD10) and Synergos11 to educate young Nigerians in the development of livestock and sustainable urban agriculture. YFL searches for Nigerians between the ages

of 18 and 35 who are excited about agriculture and believe in its profitability potential[141]. Anchor Borrowers Programme (ABP): ABP was launched on 17th November 2015. Its objective is to link anchor companies in processing and smallholder farmers with the required key agricultural products. According to the CBN govern Godwin Emefiele, over ₦55.526 billion has been disbursed to about 250,000 farmers who cultivated almost 300,000 hectares of farmland within the first two years of implementation, an estimated 890,000 direct and 2.6 million indirect jobs. The CBN facilitates interest-free credit facilities for farmers through this program[142].

The Food Security Council (FSC) was inaugurated on 26th March 2018, with President M. Buhari as chairman. Its objectives include the development of permanent responses to the conflicts between farmers and herdsmen; climate change and desertification and their effect on farmland; grazing areas and dams, rivers, and other bodies of water; oil spillage and its impact on Niger Delta Fishing Communities; piracy and banditry; agricultural research institutions and extension services; and smuggling issues. The Council will also be interested in regional and global policies and developments with food security consequences in Nigeria[143].

Agricultural Promotion Policy: Agricultural promotion policy aims to improve access to international trade. Its objectives include enhancing access to market information through the National Agricultural Information System and creating a specialized export market support team to enhance export capacity. Economic and Export Promotion Incentive: Through this program, the federal government placed trade barriers on selected goods to protect local producers and stimulate their growth. The banned products include rice, poultry, beef, egg, refined vegetable oil, fats, spaghetti, sugar, and sugarcane. The

government also restricted forex access to the above-banned products. Nigeria-Africa Trade and Investment Promotion Programme (NATIPP): NATIPP is a joint program of African Export-Import bank, Nigeria Export-Import Bank, and Nigeria Export-Import promotion council. NATIPP aims to facilitate the expansion of Nigeria's trade and agribusiness investment in Africa. All these and others, were the government endeavours to help improve agribusiness in Nigeria and create markets for MSMEs[144].

The initiatives of the African Union Commission (AUC) complement the SDGs and other national development efforts of member states, recognizing the importance of the agricultural sector in economic development and sustainable livelihoods on a continental and global scale. For instance, "a prosperous Africa based on inclusive growth and sustainable development" is the stated goal of the African Union Commission's (AUC) continental framework for ending hunger and propelling inclusive economic transformation and inclusive development. The modernization of the agriculture sector "for increased production, productivity, and value addition contributes to farmer and national prosperity and Africa's collective food security" is an important part of this goal. Further, the aspiration highlights the importance of ensuring climate-resilient economies and communities, as well as the protection of natural endowments, environments, and ecosystems. Because of this, it is clear that the agricultural sector must play a pivotal role in leading member countries' economies toward transformation and inclusive growth. The fight against poverty, unemployment, and malnutrition in Africa relies in large part on the success of initiatives to boost agricultural output[145].

People in countries where food is plentiful usually lead more positive lifestyles. Food security enhances people's quality of life, decreases social evils, and boosts health,

especially for the youngest and most vulnerable members of society. It helps promote a positive image of the local population abroad. It contributes to conditions favourable to effective leadership. Reduces agitation among young people, who are less likely to be peaceful when they're hungry. Hope for a better life for the next generation and an environment conducive to effective leadership are both fostered by sustainable agricultural growth[146].

Consumers are given more leeway in deciding what foods to put into their bodies. Increased cooperation, love, and understanding amongst people also contributes to a more peaceful and secure community by preventing the spread of disease and other problems. Sustainable agriculture improves leaders' morale, generates job openings, and paves the way for rural development, notably in the areas of social amenities and infrastructure construction in an agriculturally based setting. Trading with other countries can boost a country's economy by bringing in more money and raw resources for its manufacturers. It allows governments to boost output of products in which they enjoy a competitive edge. It's crucial to the survival of any nation, helps its citizens grow intellectually, and paves the path for a more just voting process under a democratic government. In the long run, it helps a country become less reliant on foreign goods imports and more capable of providing for its own needs[147].

In India, Agribusiness is known as Agripreneurship. A particular scholar in his book asserts that Agriculture and its allied sector is the largest economic sector in India and Indian economy depends heavily on the performance of this sector. Agripreneurship is considered as an employment in the strategy in the country especially for rural people. Agripreneur faces constraints in related to identification of scope, proper time

management and allocating budget etc. and proper project management skills are required to counter these constraints. A country's economic growth and prosperity depends on the performance of its enterprises. Women entrepreneurs are considered as the new engines for the development of economies in the developing countries. In developing countries, women entrepreneurs are faced with both internal and external constraints. Women face severe discrimination in all aspects of entrepreneurship as it is generally considered as a man's province[148].

Food safety and food security is a determinant of the well-being of the citizens of a country and how it translates to the development and transformation of the economy in a country specifically Nigeria was critically examined. Recent FAO figures indicate that over 60% of the world undernourished people live in Asia, and a quarter in Africa. Also, there are 22 countries, 16 of which are in Africa, in which the undernourishment prevalence rate is over 35%. Hunger, food insecurity (chronic or transitory), malnutrition involving micronutrient malnutrition (MNM) and protein energy malnutrition (PEM) are some of the issues arising from food insecurity[149].

In a study that examines the sustainability of food security and development among *Igbira* communities in Ado-Ekiti Local Government Areas, twenty (20) villages were identified through a googled map with two hundred and six (206) dwelling places. A pole centre was identified based on their population as well as pull factors. Purposive random sampling techniques were used to identify registration areas (wards) and their population which was a total of 31,609, therefore, a 0.5% sampling size was used to select two hundred and five (205) respondents in the areas. Research findings show that 64% of foods produced in these villages were taken to the urban area, and bought at low prices.

About 20% of it is wasted as a result of lack of good road and storage facilities. Also, 16% of the products are consumed by the farmers and their households[150].

2.4 Conceptual Model

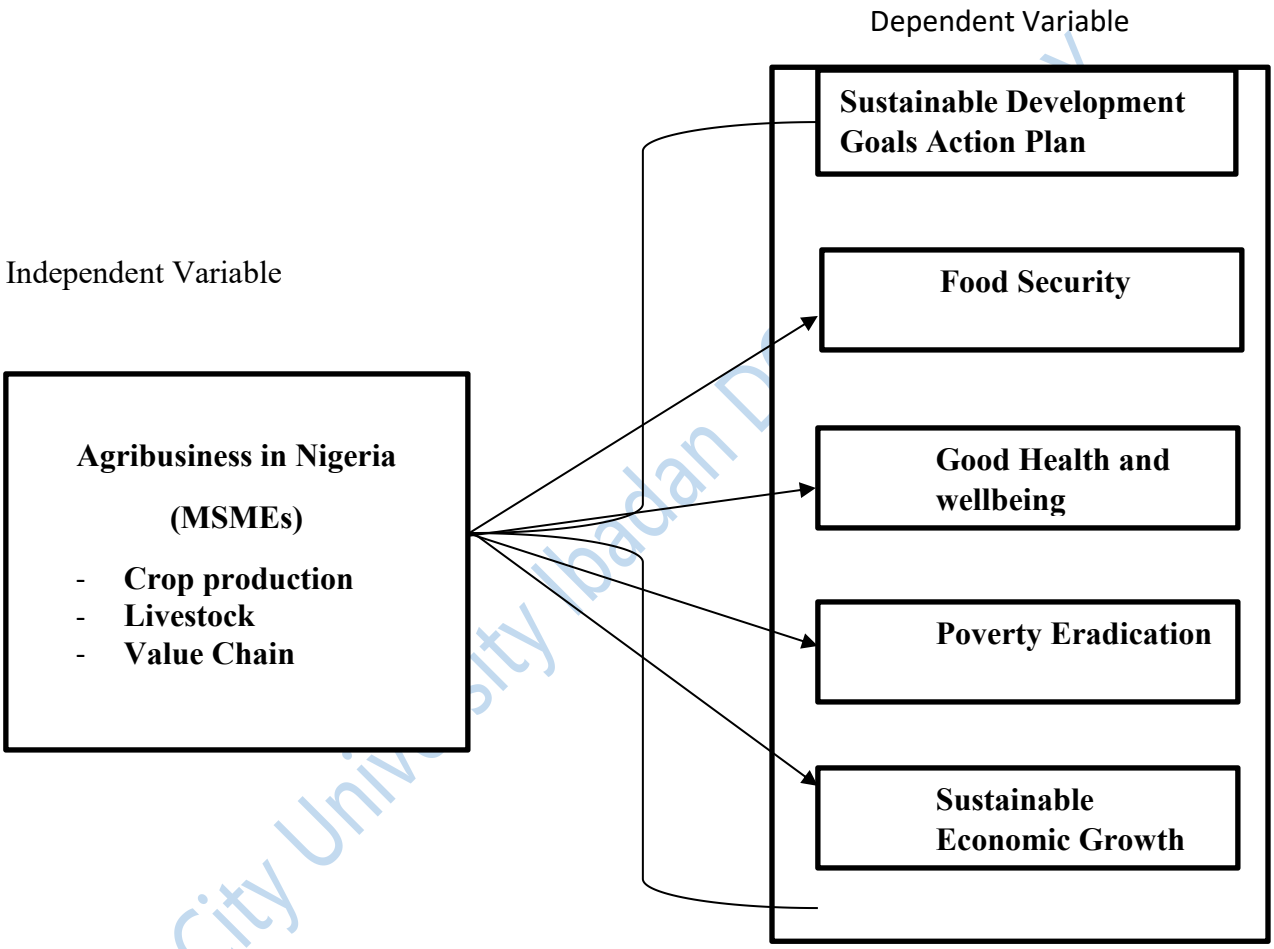

Figure 2.1 Conceptual Model of Agri-based MSMEs and SDGs

Source: Researcher's Compilation

2.5 Summary of Gap in Literature Reviewed

There is a lack of comprehensive studies specifically linking agriculture-based micro, small and medium enterprises with the achievement of individual Sustainable Development Goals. Most research focuses on general challenges and opportunities without explicitly addressing how these enterprises contribute to or hinder specific Sustainable Development Goals.

Insufficient research exists on the extent of technological adoption among agriculture-based MSMEs. Detailed studies on barriers to technology integration and the impacts of digital and agricultural technologies on productivity and sustainability are sparse. While access to finance is commonly cited as a challenge, detailed analyses of the financial landscape, including the effectiveness of microfinance and other financial products, are limited. The impact of recent financial inclusion initiatives on agriculture-based MSMEs is also underexplored.

There is limited analysis of the specific policies affecting agriculture-based MSMEs. Research often overlooks detailed evaluations of policy impacts, government initiatives, and the regulatory environment's role in facilitating or hindering MSME growth.

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Chapter Three

Methodology

This chapter delved into the decisions and processes involved in determining the methodology design for the study. It primarily drawn on the research problem and provides logical guides to the choice of methods. It explained why a mixed method approach was deemed suitable for the investigation. Moreover, the chapter outlined the steps taken to gather, examine, and present the data. Additionally, it provided a thorough explanation of the measures taken to ensure the validity and reliability of the research.

3.1 Research Design

This study employed a mixed method approach, it integrated both quantitative and qualitative research design. This approach allowed for a comprehensive understanding of the challenges and opportunities faced by agriculture-based MSMEs in Nigeria. Quantitative methods provided numerical data and statistical analysis, allowing for generalizations and identification of patterns. Qualitative methods offer depth, understanding of context, and insight into human experiences or perceptions[1]. Together, they provide a more comprehensive understanding of the research problem than either method alone.

3.2 Population of the Study

The population of the study is the total number of MSME operators in the agricultural subset of the South Western States of Nigeria. According to data from the Nigerian

Bureau of Statistics (NBS), there were over two million agriculture-based SMES in the South-West[2].

This number represents only those MSMES who have registered with the Nigerian Corporate Affairs Commission (CAC) or the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN). However, none of these agencies provided a comprehensive list of all Agriculture-based MSMEs in Nigeria.

3.3 Sample and Sampling Technique

The sample size for the research was 360 respondents comprising of 60 from each of the six Southwestern States of Nigeria. Multi-stage stratified random sampling technique was employed in selecting a target of 360 farmers drawn from the 6 states. Choose 20 farmers from each senatorial district from each state (3 senatorial districts from each state) to have a total potential respondent of 360 from the 6 states comprising of Lagos, Ogun, Oyo, Osun, Ondo and Ekiti States.

Table 3.1 Study Sample

SN	States	Sample
1.	Lagos	60
2.	Ogun	60
3.	Oyo	60
4.	Osun	60
5.	Ondo	60

6.	Ekiti	60
	Total	**360**

Source: Researcher's Compilation

3.4 Description of the Research Instrument

The research made use of a combination of research instruments. As the study relied on both primary and secondary data, the research made use of documentary analysis which involves critical examination of published works, government documents, internet sources and data from international organisations such as Food and Agriculture Organisation (FAO). The researcher also made use of an interview guide to interview key informants in order to achieve the study objectives.

For the quantitative aspect of the study, a structured questionnaire was used. The questionnaire collect data on the demographic information of the respondents, the perception of the agriculture SME landscape in Nigeria and the challenges facing agro-based entrepreneurs in south west Nigeria

3.5 Validity of the Research Instrument

Researchers develop a conceptual model that includes certain variables for the problems they identify in their study or for the topics they want to investigate. The validity of the research instrument was ensured by submitting the draft instruments to the supervisor and other expert who evaluated the instruments to ensure there are no bias and that all items in the questionnaire and interview guide are in line with the research objectives.

3.6 Reliability of the Research Instrument

In this study, ensuring reliability was crucial to maintain the accuracy and consistency of data across all research methods. Reliability, defined as the consistency and dependability of research findings, was carefully considered in both the quantitative and qualitative data collection phases.

For the quantitative survey, internal consistency was assessed using Cronbach's alpha, achieving a coefficient of 0.71, which indicates acceptable reliability of the questionnaire items. This measure ensured that the survey responses were consistent across similar items, contributing to the overall reliability of the findings.

In the qualitative component, inter-rater reliability was applied to assess consistency across different interviewers. This was achieved by training interviewers and employing standardized protocols to guide the interview process. By establishing these procedures, the study minimized potential variability in responses that could arise from differences in interviewer approaches.

3.7 Administration of Research Instrument

The study employed field methods and content analysis to gather comprehensive data. Primary data collection involved offline questionnaires and unstructured interviews with business owners in the South West region of Nigeria. The interviews focused specifically on exploring the challenges and opportunities that Micro, Small, and Medium Enterprises (MSMEs) face in achieving Sustainable Development Goals (SDGs) within this region.

3.8 Method of Data Collection

The method of data collection focused on gathering both quantitative and qualitative data from a range of sources to capture the diverse experiences of MSMEs within this context. Structured and semi-structured questionnaires, distributed in person and with the assistance of two trained research assistants, to reach agro-based MSMEs in urban and rural areas in Nigeria. The questionnaire was pilot tested among farmers in Ido, Ido Local Government Area of Oyo State. This was done with the assistance of trained personnel for this purpose. The pre-test helped to ascertain the accuracy of the instrument and the competence of the assistant researchers on the field.

Also, secondary data was gathered by analysing government reports, policy papers, financial reports of MSMEs, and studies conducted by development agencies, to examine trends in MSME performance and their alignment with the SDGs.

3.9 Method of Data Analysis

The data analysis method employed in this study reflects the nature of the research which is mixed-method research (primary and secondary method). For the secondary data collected in the study, documentary analysis was conducted to extract fact and extrapolate them in the context of the research questions. In the same vein, the primary data collected through interview was analysed using thematic analysis in which the researcher identify themes and patterns that aligns with the research objectives.

In addition to the documentary and thematic analysis, the research also used descriptive analysis to analyse the quantitative data obtained through the research questionnaire. Statistical analysis like pie-chart, histograms and percentiles were used to analyse the data obtained.

Endnotes

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Chapter Four

Results and Discussion of Findings

This chapter presents the results of the quantitative and qualitative data collected toward the achievement of the objectives of this research. The quantitative data was collected using a structured questionnaire administered to individuals and businesses engaged in commercial agricultural activities in Southwest Nigeria. The qualitative data was gathered through published articles, government documents, technical reports and other sources of relevant information. The chapter also include a discussion of findings which relates the findings of this study to existing research and identified the gaps filled by this study.

4.1 Demographic Distribution of the Respondents

Table 4.1: Demographic Distribution of the Respondents

Respondent Characteristics		Frequency	Percentage
Gender	Female	174	48.33
	Male	186	51.66
	Total	**360**	**100.0**
Farming Experience (Years)	1 - 5	168	46.67
	6 - 10	90	24.87
	11 - 15	36	10.13
	16 - 20	24	06.66
	21 - 25	18	05.00

	More than 25	24	06.67
	Total	**360**	**100.0**
Age (Years)	20 – 29	132	36.67
	30 – 39	96	26.66
	40 – 49	54	15.00
	50 – 59	36	10.00
	60 – 69	30	8.34
	70 – 79	12	3.33
	Total	**360**	**100.0**
Number of crops grown	1	66	18.33
	2	66	18.33
	3	96	26.67
	4	60	16.67
	5	42	11.67
	6	24	06.67
	9	6	01.67
	Total	**360**	**100.0**
Years of land cropping	1-5	246	68.00
	6-10	42	11.67
	11-15	30	08.33
	16-20	18	05.00
	>20	24	06.67
	Total	**360**	**100.0**
Main occupation	Farming	276	76.67
	Non-farming	84	23.33
	Total	**360**	**100.0**

Source: Researcher's Fieldwork, 2023

The demographic distribution of respondents in the study is presented in Table 4.1, offering insights into various characteristics shaping the study sample. Gender distribution reveals a relatively balanced representation, with 174 female respondents

comprising 48.33% and 186 males which represents 51.66% of the total respondents. Moving on to farming experience, the majority of respondents (46.67%) reported 1-5 years of experience, while a significant portion (24.87%) fell within the 6-10 years category. This information provides a nuanced understanding of the diverse levels of expertise within the sampled population.

The age distribution showcases a broad range of participants, with the highest frequency (36.67%) falling within the 20-29 age group. This is followed by the 30-39 age group at 26.66%. The distribution across different age brackets offers valuable context for interpreting the study's findings, considering potential variations in perspectives and practices across different age cohorts.

The number of crops grown by respondents exhibits a diverse range of agricultural practices. A notable proportion (26.67%) cultivates three crops, while others engage in varying numbers, such as 18.33% growing a single crop and 18.33% cultivating two crops. This diversity in cropping patterns is essential for understanding the agricultural landscape and the potential implications for the study's objectives.

The years of land cropping further illuminate the agricultural landscape, with a significant majority (68.00%) reporting 1-5 years of land cropping. The distribution across different time frames provides insights into the varying levels of experience and land-use patterns among respondents.

Focusing on the main occupation, the majority (76.67%) of respondents identify farming as their primary occupation, emphasizing the agricultural focus of the study. However, a

substantial proportion (23.33%) engages in non-farming occupations, showcasing the potential for diverse perspectives and experiences within the study population.

In conclusion, the demographic distribution outlined in Table 4.1 serves as a foundational understanding for the subsequent analysis, allowing for a nuanced interpretation of the study's findings within the context of the diverse characteristics and experiences of the respondents.

4.2 Presentation of Research Questions

Research Question One: What is the current landscape of agriculture-based MSMEs in South-West Nigeria, including their distribution, types, and scale of operations?

In Southwest Nigeria, agriculture-focused Micro, Small, and Medium Enterprises (MSMEs) operate across a range of landscapes and agricultural areas, capitalizing on the region's diverse climate and soil quality. Some key areas and landscapes in Southwest Nigeria associated with agriculture-based MSMEs include:

1. Oyo State: Known for large areas of fertile farmland, particularly around Ibadan, Oyo, and Iseyin, Oyo State hosts MSMEs involved in crop production (cassava, maize, and yam), animal husbandry, and agricultural processing. The region has seen growth in agri-business clusters and cooperatives, promoting sustainable practices.

2. Osun State: With fertile lands along river valleys, Osun State is active in cocoa farming, palm oil, and cashew production. MSMEs in the state support both raw production and the processing of these crops. The terrain in areas like Ilesa and Osogbo

supports farming, while MSMEs in Ife focus on agricultural technology and value-added services.

3. Ondo State: Known as one of Nigeria's major cocoa producers, Ondo State has MSMEs engaged in cocoa farming, processing, and export. The Akure and Owo regions are major hubs for these businesses. Besides cocoa, MSMEs also support rubber, oil palm, and timber production, using the state's forested landscapes.

4. Ekiti State: With highlands and fertile lowlands, Ekiti is suited to diverse crops such as yam, cassava, and rice, as well as livestock rearing. MSMEs in this state focus on crop cultivation, processing, and trade. The government also supports agri-entrepreneurship through various programs, especially around Ado Ekiti and Ikere.

5. Lagos State: Although primarily urban, Lagos State has agricultural MSMEs focusing on urban farming, fish farming, poultry, and value-added food processing. The Lagos State government supports agricultural initiatives, with zones for vegetable cultivation, particularly in peri-urban areas like Epe and Badagry.

These MSMEs benefit from various agro-industrial zones and government initiatives aimed at boosting productivity, sustainability, and market access.

USAID Empowering MSMEs in Nigeria

The agricultural MSME sector in Southwest Nigeria has grown considerably, driven by the government's focus on improving food security and economic resilience, alongside support from international organizations. Agriculture-based MSMEs in Nigeria contribute approximately 23.69% to the national GDP and involve around 35% of the labor force. This sector's activities are predominantly in agro-processing, crop cultivation,

livestock farming, and distribution of agricultural inputs. The push towards agriculture-based MSMEs has been essential due to high youth unemployment rates and a rising demand for local food production to reduce import dependency.

Digital technology and innovative farming practices are helping small-scale farmers access markets, credit, and training. Platforms like USAID-backed programs bring modern agricultural practices to millions of farmers. For example, over 311 MSMEs were supported to deliver agritech services to smallholder farmers, enhancing crop yields and productivity. However, MSMEs face significant challenges, including limited access to finance, poor infrastructure, and regulatory constraints that can impact their growth and efficiency. Additionally, high costs for electricity, inadequate roads, and limited market access are common barriers for small-scale enterprises in the sector.

Efforts from organizations like AGRA highlight the importance of private-sector support for agribusiness MSMEs. Recent investments emphasize agro-processing, access to modern farming technology, and the development of rural infrastructure to link producers with urban markets. Addressing these barriers and continuing investment could enhance the agricultural MSME landscape and improve food security and employment opportunities across the Southwest region.

The agricultural landscape for micro, small, and medium enterprises (MSMEs) in South-West Nigeria is vibrant but faces several challenges and opportunities influenced by both government and private sector interventions. Agriculture-based MSMEs in the region play a significant role in economic development, as agriculture remains a primary contributor to Nigeria's GDP and employs a substantial portion of the population. Recent government initiatives and partnerships, such as those with USAID's Feed the Future

program, have empowered hundreds of MSMEs to drive innovation and productivity in agriculture by enhancing access to extension services, markets, and financing.

Programs by USAID have supported over 311 MSMEs to offer advanced agricultural extension services to smallholder farmers, helping to introduce modern farming techniques and improve productivity. These efforts have especially targeted women and youth, creating job opportunities and fostering rural development. This collaboration has also strengthened agricultural value chains by equipping MSMEs to provide improved seeds, machinery, and advisory services, which increase farm yields and resilience among smallholders.

However, challenges persist, including limited access to capital, high inflation rates, and fluctuating foreign exchange rates, all of which affect MSME growth in Nigeria's agriculture sector. Efforts by the Nigerian government to stabilize inflation and support financial reforms aim to create a more predictable business environment, which is critical for MSMEs' planning and investment. Despite these hurdles, MSMEs in agriculture continue to see potential growth, driven by Nigeria's need for food security and rising demand for agricultural products.))

Agriculture-based MSMEs (Micro, Small, and Medium Enterprises) in South-West Nigeria are a crucial part of the region's economy, contributing significantly to job creation, poverty alleviation, and GDP. These enterprises span across various agricultural activities, including crop cultivation, livestock farming, fish farming, and agro-processing, and are generally classified by their operational scale and structure.

1. Distribution and Types: A substantial proportion of agricultural MSMEs in South-West Nigeria are concentrated around Lagos, Ogun, and Oyo states due to urban access, infrastructure, and markets. Enterprises range from micro-level subsistence farms to small and medium-scale operations that engage in commercial agriculture and value-added processing. Key sectors include food crop production, animal husbandry, and processing of agricultural products, such as cassava into garri, yams into flour, and oil palm into cooking oil.

2. Scale of Operations: Most agriculture-based MSMEs are micro-sized, often limited by access to capital and resources like land, equipment, and training. Larger enterprises in this category are typically more mechanized and engaged in higher levels of value addition, with some participating in export markets, particularly in Lagos and Ogun, where logistical facilities are more developed. However, the majority still operate with minimal technology and rely on labour-intensive processes, limiting their productivity.

3. Challenges: These enterprises face significant challenges, including limited financing, inadequate infrastructure, and outdated farming practices. Issues like high production costs due to recent subsidy removals and currency devaluation have increased operational expenses, squeezed profit margins and affected growth. Additionally, competition with imported food products poses a further challenge, although initiatives under the African Continental Free Trade Area (AfCFTA) aim to open up regional markets and enhance competitiveness.

To foster growth among agricultural MSMEs, government initiatives like the Anchor Borrowers' Program and policies for market access improvement are being implemented, supporting efforts to expand both domestic and regional trade. These measures aim to

improve resource accessibility and boost the value-added segment, which remains underdeveloped relative to production.

Research Question Two: What is the impact of agriculture-based MSMEs on local communities, focusing on income generation, job creation, and poverty alleviation in South-West Nigeria?

Agriculture-based MSMEs in South-West Nigeria have a transformative impact on local communities, particularly through income generation, job creation, and poverty alleviation.

Agriculture-based MSMEs provide a significant source of income for many individuals and households in South-West Nigeria. By creating a diverse array of revenue streams—from crop farming and animal husbandry to processing and distribution—these businesses allow locals to increase their household earnings. For example, MSMEs involved in cassava processing generate value-added products, which can be sold at a premium compared to raw produce. This not only raises income levels for MSME owners but also benefits those employed in the supply chain.

Additionally, the presence of agriculture-based MSMEs fosters local economic circulation, as income earned within the community is often spent locally, boosting small-scale retail and services. By enhancing local demand, these MSMEs further stimulate income generation across related sectors, such as transportation and retail.

Agriculture-based MSMEs are a major source of employment in South-West Nigeria, especially in rural areas where formal job opportunities are limited. These businesses employ a substantial percentage of the local labour force, both directly on farms or in processing units and indirectly in related services like logistics, marketing, and equipment maintenance. Given Nigeria's high unemployment rates, MSMEs play a critical role in reducing joblessness, particularly among youth and women, who often find work in these enterprises.

For instance, small-scale poultry farms, vegetable production units, and cassava processing plants employ both skilled and unskilled labor, creating jobs that are accessible to a wide demographic. This employment not only offers financial independence to many community members but also allows for skill acquisition, which further enhances employment opportunities in the long term.

3. Poverty Alleviation

By providing reliable income and employment, agriculture-based MSMEs contribute directly to poverty alleviation in South-West Nigeria. The income generated helps families afford essential goods and services, including food, education, and healthcare, thereby improving their quality of life. MSMEs also empower local farmers and producers to reduce dependency on low-profit subsistence farming, enabling them to invest in their businesses and increase productivity.

Moreover, many MSMEs support local sourcing of raw materials, which strengthens supply chains within the community. This approach helps retain economic benefits within the region, rather than outsourcing income-generating activities. Over time, these

enterprises contribute to upward mobility for families and reduce rural poverty through sustainable economic development.

Broader Community Benefits

Beyond immediate economic impact, MSMEs contribute to community resilience and development. Through job creation, they help to reduce urban migration, retaining young talent in rural areas. Many MSMEs also engage in community-based training initiatives, which enhance local skills and prepare future generations for entrepreneurial ventures in agriculture.

In summary, agriculture-based MSMEs in South-West Nigeria are essential engines of economic development in local communities, promoting income generation, job creation, and poverty reduction. They enable locals to build sustainable livelihoods, foster economic inclusion, and play a crucial role in the broader goal of regional economic growth and stability.

Research Question Three: What are the existing government policies and interventions aimed at supporting agriculture-based MSMEs

Government at various levels have consistently shown interest in supporting agri-business in Nigeria, especially as it relates to agriculture-based Micro, Small, and Medium Enterprises (MSMEs). This is mainly due to the perception of agriculture and agribusiness as potent solution to the socio-economic challenges facing the country. Consequently, federal, state, and even local governments in Nigerian have implemented various policies and interventions to support agriculture-based MSMEs. Some of these interventions are outlined here;

Anchor Borrowers' Programme (ABP): this programme was launched by the Central Bank of Nigeria (CBN) to provide farm inputs in kind and cash to smallholder farmers to boost agricultural production, stabilize inputs supply to ago-processors, and address the country's negative balance of payments on food. The targeted beneficiaries are smallholder farmers and medium to large scale farmers engaged in the production of agricultural commodities across the country. The smallholder farmers are expected to be in groups, cooperative(s), associations or under out-grower arrangement. According to reports, close to five million agriculture-based MSMEs have benefited from the programme.

Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL): This is an initiative of the Central Bank of Nigeria (CBN). The aim is to facilitate improved access to funding for Agriculture- based MSMEs. The initiative was borne out of government recognition of the challenges faced by small scale farmers to access financing and the reluctance of financial institutions to grant loans to businesses with high risk of defaulting. Government therefore took the step to minimise this risk to encourage increased lending by financial institutions to the agricultural sector. It provided risk management and insurance services to protect farmers and lenders.

Agricultural Credit Guarantee Scheme Fund (ACGSF): This scheme guarantees credit facilities extended to farmers by banks up to 75% of the amount in default, net of any security realized. The scheme is similar to NIRSAL in that it focused on how to secure the much funding for entrepreneurs in the agricultural sector. It is however, more expanded as it allowed entrepreneurs to source funds from any banks in Nigeria

National Agricultural Land Development Authority (NALDA): the National Agricultural Land Development Authority (NALDA) has been in existence for decades but its operations had dwindled. It was revitalized on return to democratic rule in 1999 to boost land development for agriculture. It focused on empowering rural farmers, youth, and MSMEs by providing them with land and agricultural inputs.

Presidential Fertilizer Initiative (PFI): this initiative is aimed at delivering fertilizers to farmers at affordable prices. The initiative involved the blending of fertilizers locally and ensuring their timely distribution. The need for this initiative arose due to low crop yields and difficulties faced by farmers in obtaining critical farm inputs such as fertilizer. The initiative has kept the price of fertilizer affordable for small scale farmers and boost trade for entrepreneur in the agricultural input sector. This is because as prices of fertilizer became affordable so did the patronage from farmers increased.

State Government Policies and Interventions

In addition to federal programs, each state in the South-West region (Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti) has also come up with various programmes, projects and policies to support agriculture-based MSMEs. Some of these initiatives are discussed in the next section.

Lagos State

The Lagos state government has the Lagos State Agricultural Youth Empowerment Scheme (Agric-YES). The programme focuses on training and empowering young people in modern agricultural practices and encouraging them to participate in the agriculture value chain.

In addition to this, Lagos State is also involved in boosting rice production and ensuring food security. The state once partnered with Kebbi State to introduce the Lake (Lagos and Kebbi) Rice. The scheme involved Kebbi state farmers planting rice while Lagos state bags and distribute it. In addition to this, Lagos state has established a large Rice Mill at Imota, a significant investment to boost rice production and processing capacity.

Ogun State

Ogun State Anchor Borrowers' Programme: Supports farmers by providing them with inputs and linking them with off-takers.

Ogun State Agricultural and Multipurpose Credit Agency (OSAMCA): Provides low-interest loans to farmers and agro-entrepreneurs.

Oyo State

Oyo State Agribusiness Development Agency (OYSADA): Promotes agribusiness through capacity building, technical support, and facilitating access to finance and markets.

Oyo State FADAMA III AF Project: Supports smallholder farmers with grants, training, and infrastructure development.

Osun State

Osun State Agricultural Land and Water Development Project: Focuses on developing agricultural land and water resources to support farming activities.

Osun Rural Enterprise and Agricultural Programme (O-REAP): Aims to improve rural enterprise development through agriculture.

Ondo State

Ondo State Agricultural Empowerment Programme: Provides training, inputs, and financial support to farmers and agro-entrepreneurs.

Cassava Revolution Programme: Focuses on enhancing cassava production and processing.

Ekiti State

Ekiti State Youth in Commercial Agriculture Development (YCAD): Encourages youth participation in agriculture by providing land, inputs, and technical support.

Ekiti State FADAMA Project: Supports farmers with infrastructure, inputs, and capacity-building activities.

These programmes and projects by federal and state government in Nigeria points to high interest from the public sector in the development agriculture as both business and social services to ensure food security, generate employment, and earn income for both the citizens and government of Nigeria. Majority of the initiative were certainly focused on boosting commercial activities in the agricultural sector by ensuring available of fund, skills and farm inputs.

Research Question Four: How effective are existing government policies and interventions aimed at supporting agriculture-based MSMEs in promoting sustainable development in South-West Nigeria?

This research question aims to understand how various government interventions and initiatives have empowered Agriculture-based MSMEs to promote sustainable development by reducing unemployment, food insecurity, and general economic growth. In order to obtain an objective result, the researcher relied on secondary data from various sources such as the Federal Government of Nigeria, multilateral agencies, corporate organisations and financial institutions

Role of Government Initiative in Reducing Food Insecurity in Nigeria

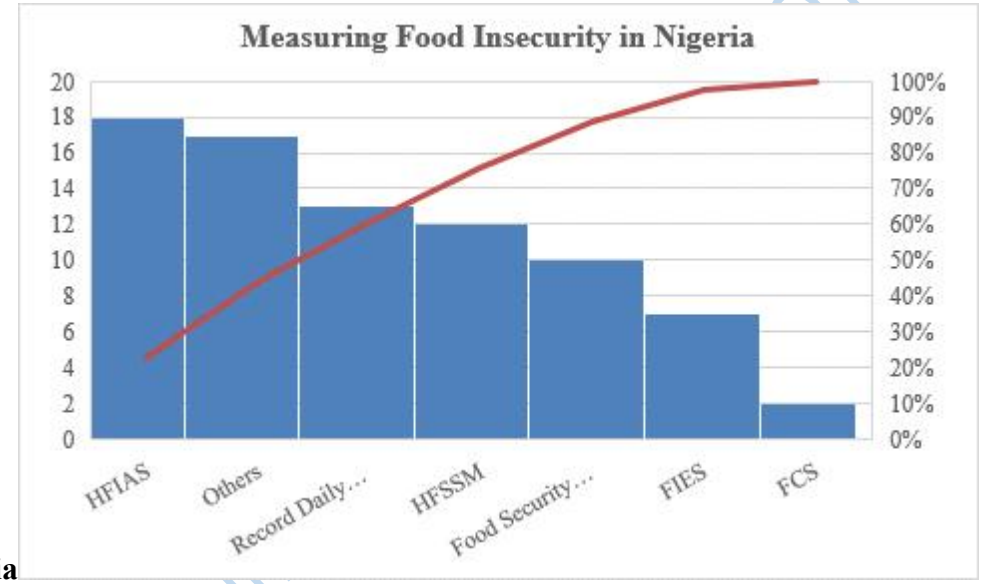

Figure 4.6 Measurement Criteria for Food Security in Nigeria

Available literature has shown that, despite various efforts of government, there is still a significant level of food insecurity in Nigeria. There are numerous tools and techniques for measuring food security across the world. These criteria include The Household Food Insecurity Access Scale (HFIAS) developed by the Food and Nutrition Technical Assistance Project (FANTA), Household Food Security Survey Module (HFSSM) by The United States Department of Agriculture (USDA), The Food Insecurity Experience

Scale (FIES), developed by the FAO, The Food Consumption Score (FCS) created by the World Food Programme (WFP) and several others[5]. Each of these scales is made up of series of questions designed to measure availability, access, utilisation and stability of food sources in each society.

Review of literature has shown that the most adopted of measuring food security/insecurity is the Household Food Insecurity Access Scale (HFIAS). The food security/insecurity prevalence measured through the HFIAS module ranged from 36.9%, reported from a study that investigated the dynamics of FI using secondary data collected in 2010/2011 and 2015/2016 among households in rural Nigeria, to 98.8%, reported in research of household FI and feeding patterns of preschool children in north–central Nigeria. Several studies that have used the HFIAS have reported high level of food insecurity in Nigeria. Majority of the studies have reported food insecurity levels of above 90 percent, especial in the rural areas which is expected to be the source of agricultural produce.

Apart from the HFIAS, Nigerian researchers also made use of Household Food Security Survey Module (HFSSM). It is common for researchers to adopt the either the 10-item or 16-item form of the HFFSM while other studies used the conventional full 18-item module. The use of the minimum recommended daily calorie required per adult equivalent is another common method for measuring FI in Nigeria in recent times. Other researchers utilized the same minimum value of 2100 Kcal for their studies in the southwestern and north–central states of Nigeria. Scholars also utilized 2260 Kcal from Kwara and Oyo states, respectively.

Other studies used different daily calorie requirements. Some studies used 2250 Kcal, while others used 2500 Kcal; 2550 Kcal; 2470 Kcal; and the highest value of 2710 Kcal. Furthermore, an approach through the per capita food expenditure of households was used in other studies. Apart from this method, a scholar added other methods, such as dietary diversity score (DDS) and Foster– Greer–Thorbecke (FGT), while another only added DDS to their study using nationally representative data from the National Bureau of Statistics (NBS).

Based on the household survey of expenditures conducted from September 2018 to October 2019, it has been determined that the cost of meeting the daily caloric requirement of 2251 calories (adjusted for age and weight to ensure food security) is approximately 82,000 naira per person per year. According to this report, over 40% of the Nigerian population is classified as food insecure. Mekonnen et al. 2021 present comparable findings utilising the identical data survey, contending that approximately 28 percent of the populace experienced food insecurity as determined by the expense of a meal incorporating local food choices that meets food-based dietary standards.

Nigeria has experienced an increase in severe food insecurity since the most recent household survey conducted in 2019, due to the negative effects of the COVID-19 epidemic and the significant spike in food inflation in 2022. Food inflation in Nigeria surged to 23 percent in September 2022. In contrast to wealthier households that have the means to purchase a variety of foods, individuals with lower incomes have limited alternatives when it comes to basic food items, which constitute approximately two-thirds of their daily dietary intake.

According to the World Food Programme (WFP) data from November 2022, 34 percent of the population in 26 states of Nigeria and the Federal Capital Territory (FCT) are experiencing challenged food security circumstances, with minimum adequate food intake at levels 2 and higher. Over the course of the past year, the number of persons experiencing severe food insecurity has increased by 5.4 million, reaching a total of 17 million individuals. This represents about 9 percent of the population.

Nigeria's food security is inferior to that of other countries in Africa, and its situation has worsened since 2019. Examination of a group of 14 nations based on factors such as income, geographical location, and other commonalities further buttressed this point. Researchers utilised two widely used metrics to analyse Nigeria's food security in comparison to these countries. An analysis of the European Intelligence Unit (EIU) and the International Food Policy Research Institute (IFPRI) indices for Nigeria and similar countries shows a strong positive relationship between the two indicators of food insecurity (Figure 4.6). This diagram demonstrates that Nigeria is positioned close to the top in terms of both measures of food insecurity compared to the other countries being analysed. Although there has been some progress in reducing world hunger in absolute terms, there has been minimal improvement on the EIU food insecurity scale.

Before the onset of Covid-19 pandemic, Nigeria's ranking among 113 countries was 97th, placing it below only Angola, Burundi, Ethiopia, and Sierra Leone among Sub-Saharan African countries. China is the top-performing country in the comparator sample, with a ranking of 34. Since 2019, Nigeria has consistently maintained its food security score according to the EIU. However, due to recent improvements in Ethiopia and Angola,

Nigeria is now ranked as the lowest among the countries in the comparison sample (Figure 4.7.

Figure 4.7 GFSI 2022: Food Security Score for Nigeria

Effectiveness of Government Interventions in Reducing the Level of Poverty among Citizens in South West Nigeria

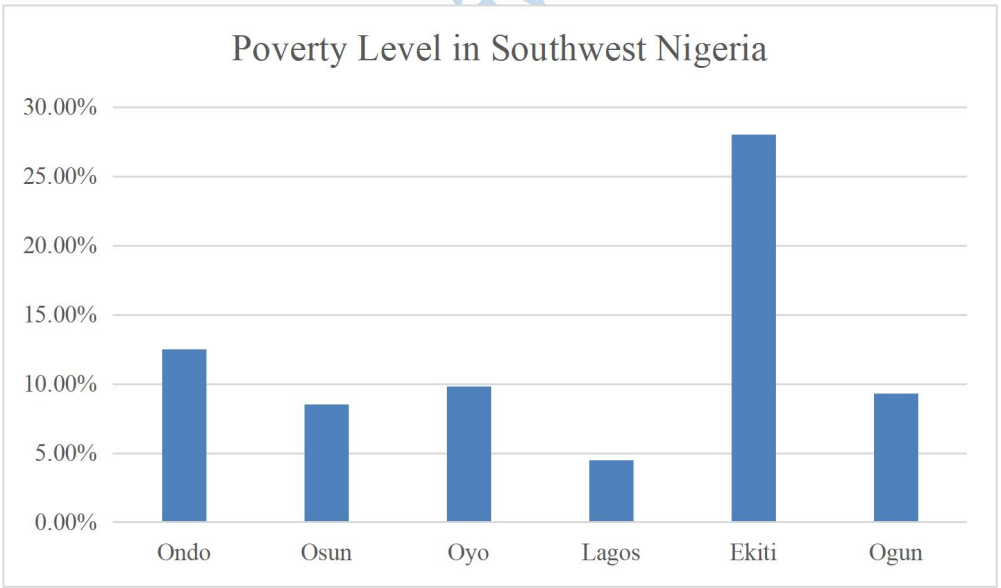

Figure 4.8: Poverty Level in Southwest Nigeria

Data on the poverty level among states in Nigeria is often hard to come by. However as shown in figure 4.8, the state in the Southwest region of Nigeria with the highest poverty rate is Ekiti State (28%) and the least is Lagos State (4.5%). Other states such as Oyo, Osun and Ogun hovers between nine and ten percents. This poverty level is better understood by the data released by the National Bureau of Statistics (NBS). The bureau estimated that 13.0% Nigerians are multidimensionally poor and live in a household where no member 15 years and above has completed primary school. This means that only one state in the Southwest is above the national average.

However, the NBS also added that 63% of Nigerians are multidimensionally poor, meaning that they have to give up, at least, one convenience they would have loved to enjoy for reasons such as lack of money, access, or money. Even based on this criterion, there is still a high disparity between north and south Nigeria with the north account for 65% and south accounting for 35% of poor people in Nigeria. Again, going by the regional average, the south west state is below the Southern regional average which consist of Southwest, Southeast and South-South.

Research Question Five: How effective are government interventions in eliminating the challenges facing agro-based entrepreneurs in South west Nigeria?

Table 4.2: Challenges Facing Agro-based entrepreneurs in South West Nigeria

Item	Strongly Agree	Agree	Disagree	Strongly Disagree
Lack of access to Finance	(35%) 126	90 (25%)	72 (20%)	72 (20%)
Lack of storage facilities for perishable goods	108 (30%)	126 (35%)	72 (20%)	54 (15%)
Poor Policy Implementation	144 (40%)	126 (35%)	36(10%)	18 (5%)
Lack of Access to Relevant Technology	108 (30%)	90 (25%)	90 (25%)	72 (20%)
Lack of Expert Support	144 (40%)	90(25%)	72 (20%)	54 (15%)
Expensive production processes	108 (30%)	72 (20%)	90(25%)	90(25%)
High post-harvest losses	144 (40%)	72 (20%)	36(10%)	54(15%)
Lack of market access	108(30%)	72 (20%)	54 (15%)	72 (20%)

Source: Researcher's Fieldwork, 2023

Table 4.2 outlines the challenges confronting agripreneurs in Nigeria, categorizing responses into distinct levels of agreement. A predominant concern is the "Lack of Access to Finance," where a substantial 35% of respondents strongly agree that financial constraints pose a significant hurdle, with an additional 25% expressing agreement. This

indicates a widespread acknowledgment of the crucial role finance plays in agricultural entrepreneurship.

The issue of lack of basic infrastructure emerges as another prominent challenge, with 35% of respondents agreeing that deficiencies in infrastructure, encompassing transportation, energy, and storage facilities, present obstacles for agripreneurs. Only 15% strongly disagree, indicating a consensus on the infrastructure-related challenges faced by the agricultural sector.

"Poor Policy Implementation" is identified as a critical challenge, with 40% of respondents strongly agreeing and an additional 35% expressing agreement. This underscores a perception among agripreneurs that policies designed to support agricultural entrepreneurship are not effectively implemented, necessitating a closer examination of policy frameworks and their execution.

"Lack of Access to Relevant Technology" is recognized as a significant concern, with 30% strongly agreeing and 25% in agreement. This underscores the perceived need for improved access to modern agricultural technologies, which can enhance productivity and efficiency in agribusiness.

Similarly, the challenge of the "Lack of Expert Support" is prominent, with 40% strongly agreeing and 25% in agreement. This emphasizes the perceived importance of mentorship and advisory services for agripreneurs, highlighting the need for knowledge-sharing and professional guidance in the agricultural sector.

"Expensive Production Processes" is acknowledged as a challenge by 30% of respondents, with 25% strongly agreeing. This draws attention to the financial burden

associated with the cost of production in agriculture, reflecting a need for cost-effective and sustainable farming practices.

Post-harvest losses emerge as a notable concern, with 40% strongly agreeing and 20% in agreement. This underscores the urgency of implementing strategies and interventions to reduce post-harvest losses in the agricultural value chain, ensuring more efficient utilization of resources.

Finally, "Lack of Market Access" is identified as a challenge by 30% of respondents, with 20% strongly agreeing. This implies a perceived difficulty in reaching markets for agripreneurs, signalling a need for improved market linkages and distribution channels.

In summary, the table illuminates the multifaceted challenges faced by agripreneurs in Nigeria, offering insights that can inform targeted interventions and policy adjustments to foster a more conducive environment for sustainable agricultural entrepreneurship.

Nigeria's agricultural sector encounters numerous obstacles that adversely affect its productivity, despite its significant contribution to the economy. The factors contributing to this issue encompass inadequate land tenure system, limited use of irrigation farming, climate change, and soil degradation. Other challenges include outdated technology, expensive production processes, inadequate distribution of resources, limited financial support, significant post-harvest losses, and limited market access.

4.3 Discussion of Findings

The study has examined the opportunities offered by agricultural entrepreneur in achieving sustainable development in Nigeria with the aim of developing an action plan for boosting entrepreneurship in this sector and also improve government revenue generation capabilities. The study found that agricultural businessmen in Nigeria still engage in sustainable practices such as crop rotation, mulching, intercropping, composting and others which minimize the use of chemical additives.

Firstly, the observation that the southwest is less engaged in agricultural activities compared to other regions underscores the diverse economic activities and livelihoods present in the region. The southwest is known for its urbanization, industrialization, and a more diversified economy compared to some other regions. This economic diversity might lead to a perception of reduced emphasis on traditional agricultural practices. It also suggests that government in South-West Nigeria have not taken a holistic approach to tackle the issue of food insecurity facing the region[1].

The revelation that the southwest is the leading cassava producer globally introduces a fascinating dimension to the discussion. While the overall engagement in agriculture might be lower, the specialization in cassava production highlights a strategic and perhaps highly efficient approach to agricultural activities boosted by intervention from the government and research institutions. This specialization could be a result of favourable agro-ecological conditions for cassava cultivation, extensive knowledge and

expertise in cassava farming, or deliberate government economic strategies that capitalize on the global demand for cassava products[2].

The prominence of cassava production in the southwest might also be linked to global market dynamics. Cassava is a versatile crop with various applications, including food, feed, and industrial uses. The region's focus on cassava production may be a response to market demands, export opportunities, or the cultivation of cassava varieties well-suited to the region's climate and soil conditions[3]. An example of Psaltry International Company is worth mentioning whose major interest is cassava. The company annual earning runs into $12M /annum, working with 5,000 farmers around Ado Awaye in Oyo State.

Additionally, the findings could be indicative of a broader trend in which regions specialise in specific crops or commodities based on comparative advantages. Such specialization allows regions to optimize resources, enhance productivity, and position themselves as key players in global markets for specific agricultural products[4].

This apparent contradiction between lower overall agricultural engagement and global leadership in cassava production prompts further inquiry into the factors shaping agricultural development strategies at the regional level. It also underscores the importance of recognizing the diversity and complexity of agricultural landscapes within a country, emphasizing that success in the agricultural sector can take various forms and be driven by distinct regional strengths and priorities[5].

The findings regarding the southwest region of Nigeria underscore the need for a nuanced understanding of regional agricultural dynamics. The juxtaposition of lower overall agricultural engagement with global leadership in cassava production highlights

the complexity of agricultural systems and the importance of considering diverse factors, including economic diversification, market dynamics, and regional specialization, in shaping the agricultural landscape of a given region[6].

The study also showed the contribution of agriculture to employment creation, poverty alleviation and food security in South-West Nigeria. The finding revealed that more than 70 percent of Nigerians are involved in the agricultural industry, majority of whom can be categorised as small and medium enterprises. However, the agricultural sector accounted for 22.35 percent of the overall Gross Domestic Product. The finding confirms previous assertions that the agricultural sector is a huge employer of labour[7,8].

However, while it was found that the agricultural sector employs seven out of every ten Nigeria, the contribution to National Gross Domestic Product (GDP) is proportionally low at just above twenty percent. This means that the Nigerian agricultural sector is made of mainly MSMEs majority of whom are micro businesses barely catering to the basic needs of the owners[9]. This highlights an opportunity for government to build capacity in this sector by coming up with relevant programmes and interventions that can boost value and, consequently, the earning power of participants in the sector. In line with this, the third research question of this study focused on the interventions by government at all levels in Nigeria, particularly in South-west Nigeria to help agriculture-based MSMEs and boost economic activities in this sector[10].

Further findings have shown that government at various level in Nigeria have initiated interventions, policies, and project to help agriculture-based MSMEs across the country, including the South-west. These programmes include Anchor Borrowers' Programme (ABP); Nigeria Incentive-Based Risk Sharing System for Agricultural Lending

(NIRSAL); Agricultural Credit Guarantee Scheme Fund (ACGSF); National Agricultural Land Development Authority (NALDA); and the Presidential Fertilizer Initiative (PFI).

In term of food security, the study found that the southwest along with the rest of the country suffers food insecurity which means that agricultural production does not meet the food demand in the region. The identification of food insecurity in the southwest suggests a misalignment between the supply and demand for food within the region. Food insecurity is a multifaceted challenge that encompasses aspects such as insufficient production, distribution inefficiencies, economic constraints, and broader systemic issues affecting access to nutritious and affordable food.

The acknowledgment that the southwest experiences food insecurity underscores the urgency of addressing the root causes of this issue. It prompts a closer examination of the factors contributing to the gap between food production and demand in the region. Possible factors may include population growth outpacing agricultural productivity, challenges in the distribution and marketing of agricultural products, economic constraints affecting people's purchasing power, and vulnerability to external factors such as climate change and market fluctuations[11].

Furthermore, the finding underscores the need for a comprehensive approach to enhancing food security in the southwest. This approach could involve targeted interventions to increase agricultural productivity, improve post-harvest handling and storage, enhance market access for farmers, and implement policies that address economic inequalities affecting food access[12].

The study's discovery of food insecurity in the southwest aligns with a broader global concern, highlighting the importance of sustainable and resilient food systems. In light of

this finding, policymakers, agricultural stakeholders, and the community at large may need to collaborate on implementing strategies that promote food security, considering the unique challenges and opportunities present in the southwest region.

The study also showed that Agriculture has not been able to reduce the prevalence of poverty in the southwest. The finding indicated that Ekiti state has the highest prevalence of poverty in the region while Lagos State has the lowest. However, it was found that all states in the southwest region of Nigeria have poverty prevalence lower than the National Average. The recognition of Ekiti state as having the highest poverty prevalence in the southwest signals a need for targeted interventions and economic development strategies in the state. Understanding the specific factors contributing to higher poverty rates in Ekiti could involve considerations of local economic structures, employment opportunities, educational attainment, and access to social services. This information is invaluable for policymakers and stakeholders seeking to implement initiatives aimed at poverty reduction in Ekiti state.

Conversely, the finding that Lagos state has the lowest poverty prevalence within the southwest aligns with Lagos' status as Nigeria's commercial and economic hub. The state's relatively lower poverty rate could be attributed to its diverse economic activities, job opportunities, and urbanization. However, this finding also highlights the need for inclusive growth strategies to ensure that the benefits of economic development reach all segments of the population[13].

The overarching observation that all states in the southwest have poverty rates lower than the national average is a positive aspect. It suggests a relatively better economic situation in the region compared to the country as a whole. This could be indicative of the region's

economic activities, natural resources, governance structures, or other factors contributing to its economic resilience. Understanding the contextual factors behind these variations in poverty rates is crucial for designing targeted poverty alleviation programs. Policymakers can leverage this information to tailor interventions that address the specific challenges faced by each state within the southwest region[14].

The findings from research question two also highlight the heterogeneous nature of poverty prevalence within the southwest region. While disparities exist among states, the overall lower poverty rates compared to the national average suggest a relatively favourable economic situation in the region. Addressing the nuanced challenges faced by each state can contribute to more effective poverty reduction strategies tailored to the specific contexts within the southwest.

The study also found that agribusiness entrepreneur in Nigeria face a lot of challenges ranging from lack of storage facilities, outdated technology, expensive production processes, inadequate distribution of resources, limited financial support, significant post-harvest losses, and limited market access. These issues have hindered agribusiness and by extension, agricultural output, impacting the sector's contribution to the country's GDP and leading to higher food imports as a result of population growth, therefore reducing levels of food sufficiency. Between 2016 and 2019, Nigeria's total agricultural imports amounted to N3.35 trillion, which is four times greater than the agricultural exports of N803 billion over the same period[15].

The Government has implemented various initiatives and programmes to tackle the situation, such as the Agriculture Promotion Policy (APP), Nigeria–Africa Trade and Investment Promotion Programme, Presidential Economic Diversification Initiative,

Economic and Export Promotion Incentives, Zero Reject Initiative, Reducing Emission from Deforestation and Forest Degradation (REDD+), Nigeria Erosion and Watershed Management Project (NEWMAP), and Action Against Desertification (AAD%) Programme, among others.

The purpose of all these endeavours is to enhance agricultural production with the goal of meeting both the domestic demand for food and the need for surplus commodity crops to be exported in the global market. In addition, their objective is to counteract the decline and deterioration of forests, advocate for the sustainable utilisation of natural resources, restore damaged lands, and mitigate erosion and susceptibility to climate change[16].

Nigeria possesses a total of 70.8 million hectares of agricultural land, primarily dedicated to cultivating important crops such as maize, cassava, guinea corn, yam beans, millet and rice. In 2018, Nigeria's rice production increased from 3.7 million metric tonnes to 4.0 million metric tonnes. However, a mere 57% of the annual rice consumption in Nigeria, which amounts to 6.7 million metric tonnes, is produced within the nation. As a result, there is a shortfall of approximately 3 million metric tonnes, which is either imported or illegally brought into the country through smuggling. In order to promote domestic manufacturing, the Government implemented a prohibition on the importing of rice in 2019.

In 2017, Nigeria was the leading global producer of cassava, with a production of 59 million tonnes, accounting for nearly 20 percent of the world's total production. The economic prospects are vast, with significant returns from both domestic value addition and derived income, as well as government revenues[17]. Anticipated output growth is

expected due to the implementation of enhanced varieties and advanced production processes.

The utilisation of animal output has been insufficient. The primary livestock species raised by agricultural households in Nigeria are small ruminants, including 76 million goats, 43.4 million sheep, and 18.4 million cattle. The ecological conditions in the northern region of the country have been advantageous for its suitability for animal husbandry. The poultry population, as reported by FMARD in 2017, is estimated to be 180 million. In this context, domestic demand surpasses output, despite many efforts made by development partners to enhance production and protect against diseases, particularly transboundary animal diseases.

To ensure food security and nutrition, it is imperative to boost agricultural production through the use of new technology and innovations, given the projected population growth to 400 million by 2050. Support from all stakeholders is crucial for the successful attainment of this objective, as it pertains to both federal and state governments[18].

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Chapter Five

Conclusion

This chapter concludes the whole study on the role of agriculture-based micro, small and medium enterprises in achieving sustainable development goals in the face of various challenges and opportunities in the sector. This chapter provides the summary of findings, conclusion, and proffers relevance recommendations to guide policy and practice.

5.1 Summary of Findings

Access to affordable finance is one of the biggest challenges facing agro-based MSMEs in Nigeria. Many financial institutions impose stringent conditions, such as high collateral requirements, which are often out of reach for small-scale entrepreneurs. Additionally, high-interest rates on loans make borrowing unsustainable, discouraging many MSMEs from taking on debt. Due to these financial barriers, agriculture-based MSMEs often lack sufficient capital to invest in new equipment, expand production, adopt modern farming technologies, or hire skilled labour. This results in limited productivity, reduced competitiveness, and ultimately affects their ability to contribute to the broader economy and SDGs.

Insufficient infrastructure, especially in rural areas where most agriculture-based MSMEs operate, significantly hampers operations. Poor road networks make it challenging and costly to transport goods, especially perishable items like fruits and vegetables, from farms to markets, leading to high post-harvest losses. Limited and unreliable electricity supply affects production activities, making it challenging to operate machinery or

process goods effectively. Furthermore, inadequate access to water sources limits irrigation, reducing crop yields and livestock productivity. These infrastructural deficits not only increase operational costs but also prevent agriculture-based MSMEs from achieving economies of scale, curtailing their growth potential.

Agriculture-based MSMEs struggle to find stable and profitable markets due to limited knowledge of market demand, weak distribution networks, and lack of marketing expertise. Without reliable market access, these enterprises often sell their products at low prices or depend on intermediaries, which reduces their profit margins. Additionally, the absence of structured value chains for agriculture-based products limits opportunities for direct access to larger retail chains and export markets. This challenge restricts MSMEs' ability to reach consumers efficiently and capitalize on market opportunities, thereby reducing their contributions to food security and poverty alleviation.

Many entrepreneurs in agriculture-based MSMEs lack the technical skills and knowledge required to adopt modern agricultural practices or efficient business management techniques. Limited training on sustainable farming practices, pest management, soil health, and efficient production methods results in suboptimal crop and livestock yields. A lack of business management and financial literacy skills also restricts their ability to budget, forecast demand, and manage resources effectively. This skill gap constrains innovation and productivity, making it harder for agriculture-based MSMEs to thrive in a competitive market and limiting their capacity to contribute toward SDG goals.

A lack of supportive policy frameworks and regulatory challenges hinders the growth of agriculture-based MSMEs. The complex and often costly process of registering a business and obtaining necessary permits deters small enterprises from formalizing.

Furthermore, frequent changes in government policies and inconsistencies in policy implementation create uncertainty, discouraging investment in long-term growth. High taxes and tariffs on agricultural inputs like seeds, fertilizers, and machinery further reduce profitability. Streamlined regulatory processes and consistent policies are needed to foster a business-friendly environment for agriculture-based MSMEs.

Both the Nigerian government and international development agencies recognize the importance of agriculture-based MSMEs for economic development and have implemented various initiatives to support them. Government programs such as the Central Bank of Nigeria's (CBN) Anchor Borrowers' Program provide small-scale farmers with low-interest loans and access to inputs. International organizations, including the World Bank and USAID, are also offering financial aid, training, and infrastructure development to support agriculture-based enterprises. By providing MSMEs with the resources and training necessary to grow, these programs can enhance productivity, create jobs, and increase contributions to the SDGs related to economic growth, food security, and poverty reduction.

The rise of agritech solutions in Nigeria offers agriculture-based MSMEs opportunities to overcome traditional challenges and modernize their operations. Digital technologies, such as mobile banking and digital payment systems, make financial services more accessible, even for those in remote areas. Additionally, mobile applications provide real-time weather forecasts, pest control advice, and market price information, helping farmers make more informed decisions. Technologies like solar-powered irrigation systems, low-cost storage solutions, and precision farming tools can improve yields, reduce waste, and lower operational costs. The adoption of such technologies enables

MSMEs to increase productivity and efficiency, aligning with SDGs focused on innovation, responsible production, and economic growth.

Investing in value addition, such as processing, packaging, and branding, offers agriculture-based MSMEs a way to increase revenue and expand market reach. Value addition not only enhances the shelf life of agricultural products but also allows MSMEs to create premium products that can attract higher prices in domestic and export markets. For example, processing raw cassava into flour or transforming fruits into packaged juices creates a diversified product range that appeals to a wider audience. By adding value to raw products, MSMEs can boost profitability, reduce food waste, and contribute to SDG 12 (Responsible Consumption and Production), while also creating more job opportunities in rural areas.

The engagement of youth and women in agriculture-based MSMEs can drive social inclusion and economic empowerment. Many development programs and NGOs are focused on providing these groups with the training and financial resources needed to start and grow agro-enterprises. Youth are often open to adopting new technologies and innovative farming methods, which can increase productivity and make the sector more competitive. Similarly, empowering women in agriculture helps reduce gender inequality and improves household incomes. By creating an inclusive environment for youth and women in agriculture-based MSMEs, Nigeria can harness a larger workforce to meet SDGs related to decent work, gender equality, and economic growth.

Emphasizing sustainable agricultural practices can help agriculture-based MSMEs attract investment and access markets that value environmentally friendly products. Practices like organic farming, crop rotation, integrated pest management, and water conservation

not only improve environmental health but can also improve crop yields over time. By adopting these sustainable methods, MSMEs can appeal to the growing number of conscious consumers and businesses that prioritize sustainability. This approach aligns with SDG 13 (Climate Action) and SDG 12 (Responsible Consumption and Production), contributing to environmental sustainability while opening up new market opportunities for MSMEs in both local and international market

Agriculture-based MSMEs are indispensable to Nigeria's progress toward the Sustainable Development Goals, especially in reducing poverty, achieving food security, fostering economic growth, and promoting environmental sustainability. By addressing the challenges they face, particularly in finance, infrastructure, market access, skills, and policy—their productivity and impact can be significantly enhanced. Leveraging available opportunities such as government support, technology adoption, value addition, youth and women empowerment, and sustainable practices can unlock the sector's potential. This approach will enable Nigeria's agriculture-based MSMEs to make substantial contributions toward sustainable development, while also building a resilient, inclusive, and vibrant economy.

5.2 Conclusion

Agriculture-based Micro, Small, and Medium Enterprises (MSMEs) in Nigeria are crucial players in the nation's pursuit of sustainable development, particularly in addressing poverty, enhancing food security, fostering economic growth, and promoting responsible production and consumption. However, these enterprises face significant barriers that hinder their potential contributions to the Sustainable Development Goals (SDGs). Key challenges include restricted access to affordable financing, inadequate

infrastructure, limited market access, skill shortages, and complex regulatory environments. These issues limit MSMEs' productivity and reduce their competitiveness, preventing them from scaling their operations and effectively meeting the demands of Nigeria's growing population.

Despite these challenges, agriculture-based MSMEs also have a wealth of opportunities to leverage. Governmental and international support programs, alongside emerging agritech solutions, offer avenues for financial access, productivity improvements, and capacity-building. Opportunities in value addition, such as food processing and branding, enable these enterprises to increase their market reach and profitability. Additionally, the inclusion of youth and women in agriculture-based MSMEs offers a pathway to social inclusion and poverty reduction. The adoption of sustainable farming practices can further attract new investments and open access to environmentally conscious markets, aligning these enterprises with global standards in responsible production and consumption.

For Nigeria to fully harness the potential of agriculture-based MSMEs, a multi-stakeholder approach is needed. Policy reforms are essential to create a more business-friendly environment, simplifying regulatory requirements and offering tax incentives to encourage formalization and investment. Infrastructure development, particularly in rural areas, is crucial for connecting MSMEs to broader markets and reducing operational costs. Further, targeted training programs to enhance technical and business skills among MSME operators will empower these enterprises to innovate, compete, and grow sustainably.

By addressing the challenges and capitalizing on the available opportunities, agriculture-based MSMEs in Nigeria can become powerful agents for achieving the SDGs. Strengthening this sector will not only improve food security and economic stability but will also contribute to a more inclusive and resilient Nigerian economy, setting the foundation for long-term sustainable development.

5.3 Recommendations

In view of the findings and conclusions reached in this study, the following recommendations are considered relevant for all stakeholders

i. Government and all other stakeholders should promote sustainable practices. It is important to encourage and support the adoption of sustainable agricultural practices among businessmen through awareness campaigns, training programs, and incentives. Government and non-governmental organizations can play a pivotal role in providing the necessary resources and knowledge.

ii. Policy makers and all stakeholders should make attempts to diversify agricultural engagement in the southwest region of Nigeria. appropriate strategies to diversify agricultural engagement in the southwest should be implemented, acknowledging the region's potential as the leading cassava producer. This may involve promoting other high-value crops, value addition, and exploring opportunities for agro-processing industries.

iii. Government should also revaluate and revamp targeted measures to enhance food security in the southwest. This includes large scale involvement of people at the local government level. It is important to encourage local governments to also

invest in agricultural infrastructure, improved post-harvest handling, and the formulation of policies that ensure equitable access to food resources.

iv. More effort should be directed at harnessing the potentials and opportunities offered by the agricultural value chain to create more employment opportunities for states such as Ekiti where poverty is high, mostly due to unemployment and low level of economic activities. Government should tailor poverty alleviation programs to the unique challenges faced by each state in the Southwest.

v. In order for agri-business to serve its purpose in bridging unemployment, government needs to increase infrastructural funding. It is important to tackle challenges such as outdated technology, expensive production processes, resource distribution disparities, and limited financial support. Policymakers should formulate interventions to modernize agricultural practices, make resources more accessible, and provide targeted financial support to agribusinesses.

5.4 Contribution to Knowledge

The study significantly contributes to the existing body of knowledge by offering a nuanced understanding of the agricultural dynamics in the southwest region of Nigeria. The dual revelation of sustainable agricultural practices coexisting with challenges such as limited engagement, food insecurity, and varying poverty rates provides a more comprehensive picture. This nuanced understanding can inform targeted interventions, policies, and strategic initiatives aimed at fostering sustainable development in the agribusiness sector. The study's findings offer valuable insights for policymakers,

researchers, and practitioners working towards the advancement of agriculture, food security, and poverty reduction in the region and beyond.

5.5 Suggestion for Further Studies

Building on the findings of the current study, there are several areas within the context of agribusiness and sustainable development in the southwest region of Nigeria that could benefit from further research.

1. Impact of policy interventions on the development of agribusiness entrepreneurship in Nigeria.
2. Assessment of the socio-economic factors contributing to food insecurity in southwest Nigeria
3. The role of community engagement in promoting sustainable development in agribusiness

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Appendix

Questionnaire

Dept. of Politics & International Relations
Faculty of Social and Management Sciences
Lead City University Ibadan

Dear Respondent,

I am a student of the above-named institution. I am currently conducting a research work on "Agro-based Micro, Small and Medium Enterprises in Nigeria: Challenges and Opportunities in Achieving Sustainable Development Goals (SDGs) 2012-2022". I, therefore solicit your support in completing this instrument. Please note that any information supplied by you in this questionnaire shall be treated with utmost confidentiality and will be used for academic research only.
Thank you for your anticipated cooperation.

Section A: Demographic Analysis

Instruction: Please tick √ the appropriate answer from the alternatives given as they best describe your opinion:

Gender: Female [ ]; Male [ ]

Farming Experience (Years): 1 - 5 [ ], 6 – 10 [ ], 11 – 15 [ ], 16 – 20 [ ], 21 – 25 [ ], More than 25 [ ]

Age (Years): 20 – 29 [ ], 30 – 39 [ ], 40 – 49 [ ]. 50 – 59 [ ], 60 – 69 [ ], 70 – 79 [ ]

Number of crops grown; 1[ ] , 2[ ] , 3 [ ], 4 [ ], 5[ ], 6 [ ]

Years of land cropping; 1-5 [ ]; 6-10 [ ], 11-15 [ ], 16-20 [ ], >20 [ ]

Main occupation: Farming [ ] Non-farming [ ]

Section B: Sustainable Strategies in the Agricultural Sector in The South West Nigeria

Instruction: Please select the option that best apply to you Key: 4 = Aware and applied, 3 = Aware, 2 = Aware but not Applicable, 1 = Not aware

Sustainable practices	**Aware and applied**	**Aware**	**Aware Not-applied**	**Not-aware**
Composting				
Mulching				
Crop rotation				
Intercropping				
Agro-forestry				
Biological pest control				
Green manure				
Erosion prevention				
Water harvesting				

Section C: Challenge Facing Agricultural Sector in the South West Nigeria

Instruction: Please select the option that best apply to you Key: 4 = Strongly Agree 3 = Agree 2 = Disagree 1 =Strongly Disagree

Item	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**
Lack of access to Finance				
Lack of storage facilities for perishable goods				
Poor Policy Implementation				
Lack of Access to Relevant Technology				
Lack of Expert Support				
expensive production processes				
High post-harvest losses				
Lack of market access				

Bio-data

A. Personal Data

Full Name:	Adekunle Julius TOLUJU
Address:	3, Olaoluwa Street, Ojodu-Abiodun, Ojodu. Lagos
E-mail:	atoluju@gmail.com
Phone Number:	+2348023933307
Date of Birth:	3rd July, 1967
Place of Birth:	Ilorin, Kwara State
Nationality:	Nigerian
Name of Next of Kin:	Oluwabunmi Beatrice TOLUJU 3, Olaoluwa Street, Ojodu-Abiodun, Ojodu. Lagos

B. Educational Background

Educational Institutions Attended with Dates and Qualifications

- Lead City University, Ibadan – PhD in Public Administration - In view
- University of Ilorin – Masters of Public Administration 2004
- University of Ilorin – Bachelor of Science, Geography 1992

C. Working Experience with Dates

- Managing Director / Principal Consultant/CEO, Glosol Network Limited. 2010 – Date
- Business Development Manager/ Head, Imperial Product Limited 2004

Principal Consultant/ Training Manager, Tyenovilth Consulting Limited 2010

• Resource Person (External Consultant) Nigerian Institute of Management (Chartered). 2022

• Training Consultant, MMC Limited 1999

Assistant Lecturer, Kwara State Polytechnics, Ilorin. 1995

D. Awards and Fellowship (if any)

Nil

E. Membership of Academic and Professional Bodies

- Member, Nigerian Institute of Management (Chartered)
- Fellow, Institute of Classic Entrepreneurship of Nigeria
- Fellow, Institute of Business Administration and Knowledge Management
- Fellow, African Council for Small Business and Entrepreneurship
- Fellow, Global Academy of Entrepreneurship and Innovation
- Fellow, Academy of Technology Innovation Management and Entrepreneurship

F. Publications

Upcoming

G. Major Conferences Attended with Dates

None yet

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This is to certify that, this thesis written by Julius Adekunle TOLUJU with Matriculation number LCU/PG/002364 in the Department of Politics and International Relations, Faculty of Management and Social Sciences, Lead City University, Ibadan is in full compliance with the approved University format and style.

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Signature Date

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Appendix

Questionnaire

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