ASSESSMENT OF WOMEN-RESPONSIVE AGRICULTURAL EXTENSION SERVICES FOR RURAL WOMEN CASSAVA FARMERS IN ESAN WEST LOCAL GOVERNMENT AREA OF EDO STATE, NIGERIA

BY

Japheth Lesley ENAKOYA (Miss)

AGR2000014

DEPARTMENT OF AGRICULTURAL ECONOMICS AND

EXTENSION SERVICES

FACULTY OF AGRICULTURE

UNIVERSITY OF BENIN

BENIN CITY

NOVEMBER, 2025

ASSESSMENT OF WOMEN-RESPONSIVE AGRICULTURAL EXTENSION SERVICES FOR RURAL WOMEN CASSAVA FARMERS IN ESAN WEST LOCAL GOVERNMENT AREA OF EDO STATE, NIGERIA

BY

Japheth Lesley ENAKOYA (MISS)
AGR2000014

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

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE BACHELOR OF AGRICULTURE (B. AGRIC) (WITH OPRION OF AGRICULTURAL ECONOMICS AND EXTENSION SERVICES)

NOVEMBER, 2025

CERTIFICATION

This is to certify that this research project titled **"Assessment of Women-Responsive Agricultural Extension Services For Rural Women Cassava Farmers in Esan West Local Government Area of Edo State, Nigeria"** was carried out by **Japheth Lesley ENAKOYA (Miss)** with Matriculation Number **AGR2000014** of the Department of Agricultural Economics and Extension Services, Faculty of Agriculture, University of Benin, Benin City, Edo State.

MRS. S.E. OKUNDAYE	**DR. J.I. OSABUHIEN**
Project Supervisor	**Head of Department**

Date	**Date**

DEDICATION

This project is dedicated first to God Almighty, my unfailing source of strength, wisdom, and grace. His love and guidance made this work possible from beginning to completion. I also dedicate this work to my wonderful parents, whose support, prayers, and sacrifices continue to inspire me. I love you both deeply.

ACKNOWLEDGEMENTS

I express my heartfelt gratitude to everyone who contributed to the successful completion of this project. My profound appreciation goes to my Supervisor, Mrs. S. E. Okundaye, for her guidance, encouragement, and invaluable support throughout this work. Her accessibility, constructive feedback, and dedication greatly shaped this research. I am also grateful to the Dean, Faculty of Agriculture, Prof. C. O. Emokaro; the Heads of Department, Dr. J.I. Osabuhein and all lecturers in the Department of Agricultural Economics and Extension Services, including Professor O. Ojogho, Dr. (Mrs.) Izekor, Dr. G. F. Kolodoye, Prof. J. Ahmadu, Dr. Uwana, Dr. (Mrs.) Oboh, Dr. Miss O. Emokpae, and many others. Thank you for the knowledge and support. To my parents, Hon. Japheth Enakoya and Mrs. Beauty Ogah, thank you for your unwavering love and encouragement. To my wonderful siblings, my uncle, and my grandparents, your belief in me has been a constant motivation. I love you all. I also appreciate my favourite girls Uwa, Omo, Vanessa, Paula and Esosa for their encouragement and companionship. Thank you for making my journey memorable.

Finally, I give all glory to God Almighty for strength, knowledge, and grace throughout my stay in this institution. Thank you, Lord.

TABLE OF CONTENTS

CONTENTS **PAGE**

CHAPTER FOUR: RESULTS AND DISCUSSION

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

LIST OF TABLES

TABLES TITLE PAGE

ABSTRACT

This study assessed the delivery of gender-responsive agricultural extension services to rural women cassava farmers in Esan West Local Government Area, Edo State, Nigeria. Specifically, it examined the socio-economic characteristics of the women farmers, their awareness of and access to extension services, adoption of improved cassava practices, and challenges encountered in farming. A total of 100 rural women cassava farmers were selected using a purposive sampling and stratified sampling technique and data were collected through structured questionnaires, interviews, and focus group discussions, supplemented by secondary sources from literature and official reports. Findings revealed that 18.37% of respondents were less than 30 , 77.55% of respondents were within the age range 30-40, 4.08% of respondents were within the age range 40-50 ,with an average household size of 5.07% and average farming experience of (4.14%). While 35.7% were aware of extension services, only 29.59% had regular contact with extension agents. Key constraints identified included limited access to female extension personnel, credit facilities, farm equipment, and digital tools. Socio-economic factors such as age, education, and marital status significantly influenced access to extension services. The study recommends strengthening gender-responsive extension approaches, increasing the recruitment of female extension agents, improving access to credit and digital platforms, and implementing community-based participatory programs to enhance productivity and livelihoods of rural women cassava farmers.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Agriculture plays a pivotal role in Nigeria's economic growth, contributing significantly to GDP, employment, and food security. As the largest sector in terms of employment, it engages about 35% of the workforce (World Bank, 2023), serving as a primary livelihood source for rural populations. Agriculture contributes approximately 23% to Nigeria's GDP (NBS, 2023), with crops like cassava, yam, maize, and rice dominating production. The sector also supports agro-industries, fostering value addition and export earnings through commodities such as cocoa, sesame, and cashew nuts. Despite oil dominance, agriculture remains critical for diversification, reducing dependency on volatile crude oil revenues. The federal government's policies, including the National Agricultural Technology and Innovation Policy (NATIP) 2022-2027, aim to enhance productivity through mechanization, improved seeds, and financing (FMARD, 2022). Furthermore, agriculture aids poverty reduction by empowering smallholder farmers, who constitute 80% of producers AFDB, 2023). Challenges like insecurity, climate change, and inadequate infrastructure persist, but

investments in agtech and public-private partnerships (e.g., the Anchor Borrowers' Programme) show promise in boosting output. With a growing population exceeding 220 million, agricultural expansion is vital for food security and economic stability, aligning with the UN Sustainable Development Goals (SDGs) on zero hunger and inclusive growth (UNDP, 2023). Thus, Nigeria's agricultural sector remains a cornerstone for sustainable development and economic resilience. Among the various crops contributing to this growth, cassava stands out as a vital staple and income-generating crop, especially in rural communities.

Cassava (*Manihot esculenta*) a starchy root crop native to South America, specifically the Amazon basin, and was introduced to Africa by Portuguese traders in the 16th century (Oliveira *et al.,* 2021). It quickly became a staple food due to its drought resistance, adaptability to poor soils, and high carbohydrate content. In Africa, cassava is a crucial food security crop, supporting over 500 million people (FAO, 2023), with Nigeria being the world's largest producer,: contributing over 60 million metric tons annually (FAO, 2024). In Nigeria, cassava is a key component of diets and livelihoods, particularly in rural areas like Esan West Local Government Area (LGA) in Edo State. The crop is processed into garri, fufu, tapioca, and industrial products like starch, ethanol, and flour. The

National Root Crops Research Institute (NRCRI) reports that cassava farming employs millions of smallholder farmers and contributes significantly to income generation (NRCRI, 2023). In Esan West LGA, cassava cultivation supports local economies, with many farmers engaging in cooperative societies to enhance production and access markets. Cassava also plays a role in industrial growth, with government initiatives like the Cassava Bread Development Fund promoting value addition (FMARD, 2022). Additionally, cassava's resilience to climate change makes it vital for food security in Nigeria, where erratic rainfall and rising temperatures threaten other crops (World Bank, 2023). Despite challenges like post-harvest losses and limited mechanization, innovations in high-yield varieties and processing technologies (e.g., improved garri fryers) are boosting productivity (IITA, 2024). The transformative potential of cassava for Nigeria's food security and rural economies cannot be fully realized without addressing the specific roles, needs, and contributions of women in the cassava value chain.

Women are adult human females who perform diverse biological, social, cultural, and economic roles within society (UN Women, 2023). In rural communities, the term "women" specifically refers to adult female members of the household who engage in productive and reproductive activities such as farming, processing,

caregiving, and community participation (FAO, 2023). Understanding who women are beyond their biological characteristics helps to explain why they occupy unique positions in agricultural systems and why they require support tailored to their specific needs and responsibilities. Women play an essential and irreplaceable role in cassava production, processing, and marketing in Esan West LGA, Edo State. Rural women are responsible for most activities along the cassava value chain, including land preparation on small plots, planting, weeding, harvesting, peeling, grating, fermenting, and processing cassava into staple products such as garri, fufu, and lafun (FAO, 2023). Research shows that women contribute 60–80% of the total labor input in cassava production in southern Nigeria, making them the backbone of household food security and local agro-processing enterprises (Abudu *et al.,* 2023). Despite their significant involvement, women face persistent challenges that limit their productivity, such as restricted access to farmland, limited ownership rights, scarcity of credit opportunities, and inadequate access to modern cassava technologies like improved varieties, mechanized graters, and efficient dryers (World Bank, 2022).

In Esan West LGA, traditional norms and inheritance systems often grant land ownership to men or male descendants, putting women at a disadvantage when

expanding cassava fields or investing in long-term farm improvements (NBS, 2023). Furthermore, women farmers frequently experience inadequate access to vital agricultural information, as extension meetings are sometimes held at locations or times that clash with their household caregiving roles (Oluwatayo and Sanni, 2021). To bridge this gap, several development programmes have begun prioritizing women-specific interventions. Initiatives such as the Edo State Agripreneur Programme and IFAD's Value Chain Development Programme have provided rural women with training on high-yield cassava varieties, modern processing equipment, and business skills to enhance profitability (IFAD, 2024). Women-led cooperatives, including the Esan Women Cassava Farmers Association, have improved collective bargaining, reduced post-harvest losses through shared processing centres, and expanded women's access to markets (IITA, 2023).

Despite these improvements, inequalities remain in areas like income control and agricultural decision-making. Studies show that even when women perform most of the production and processing work, men often make key financial decisions regarding sales and profit allocation (African Development Bank, 2023). To address these barriers, policies such as Nigeria's National Women's Agricultural

Empowerment Framework emphasize improving women's access to land, credit, inputs, and training to enable them to compete fairly in the agricultural sector (FMARD, 2021). Climate-smart cassava initiatives introduced by CARE International in Edo State have also targeted women, offering training on sustainable practices, drought-resistant cassava varieties, and post-harvest management to improve resilience amid climate change (CARE, 2024). Given women's enormous contribution to cassava farming and the persistent challenges they face, women-responsive agricultural extension services have become crucial in ensuring that extension delivery meets the specific needs, constraints, and priorities of women farmers in rural communities.

Women-responsive extension services are agricultural advisory programmes specifically designed to address the unique needs, roles, and challenges faced by women farmers, ensuring they have equitable access to knowledge, resources, and appropriate technologies (FAO, 2023). Examples of women-responsive extension strategies include deploying more female extension workers, providing flexible training schedules that suit women's time burdens, developing women-focused training materials, and promoting policies that enhance women's access to land, credit, and decision-making spaces (FAO, 2023). Unlike traditional extension

systems which often overlook the specific constraints women face women-responsive approaches deliberately incorporate methods that make information more accessible, culturally appropriate, and supportive of women's daily responsibilities.

For rural women farmers, especially younger women with limited resources and limited decision-making power, these tailored services are particularly crucial. Research shows that young women in agriculture are significantly less likely to receive formal training or extension support than men, despite contributing substantially to farm labour and post-harvest activities (World Bank, 2024). In Nigeria, innovative approaches such as mobile-based advisory platforms introduced by the National Agricultural Extension and Research Liaison Services (NAERLS) including SMS broadcasts, voice messages, and WhatsApp groups have proven effective in reaching women who may face mobility restrictions or cultural barriers to attending physical training sessions (NAERLS, 2023). Additionally, programmes like IFAD's Rural Youth Agripreneurs initiative have provided young women with practical skills in high-value cassava processing, product packaging, and digital agribusiness, enhancing their income and reducing post-harvest losses (IFAD, 2024). Evidence from sub-Saharan Africa indicates

that women-responsive extension services can increase women's adoption of improved agricultural practices by 30–50%, demonstrating their transformative potential for empowering women and strengthening food systems (AGRA, 2023).

1.2 Problem Statement

Rural women cassava farmers in Esan West LGA, Edo State, play a pivotal role in agricultural production, contributing significantly to food security and the local economy. Despite their critical involvement, these women continue to face substantial barriers in accessing agricultural extension services, which are essential for improving farming practices, adopting new technologies, and increasing productivity (Edo State Ministry of Agriculture, 2023). Traditional extension systems in Nigeria are largely gender-insensitive, often overlooking the specific challenges faced by women farmers, such as limited access to land, inadequate credit facilities, lack of labor-saving technologies, time constraints due to domestic and caregiving responsibilities, low literacy levels, and sociocultural restrictions on mobility (FAO, 2023; World Bank, 2024).

As a result, women remain significantly underrepresented in agricultural extension programs. National statistics indicate that fewer than 20% of extension beneficiaries are women, despite their major role in crop production and

processing (IFAD, 2023; NBS, 2023). In Esan West LGA specifically, women account for over 60% of cassava production, yet they continue to face systemic exclusion due to the scarcity of female extension agents, male-dominated training sessions, and communication methods that are poorly suited to their educational and social realities (Ragasa *et al.,* 2022; NBS, 2021).

Further compounding these challenges are entrenched gender norms and structural inequalities. Only a small proportion of women approximately 8% hold formal land titles, which limits their ability to access agricultural loans or invest in improved farming practices (Ogunmodede *et al.,* 2020; CBN, 2022). Women also experience higher rates of loan rejection compared to men and have fewer opportunities to participate in cooperatives or collective action groups, which are often critical channels for accessing training, inputs, and market information. These barriers restrict women's capacity to fully benefit from government programs, private sector initiatives, or community-based agricultural innovations.

The consequences of such exclusion are evident in productivity and income disparities. Women cassava farmers in the area typically record yields that are 30–40% lower than those of their male counterparts due to limited access to improved planting materials, mechanized processing technologies, and

post-harvest handling techniques (IFPRI, 2021; FMARD, 2022). This productivity gap not only limits household income but also perpetuates cycles of poverty, food insecurity, and reduced livelihood opportunities, undermining broader agricultural and rural development objectives (Ogunniyi *et al.,* 2023; FAO, 2023).

Given the persistent gaps in access to information, technology, and support, there is an urgent need to examine how extension services in Esan West LGA can be strengthened to better serve women farmers. By identifying the specific barriers faced by women cassava farmers, this study seeks to provide evidence-based recommendations for designing and implementing women-responsive agricultural extension strategies that enhance productivity, income generation, and empowerment. Understanding and addressing these challenges is critical not only for improving cassava production but also for promoting inclusive rural development and reducing gender disparities in agriculture.

1.3 Question Statements

1. What are the socio-economic characteristics of respondents to women -responsive agricultural extension services in Esan West LGA?

2. What is the level of awareness to women-responsive agricultural extension services among rural women cassava farmers?
3. What is the level of access to women-responsive agricultural extension services among rural women cassava farmers?
4. What are the perceived effectiveness of women-responsive agricultural extension services to rural women cassava farmers?
5. What are the key constraints limiting respondents to women-responsive agricultural extension services in Esan West LGA, Edo State?

1.4 Objectives of the Study

The main objective of this study is to evaluate the effectiveness, extent, and impact of women-responsive agricultural extension services on rural women cassava farmers in Esan West Local Government Area, Edo State, Nigeria. With a view to identifying gaps, challenges, and opportunities for improving the inclusivity and responsiveness of extension services to their specific needs.

Specific Objectives:

1. Examine the socio-economic characteristics of respondent to women-responsive extension services in Esan West LGA;

2. To determine the level of awareness of women-responsive agricultural extension services among rural women cassava farmers;
3. To assess the level of access to women-responsive agricultural extension services among rural women cassava farmers;
4. To evaluate respondents perceived effectiveness of women-responsive extension services;
5. To identify the key constraints affecting respondents to women-responsive extension services in Esan West LGA.

1.5 Hypothesis of the Study

1. There is no significant relationship between socio-economic characteristics of rural women cassava farmers and access to women -responsive extension services.
2. Awareness of gender-responsive extension services do not significantly influence accessibility among rural women cassava farmers.

1.6 Justification of the Study

This study is critically justified by the persistent disparities in agricultural extension services that limit the productivity and empowerment of rural women in cassava farming. Despite their vital role in Nigeria's agricultural sector, women

farmers particularly rural women face systemic barriers such as limited access to training, resources, and women-focused extension programs (FAO, 2022; World Bank, 2021). In Esan West LGA, where cassava farming is a major livelihood, the exclusion of women from extension services undermines food security and rural development (Edo State Agricultural Development Programme, 2023).

Recent studies highlight that women-responsive extension services significantly enhance women's adoption of improved farming techniques, income generation, and decision-making power (IFAD, 2023; Ragasa and Mazunda, 2021). However, most research on agricultural extension in Nigeria has focused on general farmer populations, neglecting the specific needs of rural women (Nnadi *et al.,* 2022). This study fills that gap by providing localized evidence on how tailored extension services can empower women cassava farmers in Esan West LGA.

Furthermore, the findings will align with global and national development agendas, including:

- SDG 5 (Gender Equality) – Promoting inclusive agricultural policies that support women farmers (UN Women, 2023).
- SDG 2 (Zero Hunger) – Strengthening women's contributions to food security (FAO, 2023).

- Nigeria's National Policy on Women in Agriculture (2021) – Advocating for women-focused extension reforms.

CHAPTER TWO

LITERATURE REVIEW

2.1 Cassava Production in Nigeria

Cassava (*Manihot esculenta* Crantz) is a staple crop in Nigeria, serving as a primary source of calories for millions, as well as providing raw materials for industrial applications and generating income for smallholder farmers (FAO, 2024; Otekunrin and Sawicka, 2024). Nigeria is recognized as the largest global producer of cassava, contributing approximately 18–20% of total world output, with production estimated at 62.7 million metric tonnes in 2023 (FAO, 2024; NCGA, 2024). Despite these impressive production volumes, average yields per hectare remain significantly below the global potential, with Nigerian farmers achieving around 6.35 t/ha compared to the global potential of over 30 t/ha (IITA, 2023; Srivastava *et al.,* 2023). The observed yield gap can largely be attributed to low-input farming systems, inadequate mechanization, suboptimal agronomic practices, and high post-harvest losses (GIZ and IITA, 2024; CARA, 2024). Women, who constitute the majority of cassava producers and post-harvest

laborers, face limited access to improved planting materials, modern technologies, and extension services, which constrains productivity and income (Abioye *et al.,* 2024; Otuisi *et al.,* 2025).

In Esan West Local Government Area of Edo State, women account for a significant proportion of cassava farmers, yet studies indicate that less than 40% have regular contact with extension agents, limiting their awareness of improved varieties and modern processing methods (Edo State Agricultural Development Programme [ESADEP], 2023; Okon and Igbinedion, 2024). To address these challenges, research institutions such as the International Institute of Tropical Agriculture (IITA), the National Root Crops Research Institute (NRCRI), and the NextGen Cassava Project supported by the Bill and Melinda Gates Foundation and the UK Foreign, Commonwealth and Development Office (FCDO) have developed improved cassava varieties with higher starch content, enhanced disease resistance, and better agronomic traits (NRCRI, 2023; NextGen Cassava Project, 2023).Locally, pilot initiatives in Edo State, including farmer field schools and women-focused mechanization support programs, have begun to enhance productivity and post-harvest efficiency among rural women farmers in Esan West (ESADEP, 2023; Okon and Igbinedion, 2024).

Despite these interventions, Nigeria's cassava value chain remains underdeveloped. The country continues to import cassava flour and starch, even though domestic demand exceeds supply by over 700,000 tonnes annually (FMARD, 2023; PwC Nigeria, 2023). Moreover, cassava product prices remain volatile; for instance, garri prices increased by more than 100% in 2024 due to climate-induced production shocks and insecurity (NBS, 2024; Premium Times, 2024). Unlocking Nigeria's potential to become a global leader in cassava industrial processing will require targeted investments in processing infrastructure, policy stability, and dedicated support for women and youth engaged in cassava production (World Bank, 2023; FAO, 2024).

2.1.1 Environmental requirements of cassava

Cassava (*Manihot esculenta* Crantz) is a major staple crop in Nigeria and widely cultivated across tropical Africa due to its adaptability to diverse agro-ecological conditions (FAO, 2024; IITA, 2023). Despite this adaptability, cassava requires specific environmental conditions to achieve optimum growth, yield, and quality. Understanding these requirements is crucial, particularly in rural areas such as Esan West LGA, Edo State, where cassava serves as a key source of food security and income for women farmers (Okoye, Onyenweaku, and Asumugha, 2024).

Cassava thrives in tropical and subtropical climates with warm, consistent temperatures (FAO, 2024). The optimal temperature range is 25°C to 30°C, although some varieties tolerate slightly lower or higher extremes (IITA, 2023). Temperatures below 18°C can slow root initiation, while heat above 35°C, particularly under water stress, reduces tuber size and starch content (Okoye *et al.,* 2024).

Rainfall is another critical factor, with cassava requiring 1,000–1,500 mm of annual rainfall evenly distributed across its 10–12 month growth cycle (FAO, 2024; Ezedinma and Dixon, 2023). The crop is drought-tolerant and can survive short periods of water scarcity, an important trait in rain-fed systems like those in Esan West (IITA, 2023). Nevertheless, prolonged drought during the first 3–5 months post-planting can impair canopy development and reduce root bulking (Okoye *et al.,* 2024).

Soil conditions are equally important. Cassava grows best in well-drained sandy loam or loamy soils rich in organic matter (FAO, 2024; IITA, 2023). Although it tolerates low-fertility soils better than many crops, cassava is highly susceptible to waterlogging, which can lead to root rot and poor tuber development (Ezedinma and Dixon, 2023). Heavy clay soils should be managed with ridging or mounding

to avoid waterlogging (FAO, 2024). The optimal soil pH ranges from 5.5 to 7.0, with acidic soils (<5.0) reducing nutrient uptake and alkaline soils (>7.5) limiting micronutrient availability (IITA, 2023).

Cassava requires full sunlight, ideally 6–8 hours per day, for effective photosynthesis and tuber development. Dense intercropping or shading can reduce yield (FAO, 2024). During the early growth stages (first 3–4 months), cassava is highly vulnerable to weed competition, which can reduce nutrient availability and canopy formation; hence, timely weed management is essential (Okoye *et al.,* 2024; Ezedinma and Dixon, 2023).

In terms of altitude, cassava can grow from sea level to 1,500 meters, though optimal yields occur below 800 meters (FAO, 2024). Areas prone to wind and erosion require soil conservation practices such as mulching and agroforestry to protect the shallow-rooted crop (IITA, 2023). For Esan West LGA, which has moderately distributed rainfall, mixed soil types, and increasing climate variability, farmers particularly women with limited access to extension services must adopt practices that enhance soil fertility, moisture retention, and crop resilience (Okoye *et al.,* 2024).

Considering climate change and erratic weather patterns, integrating these environmental requirements into cassava cultivation strategies is vital for sustainable production in Esan West. Such practices support productivity, reduce post-harvest losses, and strengthen women farmers' capacity to contribute to household food security and income generation.

2.1.2 Concept of agricultural extension

Agricultural extension refers to the system of providing farmers with knowledge, technologies, and practices to improve productivity, income, and livelihoods. In the context of gender-responsive services for rural women cassava farmers, extension is not only about transferring technical knowledge but also about addressing gender-specific constraints, such as limited mobility, low literacy, and restricted access to inputs and credit (Akinbile *et al.,* 2022; Odo and Uma, 2023). Recent studies in Nigeria emphasize that gender-responsive extension programs integrate women's perspectives in program design, ensure participation in decision-making, provide flexible training schedules compatible with women's household responsibilities, and include female extension agents where possible (Agbon *et al.,* 2022; Igbokwe *et al.,* 2023). Such approaches have been shown to improve adoption rates of improved cassava varieties and post-harvest

technologies. For instance, farmers' field schools and women-to-women advisory models significantly increase the uptake of mechanized processing, disease-resistant cassava varieties, and best agronomic practices (Odo and Uma, 2023; Uzondu *et al.,* 2024).

Despite these advances, significant barriers remain. Cultural norms in rural areas, including Esan West LGA, often restrict women's mobility and participation in formal training sessions. Additionally, the shortage of female extension agents and low literacy levels among women farmers limit effective engagement (Igbokwe *et al.,* 2023; Uzondu *et al.,* 2024). For extension services to be truly effective, they must go beyond technology delivery to also empower women by enhancing their decision-making autonomy, facilitating access to inputs and credit, and supporting participation in the cassava value chain (Akinbile *et al.,* 2022; Agbon *et al.,* 2022).

2.1.3 Agricultural extension services

Agricultural extension services provide farmers with information, technologies, and support to improve productivity and livelihoods. For rural women cassava farmers, gender-responsive extension addresses the social, economic, and cultural constraints women face (Obot *et al.,* 2023; Lawal and Ibrahim, 2025). These

services promote the adoption of improved cassava practices—such as high-yielding and biofortified varieties, value-added processing, and post-harvest management through participatory approaches like farmers' field schools, mother–baby trials, and women-to-women advisory networks, which have been shown to enhance uptake, productivity, and income (Madu *et al.,* 2024; Uzondu *et al.,* 2024).

Despite these efforts, adoption disparities persist due to cultural norms, limited female extension personnel, and insufficient ICT infrastructure (Igbokwe *et al.,* 2023; Kante *et al.,* 2024). Integrating women's preferences such as root taste, storage quality, and ease of processing into breeding programs and extension advice improves adoption (Madu *et al.,* 2024). Corporate social responsibility-driven programs have also increased women's decision-making autonomy, yields, and household income when gender considerations are included (Uduji *et al.,* 2024).

In Nigeria, extension channels include on-farm demonstrations, group meetings, farmer field schools, mobile technology, and community-based facilitators (Obot *et al.,* 2023; Lawal and Ibrahim, 2025). Women-responsive strategies adjust training timing to women's workloads, use local languages, and promote access to

female extension agents and credit facilities, which is especially relevant in Esan West LGA, Edo State, where women face mobility, land, and financial constraints (Okoye *et al.,* 2023; Obot *et al.,* 2023).

Community-driven approaches such as women-to-women advisory groups, rural video training, and SMS-based advisories help reach women excluded from conventional systems, though challenges remain, including patriarchal land norms, limited female personnel, inadequate funding, and digital illiteracy (Igbokwe *et al.,* 2023; Obot *et al.,* 2023; Uzondu *et al.,* 2024). Policy interventions such as gender mainstreaming in curricula, recruitment of female extension officers, capacity-building, and collaboration between government, NGOs, and the private sector are crucial for effective, inclusive extension that improves productivity and livelihoods (Madu *et al.,* 2024; Uduji *et al.,* 2024).

2.1.4 Agricultural extension agents

Agricultural extension agents are trained professionals or facilitators who work in the agricultural extension system, responsible for delivering agricultural knowledge, innovations, and advisory services to farmers, agricultural producers, and other stakeholders in the agricultural sector and rural communities. They serve as a vital link between research institutions, government policies, and

farming populations, translating scientific information into practical field-level guidance.

Some examples of extension agents include:

1. Agricultural Extension Officers (AEOs)
2. Extension Specialists
3. Farm Advisors
4. Agricultural Educators
5. Rural Development Agents
6. Livestock Extension Agents
7. Crop Protection Agents
8. Soil Conservation Agents

These professionals work in various organizations, such as:

1. Government ministries of agriculture
2. Universities and colleges of agriculture
3. Research institutions
4. Non-governmental organizations (NGOs)
5. Private sector companies
6. Cooperative extension services

Their primary role is to help farmers improve productivity, adopt improved technologies, manage risks, and strengthen their decision-making capacity through education, demonstration, and follow-up support.

2.1.5 Women-responsive agricultural extension

Women-responsive agricultural extension designs and delivers services that account for the distinct roles, needs, and constraints of women farmers. It ensures equitable access to information, inputs, training, and support, often through female extension agents, flexible training schedules, and integration of women's preferences into technology development (Madu *et al.,* 2024; Odo and Umoh, 2023).

Tailored strategies, such as participatory varietal selection, trait-preference profiling, and inclusive breeding trials (mother–baby and tricot models), involve women directly in evaluating cassava innovations, aligning with priorities like cooking quality, storability, and ease of processing (van Etten *et al.,* 2023; NRCRI, 2023; Madu *et al.,* 2024). Evidence from Ondo State shows that addressing cultural and workload barriers increases adoption among women, emphasizing the value of women-focused interventions (Akinwalere, 2025).

Programs like GREAT enhance extension professionals' capacity to integrate women's needs, while assessments like WEAGov highlight gaps in women's inclusion in agrifood governance (Makerere University and Cornell University, 2023; Ragasa *et al.,* 2023). Despite progress, structural barriers cultural norms, male-dominated services, and limited digital access restrict women's full participation (Igbokwe *et al.,* 2023; Kante *et al.,* 2024). Studies in Oyo and Benue States show that scaling biofortified cassava requires attention to women's schedules, market linkages, and adoption incentives (Odo and Umoh, 2023; van Etten *et al.,* 2023).

Women-responsive extension therefore not only enhances technology uptake but also strengthens women's decision-making, autonomy, and participation in sustainable cassava production.

2.1.6 Rural women cassava farmers

Rural women are central to cassava production in Nigeria, participating in planting, weeding, harvesting, processing, and marketing (Udemezue, 2023). In southern Nigeria, including Esan West LGA, women provide over 70% of cassava labour, particularly in processing tasks like peeling, fermentation, and garri production (Udemezue, 2023).

Despite their vital roles, women face significant barriers: limited access to land, credit, extension services, and improved technologies (Igbokwe *et al.,* 2023; Nwadiolu *et al.,* 2024). Many farm on borrowed or family land, restricting long-term investment and access to credit. Extension services often target men, with male agents rarely addressing women's technical needs. Cultural norms and household responsibilities further limit women's participation in training (Obot *et al.,* 2023; Onemolease, 2022).

Women-responsive approaches such as women-only training groups, community advisory platforms, and participatory varietal selection have improved skills, confidence, and adoption of improved cassava practices (Uzondu *et al.,* 2024; Madu *et al.,* 2024). Considering women's varietal preferences, including ease of peeling, taste, and storability, further increases adoption and satisfaction. Digital tools, mobile devices, and agricultural apps are emerging solutions to bridge information gaps, though challenges like poor network coverage, low digital literacy, and limited smartphone access persist (Tech Herfrica, 2023).

2.2 Women Dimensions of Agricultural Extension Services

2.2.1 Access to agricultural extension services

Women farmers in Nigeria generally have limited access to agricultural extension services. Obot *et al.* (2023) found that rural women in the cassava value chain rarely interacted with extension agents due to mobility constraints, domestic workload, and male-dominated extension structures. In Esan North-East and Igueben LGAs, only about 35% of women farmers had contact with extension agents in a production cycle (Onemolease, 2022).

These challenges are also evident in Esan West LGA, where cultural norms, restricted mobility, and the shortage of female extension agents reduce women's access to information. Similar findings from Delta and Imo States show that poor access persists, although ICT tools can increase contact with extension services (Udemezue, 2023; Amadi *et al.,* 2023).

Limited access affects women's awareness and adoption of improved cassava technologies, reducing productivity. Women-focused measures such as increasing female extension agents, scheduling flexible training sessions, and expanding ICT-based platforms can improve access in Esan West.

2.2.2 Women-based barriers in extension

Constraints specific to women continue to hinder their participation in extension activities across rural Nigeria. Igbokwe *et al.* (2023) highlight the absence of female extension agents, restrictive cultural norms, and high illiteracy rates as major barriers. In Esan West LGA, many training sessions are held at distant locations or times that clash with domestic duties. The predominance of male extension workers discourages participation in communities where cultural norms restrict women's interactions with men (Obot *et al.,* 2023; Uzondu *et al.,* 2024). Structural issues such as limited transportation, low education levels, and communication materials that are not women-focused further reduce women's ability to benefit from extension messages (Madu *et al.,* 2024).

Addressing these barriers is essential for strengthening women-focused extension delivery in Esan West.

2.2.3 Women-focused approaches and participation

Women-focused extension methods such as women-to-women training, female-led farmer field schools, and group-based learning have significantly improved women's adoption of agricultural technologies (Madu *et al.,* 2024; Uzondu *et al.,* 2024). Akinwalere (2025) noted that although men had higher

awareness in Ondo State, women achieved higher adoption when technologies reflected their needs. Participatory varietal selection enhances adoption, particularly when women evaluate cassava traits important to them (Madu *et al.,* 2024). Training in post-harvest processing and cooperative membership also boosts women's participation (Nwaobiala, 2024). Digital tools through initiatives such as Tech Herfrica's EquipHer program have improved women's incomes and access to information, though challenges like poor connectivity and limited phone ownership remain (Tech Herfrica, 2023; Amadi *et al.,* 2023). Applying these women-focused practices in Esan West would likely improve women's technology uptake and empowerment.

2.2.4 ICT and e-extension for women inclusion

ICT and e-extension tools help bridge access gaps for women by overcoming mobility and time constraints. Women using mobile phones, radio, and WhatsApp-based advisory platforms have recorded improved agronomic practices and adoption of improved cassava varieties (Amadi *et al.,* 2023; Iyere-Freedom and Enwelu, 2023). However, challenges such as limited device ownership, low digital literacy, and poor network access still restrict use. Digital inclusion programs such as Tech Herfrica's EquipHer4Growth and IITA–I4ALL have

shown that providing smartphones, training in local languages, and linking women to online markets can significantly improve access and income (Tech Herfrica, 2023; NAN, 2023).

To strengthen women-focused e-extension in Esan West, strategies should include providing ICT devices and training, using hybrid extension models, partnering with digital inclusion initiatives, and addressing connectivity and literacy gaps. These measures would help women access timely agricultural information and participate more effectively in cassava production and marketing.

2.3 Constraints Faced by Women Cassava Farmers in Accessing Agricultural Extension Services

Cassava production and processing remain key agricultural activities in Nigeria, and women contribute significantly across the value chain from planting and harvesting to processing and marketing (Abudu *et al.,* 2023). In Esan West LGA of Edo State, rural women play a central role in cassava-related activities, yet they face several constraints that limit their access to agricultural extension services. Although extension programmes exist, many women remain excluded due to poor infrastructure, limited coverage, women-insensitive systems, and socio-cultural barriers that reduce their ability to benefit from available support services.

A major challenge is the limited contact women have with extension agents. Extension delivery in Nigeria is largely male-dominated, which reduces women's participation in trainings and advisory sessions (Obot *et al.,* 2023). In many rural areas, women have less interaction with field workers because of social expectations and limited visibility in public spaces (Onemolease, 2022). Evidence from Esan North-East and Igueben LGAs shows that only about 35% of women cassava farmers had contact with an extension agent during a cropping cycle (Onemolease, 2022). This low exposure limits access to timely information, improved inputs, and new technologies (Obot *et al.,* 2023).

Socio-cultural norms also play a significant role. In some communities within Edo State, cultural expectations restrict women from participating in public trainings or engaging comfortably with male extension agents (Igbokwe *et al.,* 2023). Women are often discouraged from travelling long distances to attend group meetings or field demonstrations (Uzondu *et al.,* 2024). As a result, many are unable to access modern agronomic practices and continue relying on outdated methods (Igbokwe *et al.,* 2023).

Time constraints are another major limitation. Women in Esan West typically shoulder heavy domestic responsibilities such as cooking, childcare, and water

collection alongside their farm work (Madu *et al.,* 2024). Many extension programs schedule activities during hours when women are occupied with household tasks, making it difficult for them to attend or complete training sessions (Uzondu *et al.,* 2024).

Low literacy levels and the lack of women-sensitive communication methods further affect women's ability to benefit from extension services. Training materials are often delivered in English or technical terms that are difficult for women with low educational backgrounds to understand (Udemezue, 2023). This reduces their confidence in adopting new practices and limits the effectiveness of extension outreach (Madu *et al.,* 2024).

Finally, digital access remains a major constraint. Many rural women in Esan West do not have personal mobile phones or cannot afford the data required for ICT-based extension services (Iyere-Freedom and Enwelu, 2023). Network challenges and low digital literacy further restrict the use of SMS advisories, WhatsApp groups, or agricultural applications (Tech Herfrica, 2023). As a result, the benefits of e-extension do not reach most women farmers.

CHAPTER THREE

METHODOLGY

3.1 Study Area

This study was conducted in Esan West Local Government Area (LGA) of Edo State, Nigeria. Esan West is one of the 18 LGAs in Edo State and is located in the Central Senatorial District of the state, within the South-South geopolitical zone (Wikipedia, 2024a). It shared boundaries with five neighboring LGAs: Esan Central to the north, Esan South-East to the east, Igueben to the northeast, Orhionmwon to the south, and Uhunmwonde to the southwest (Esan World Congress, n.d.). Esan West lies approximately between latitude 6°45' N and 6°55' N and longitude 6°05' E and 6°15' E (Obrifor *et al.,* 2024). According to the 2006 National Population Census and 2022 population projections, Esan West had an estimated population of about 188,700 (City Population, 2024).

The area experienced a tropical wet and dry climate, with annual rainfall between 1,500 and 2,000 mm well-distributed across the growing season (IITA, 2020; NIMET, 2021). The rainy season, which spanned from April to October, supported early growth and tuber expansion, while the dry season from November to March was managed by cassava's drought tolerance, although irrigation could

enhance yields (FAO, 2013; CARDI, 2011). Temperatures generally ranged between 25–30°C during the day, rarely falling below 20°C at night; this stable warmth, particularly the 27–32°C typical during tuber formation, promoted healthy root development (Wikifarmer, 2023; CIAT, 2007). Temperatures below 20°C slowed cassava growth, while extremes above 35°C reduced tuber yield (Howeler, 2002). Esan West's loamy soils offered good drainage and nutrient retention, supporting cassava's tuber development, and the slightly acidic pH of 5.5–6.5 was ideal for the crop (IITA, 2020; Wikifarmer, 2023). The region's typical humidity levels, ranging from 70–80%, were favorable for cassava production (UNIZIK, 2022).

The target population comprised rural women cassava farmers residing in Esan West LGA who had had contact with agricultural extension services in the past 2 years and those who had not.

3.2 Sample Procedure and Data Collection

A two-stage sampling technique was employed to ensure representative selection of respondents for this study.

The first stage involved purposive sampling of five rural communities in Esan West LGA Ekpoma, Ugbegun, Iruekpen, Ujemen, and Eguare selected based on their high cassava production and documented participation of women farmers.

The second stage employed a stratified sampling technique based on gender (females only), targeting active cassava farmers who cultivated at least 0.5 hectares and who had either interacted with agricultural extension services in the past 12 months or had never interacted with them. A simple random sampling technique was applied within each of the five selected communities to choose twenty (20) cassava farmers, resulting in a total of 100 respondents for the study.

3.3 Types and Sources of Data

The data were generated from both primary and secondary sources.

Primary data were generated through administration of a well-structured questionnaire designed in line with the specific objectives of the study. The questionnaire was administered to 100 young women cassava farmers in the five selected communities.

Secondary data were obtained from relevant literature, agricultural journals, periodicals, textbooks, agricultural publications, bulletins, and internet sources.

3.4 Measurement of Variables

3.4.1 Independent variable

The independent variables were measured as follows:

1. Socioeconomic characteristics

a. Community: Respondents were asked to indicate the community in which they resided.

b. Sex: Respondents were asked to indicate if they were male or female (coded as 1 and 2).

c. Age: Respondents were asked to state their age.

d. Marital status: Respondents were asked to indicate their marital status from the options of Single (1), Married (2), Divorced (3), Separated (4), and Widowed (5).

e. Family/Household size: Respondents were asked to indicate the number of people eating from the same pot.

f. Level of education: Respondents were asked to indicate their level of education, measured with the options of Non-formal (1), Primary (2), Secondary (3), Tertiary (4), and Others (5).

g. Farming experience: Respondents were asked to indicate years of farming experience.

h. Farm size: The farm size of the respondents was measured in hectares (Ha).

i. Annual income: Respondents were asked to indicate their income level in Naira.

j. Membership of cooperatives: Respondents were asked to indicate if they belonged to any cooperative society (0 = non-member, 1 = member).

k. Extension contact: Respondents were asked to indicate if they had had any contact with an extension agent (0 = No contact, 1 = contact).

l. Frequency of contact: Respondents were asked to indicate how often they had contact with an extension agent (1 = Daily, 2 = Weekly, 3 = Fortnightly, 4 = Monthly, 5 = Quarterly, 6 = Annually, 7 = Not at all).

3.4.2 Dependent variable

1. The level of awareness, access, and usage of agricultural extension services: Respondents were required to indicate whether they were aware of agricultural extension services by selecting either yes or no. They were also asked

to rate their level of access to agricultural extension services using a 5-point Likert scale: Very accessible = 5, Accessible = 4, Undecided = 3, Slightly accessible = 2, and Never accessible = 1. Additionally, they were asked to assess their level of usage of these services using another 5-point Likert scale: Very often = 5, Often = 4, Undecided = 3, Rarely = 2, and Not at all = 1.

2. Perceived effectiveness of agricultural extension services: Respondents were required to indicate how they perceived the effectiveness of agricultural extension services on a 5-point Likert scale: Very effective = 5, Effective = 4, Undecided = 3, Ineffective = 2, and Not effective = 1.

3. Constraints affecting respondents in agricultural extension services: Various constraints were listed, and respondents were asked to indicate the extent to which they experienced each one. These constraints were structural, institutional, socio-cultural, and economic in nature and significantly influenced awareness, access, use, and the overall effectiveness of extension services. The constraints encountered by respondents were measured using a 5-point Likert-type rating scale: Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree = 2, and Strongly Disagree = 1. Data were analyzed using descriptive statistics such as frequency, percentage, and mean.

3.5 Data Analysis

Analytical Technique

- Objective 1: Was analyzed using frequency counts, percentages, standard deviations, and tables to summarize the socio-economic characteristics of rural women cassava farmers.
- Objectives 2, 3, and 4: Were analyzed using mean scores to assess:
- Level of awareness and access to extension services,
- Perceived benefits of extension services,
- Constraints in accessing gender-responsive extension services.

Hypothesis Test

Hypothesis One

H_{01}: There is no significant relationship between socio-economic characteristics of rural women cassava farmers and access to gender-responsive extension services.

This was tested using Multiple Regression Analysis.

Multiple Regression Model

$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + ……..+ b_nX_n + E$

Where:

- Y = Dependent variable (Level of access to and effectiveness of gender-responsive extension services)
- b_0 = Constant (intercept)
- $b_1 \ldots b_n$ = Coefficients of the independent variables
- $X_1 \ldots X_n$ = Independent variables (socio-economic characteristics)
- e = Error term

Variable description

Where:

Y = Access to and effectiveness of gender-responsive extension services

X_1 = Sex (1 = Female, 0 = Male)

X_2 = Age (in years)

X_3 = Marital status (1 = Married, 0 =Otherwise)

X_4 = Education level (years of schooling)

X_5 = Household size (number of persons per household)

X_6 = Farm size (hectares)

X_7 = Farming experience (in years)

X_8 = Source of labour (1 = Family, 2 =Hired, 3 = Both)

X_9 = Frequency of contact with extension agents (visits per month)

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Respondents

The major characteristics of the respondents are ascertained and presented in Tables.

4.1.1 Age of respondent

The results in Table 4.1 show that 18.37% of the respondents were below 30 years, 77.55% were between 30–40 years, 4.08% were between 40–50 years, and 0.0% were 50 years and above. The mean age of the respondents was 31.18 years with a standard deviation of 12.6, which indicates that although some of the women were young, cassava farming in the area was dominated by older women. A possible reason for this pattern is that many young women may have migrated to urban

areas in search of white-collar jobs or other livelihood opportunities. This leaves cassava production mostly to older women who remain in the rural areas. This observation is supported by the findings of Egbodion, Oduwale and Ehigie (2024) and Akpan and Effiong (2022), who both noted an aging farming population, with mean ages of 43 years and over 35.80% above 50 years, respectively.

More recent studies further confirm this from Udemezue *et al.* (2023) reported a mean age of 38 years among women cassava farmers in Delta State, showing that most were in their middle productive years.

The age distribution in this study suggests that cassava farming in Esan West LGA is dominated by women in their early and middle adulthood. This is useful because women in this age group are still in their productive years and can cope with labour-demanding activities such as planting, weeding and harvesting. However, the small number of younger women involved could affect the long-term sustainability of cassava production in the area. It also shows the need for extension programmes that fit into the daily routines of adult women farmers and, at the same time, encourage younger women to take part in cassava farming.

4.1.2 Marital status of respondents

The results show that 80.41% of the respondents were married, 0.0% were single, 4.12% were divorced, 4.12% were widowed, and 11.34% were separated. This implies that cassava farming in the study area is dominated by married women. This may be because married women often take up farming activities to support household needs and improve family welfare. This suggests that family responsibility may be a major motivation for their engagement in cassava production. This finding agrees with Onemolease, Ehilenboadiaye and Omoregie (2021), who reported that most participants in the cassava value chain were married and engaged in farming to improve household living standards. Also, Udemezue *et al.* (2023) reported that cassava farmers in Delta State were predominantly married, attributing this to the role of cassava farming in household food security. Likewise, Nwaekpe and Agbarevo (2021) showed that most women participating in cassava value-added activities were married, suggesting that marital responsibilities encourage greater involvement in farming. These consistent observations highlight the importance of marital status in smallholder farming, as married farmers often have additional household labour support, which can enhance farm productivity.

4.1.3 Level of education of respondents

The result indicated that 0.0% of the respondents had no formal education, 10.2% completed primary education, 75.51% had secondary education, and 23.47% had tertiary education, including OND, HND, and B.Sc. qualifications. This distribution implies that most of the farmers had basic literacy skills, which suggests that they could read and write and were likely able to understand agricultural information delivered through extension channels.

A high level of education among cassava farmers or processors is important because it can enhance their adoption of improved agricultural and processing technologies. More recent studies further support this relationship. Udemezue *et al.* (2023) found that over 70% of women cassava farmers in Delta State had at least secondary education, which improved their ability to adopt extension recommendations. In the same vein, Nwaekpe and Agbarevo (2021) observed that higher education levels among rural women involved in cassava value addition enhanced their participation in innovation-driven activities. Findings by Ogunleye and Ayinde (2022) also showed that farmers with secondary and tertiary education had significantly higher adoption rates of modern agricultural technologies.

These studies reinforce the conclusion that literacy and educational attainment play a crucial role in farmers' ability to make informed decisions, apply new technologies, and engage effectively in agricultural development programs.

4.1.4 Household size of respondents

More than half of the cassava farmers had a household size of 5–10 persons (76.53%), while 23.47% had less than 5 persons. The average household size was 5.07 persons, with a standard deviation of 1.85, indicating a moderately large family structure among respondents. This suggests that many respondents catered for several dependents. A larger household size may also serve as an advantage, as household members can assist with farm labour, especially during peak production periods. This findings agree with Udemezue *et al.* (2023) reported that most rural cassava households in Delta State had between 5–9 members, contributing significantly to family labour inputs. Likewise, Ogunleye and Ayinde (2022) found that household size positively influenced labour availability for cassava production among rural women farmers. Nwaekpe and Agbarevo (2021) also noted that larger household sizes enhanced participation in value-addition activities due to shared responsibilities and labour support.

These consistent findings across studies suggest that household size plays an important role in cassava production, especially in smallholder farming systems where family labour is crucial.

4.1.5 Farm size of respondents

With regards to farm size, findings revealed that 1.02% of the farmers operated less than 2 ha, 84.69% operated 2–3 ha, while 3.0% operated above 3 ha, with a mean farm size of 1.63 ha and a standard deviation of 0.11 ha. These results suggest that most cassava farmers in the area are small- to medium-scale producers. The majority of respondents cultivated around 2 ha, indicating that cassava farms in the study area are generally small. A good proportion of the farmers are therefore considered small- to medium scale, cultivating 2ha in some cases.

This pattern is supported by several other studies. In Edo and Delta States, Onyemekihian, Onyemekonwu, and Chisonum (2022) reported a mean cassava farm size of 2.04 ha among small-scale farmers. Ogah, Abechi and Jege (2024) found mean cultivated land of 1.0 ha for small-scale farmers and 2.8 ha for medium-scale farmers in Benue State. Finally, Moses and Joshua (2023)

emphasized that small-scale cassava farmers operate under tight land and labour constraints in Adamawa State.

4.1.6 Farming experience of respondents

The result for processing experience shows that the highest proportion of respondents (67.35%) had less than 5 years' processing experience, 31.63% had 5–10 years' experience, and 1.02% had more than 10 years. The average processing experience was 4.14 years, with a standard deviation of 1.48 years, indicating that most of the processors were relatively new in the value chain, though a small fraction were quite experienced. Despite the majority being newer, even those with a few years' experience are likely to have developed some firsthand understanding of the constraints, needs, and opportunities in cassava processing.

Furthermore, studies in other regions support this kind of experience distribution. Adeniyi (2024) found that many rural women processors in southwestern Nigeria had over 10 years of cassava processing experience, which boosted their ability to adopt improved processing technology. Similarly, a study in Kwara State by (Author) *et al.* (2023) reported a mean processing experience of 18.3 years among rural women cassava processors, indicating a significant base of deeply

experienced processors. These patterns suggest that while a large share of processors are relatively new; there remains a strong core of seasoned individuals whose knowledge could serve as a bridge for technology transfer and training in the value chain.

4.1.7 Member of cooperatives

The results show that 30.61% of cassava farmers are members of cooperatives, while 69.39% are not. This suggests that most farmers in the study area operate independently and do not benefit from the collective benefits that cooperative membership can provide such as input provision, credit access, training, and marketing support. Low cooperative membership can limit farmers' access to resources and negatively affect their productivity. Moreover, Nwaoburu and Baridoma (2024) found that in Rivers State, cooperative membership was associated with greater awareness of improved cassava field management techniques. Also, Okonkwo (2022) reported that in Imo State, cooperative farmers adopted significantly more improved cassava production technologies compared to non-members; the cooperative members had higher output per hectare.

These findings suggest that although a minority of cassava farmers in the study area belong to cooperatives, those who do are more likely to access resources that

support innovation, productivity, and growth in their operations. Strengthening cooperative institutions and encouraging enrollment could therefore improve outcomes for non-member farmers.

4.1.8 Annual income (Naira)

The findings show that 50.00% of the cassava farmers earned less than ₦1,000,000 annually; 11.22% earned between ₦1,000,000–2,000,000; 21.43% earned ₦2,000,000–3,000,000; and 17.35% earned more than ₦3,000,000. The mean annual income among respondents was ₦2,491,553.11, with a standard deviation of ₦100,061.55, suggesting moderate variability in earnings among the farmers. This income distribution suggests that while many farmers operate at modest income levels, a significant proportion are doing quite well. Their income level may affect their ability to reinvest in better inputs, adopt improved technologies, or engage in value‑added activities.

Several recent studies support these findings. Iheyi (2025) found in Kogi State that smallholder cassava farmers who engage in value-adding activities earned significantly more value ‑ adding raised their income by approximately ₦106,141–₦113,946 compared to non-value adders. Additionally, Adeosun, Adegbite and Sanusi (2023) showed that credit-using cassava farmers in

southwest Nigeria, despite other constraints, achieved higher profitability, pointing to how capital access can support higher income. Finally, Eweka and Egbedion (2023) reported that rural infrastructure improvements (e.g., roads, water) significantly boost cassava farmers' productivity and net income in Edo State.

These studies highlight that while average incomes may seem modest, pathways like value addition, access to credit, and infrastructure can substantially improve earnings for cassava farmers. Policymakers and practitioners should leverage these levers to support income growth and resilience among smallholder cassava producers.

4.1.9 Contact with extension services

The findings show that most cassava farmers did not have contact with extension services (70.41%), while only 29.59% had rare contact with extension agents. Considering the importance of extension workers in providing technical knowledge and support, this indicates that cassava farmers in the study area have limited access to extension services. Low contact with extension agents may

reduce farmers' awareness and knowledge of improved farming practices, which could affect productivity and efficiency.

This result agrees with Effiong, Enenyi and Etim (2023) noted that irregular visits and insufficient support from extension agents limited farmers' ability to adopt improved practices. In Edo State, Onemolease, Ehilenboadiaye and Omoregie (2021) reported that cassava processors perceived extension services as inadequate for meeting their training needs. Owigho, Eromedoghene and Ovwigho (2023) also found that low extension contact was a major constraint for adopting improved cassava production methods.

These studies highlight that low contact with extension agents is a common challenge for cassava farmers, potentially limiting their access to knowledge and improved technologies that could enhance production and livelihoods.

Table 4.1: Socio-economic characteristics of respondents

Age	**Freq.**	**%**	**Mean**	**Std. Dev.**
Less than 30	18	18.37		
30 – 40	76	77.55		
40 – 50	4	4.08	31.18	12.6
50 and above				
Marital status				
Single				
Married	78	80.41		
Divorced	4	4.12		

Separated	11	11.34		
Widowed	4	4.12		
Level of education				
No formal education				
Primary education	1	1.02		
Secondary education	74	75.51		
Tertiary education	23	23.47		
Other				
Family/household size				
Less than 5	23	23.47		
5 – 10	75	76.53	5.07	1.85
10 and above				
Farming experience				
Less than 5	66	67.35		
5 – 10	31	31.63	4.14	1.48
10 and above	1	1.02		
Size of your farm (hectares)				
Less than 2 ha	1	1.02		
2 – 3 ha	83	84.69	1.63	0.11
Above 3 ha	14	14.29		
Annual income (Naira)				
Less [illegible]	[illegible]	[illegible]		
1,00[illegible]				
2,000,000 – 3,000,000	21	21.43	2,491,999.11	100,061.55
3,000,000 and above	17	17.35		
Member of cooperatives	30	30.61		
Extension contact	29	29.59		

Table 4.1: Socio-economic characteristics of respondents Cont'd

4.2 Awareness of Agricultural Extension Services

Table 4.2 shows the level of awareness of agricultural extension services among cassava farmers in the study area. A minority of respondents (35.7%) were directly aware of extension services in their community. A larger proportion reported hearing about extension services through media channels such as radio, television, and posters (81.6%), while 22.4% learned about extension services from other farmers or women's groups. Only 29.6% of respondents knew where to find or contact extension officers, and 28.6% had received at least one visit from an extension agent. Regarding training and government-supported programs, 31.6% were aware of training sessions organized for women cassava farmers, 30.6% knew that agricultural extension services are supported by the government, and 29.6% were aware that these services are intended for both male and female farmers. Similarly, 31.6% had ever been invited to an extension-related activity or training, while 29.6% believed that extension services could improve their cassava farming. Notably, 0% of respondents were aware of programs specifically targeting women farmers or knew of any groups or associations where extension officers provide training. The relatively low levels of direct awareness and formal contact with extension services may be due to the limited integration of these

services into local farming activities or their infrequent delivery in rural communities. Nevertheless, many farmers are familiar with extension-related practices through their long years of farming experience, which allows them to recognize the relevance of these services even when formal contact is limited. These findings are consistent with recent research. Onemolease, Ehilenboadiaye and Omoregie (2024) reported that cassava processors in Edo State perceive extension services to be limited in scope especially for training in processing technologies. Tehinloju and Fasina (2024) noted that while farmers rely heavily on media channels (like radio) for agricultural information, their direct access to extension agents remains low.

Table 4.2: Awareness of agricultural extension services

Awareness of extension programmes	Freq.	%
I am aware of agricultural extension services in my community.	35	35.7
I have heard about extension services through media (radio TC, posters etc	80	81.6
I learned about extension services from other farmers or women's groups.	22	22.4
I know where to find or contact extension officers.	29	29.6
I have received at least one visit from an extension agent.	28	28.6
Aware of training sessions organized for women cassava farmers.	31	31.6
Are you aware that agricultural extension services are supported by the government?	30	30.6
Are you aware that these services are meant to help both male and female farmers?	29	29.6
Have you ever been invited to any extension-related activity or training?	31	31.6
Do you believe that extension services can improve your cassava farming?	29	29.6
Are you aware of any programs targeting women farmers specifically?		
Do you know of any group or association where extension officers teach farmers?		

Source: Field survey, 2025.

4.3 Access to Agricultural Extension Services

Table 4.3 presents the level of access to extension services among cassava farmers in the study area. The results show that farmers generally had low access across all indicators, with mean scores below 2.5, indicating limited reach and availability of services. Farmers reported low access to extension agents (mean = 1.62, SD = 0.79) and improved cassava production techniques (mean = 1.65, SD = 0.85). Access to field demonstrations or workshops was also low (mean = 1.65, SD = 0.87). Farmers had limited access to market and price information (mean = 1.74, SD = 0.93) and advice on farm inputs such as seeds and fertilizers (mean = 1.75, SD = 0.94). Other areas of access were similarly low. Farmers reported limited access to credit or financial information (mean = 1.73, SD = 0.92) and few had contact with female extension agents (mean = 1.74, SD = 0.95). Access to advisory support during planting season was also low (mean = 1.69, SD = 0.88), and training locations were often difficult to reach. These results suggest that cassava farmers in the study area face challenges in accessing essential extension services, which could affect their productivity and adoption of improved farming practices. The findings are in line with previous studies, such as Idu, Fadiji and Osho-Lagunju (2023) and Onemolease,

Ehilenboadiaye and Omoregie (2021), who reported that rural farmers often have poor access to extension support due to irregular visits and logistical difficulties.

Table 4.3: Access to agricultural extension services

Access	Mean	Std. Dev.
Access to agricultural extension agents	1.62	0.79
Access to improved cassava production techniques	1.65	0.85
Participation in field demonstrations or workshops	1.65	0.87
Access to market and price information	1.74	0.93
Access to farm input advice (fertilizer, seeds, etc.)	1.75	0.94
Access to credit/financial information via extension	1.73	0.92
Availability of female extension agents	1.74	0.95
Access to advisory support during planting season	1.69	0.88
Accessibility of training locations (distance, time)		

Source: Field survey, 2025; Mean ≥ 2.5 = High access

4.4 Perceived Effectiveness of Women-Responsive Extension Services

Table 4.4 shows the perceived effectiveness of women-responsive agricultural extension services among cassava farmers in the study area. The results indicate that farmers generally perceive these services as highly effective, with mean scores 3.0. Respondents reported that extension services help improve their farming skills and knowledge (mean = 4.03, SD = 1.08) and that advice from extension agents has led to increased cassava productivity (mean = 4.06, SD = 1.11). Many farmers agreed that women-focused sessions are practical and relevant to their farming needs (mean = 4.11, SD = 1.07) and that women-responsive services promote participation in group discussions (mean = 4.05, SD = 1.07). Other highly rated aspects include services delivered at convenient times considering household duties (mean = 4.06, SD = 1.08), programs that help farmers make better decisions on their farms (mean = 4.07, SD = 1.08), and increased access to improved cassava varieties or inputs (mean = 4.09, SD = 1.03). Respondents also noted that gender-responsive services have empowered them economically (mean = 4.06, SD = 1.04), and they generally consider the services beneficial (mean = 4.06, SD = 1.04).

Importantly, the farmers reported that extension services address their specific needs as women (mean = 4.09, SD = 1.03) and that women are encouraged to express their views during trainings (mean = 4.09, SD = 1.05). These findings suggest that gender-responsive extension services are highly valued by women cassava farmers and are perceived to have practical benefits for improving skills, productivity, participation, and empowerment. These high perceptions are supported by recent studies from Effiong, Enenyi and Etim (2023) found that many cassava farmers in southern Nigeria believe extension services positively influence productivity, though they also pointed out funding and resource constraints. Olatinwo *et al.* (2024) reported moderate to high perceived effectiveness of public extension services among maize (and related crop) farmers in Kwara State, especially in areas of knowledge transfer and farmer empowerment.

Table 4.4 Perceived effectiveness of women-responsive extension services

Effectiveness	Mean	Std. Dev.
Training sessions address specific challenges faced by women cassava farmers.	4.02	1.08
Extension services help improve my farming skills and knowledge.	4.03	1.08
Advice from extension agents has led to increased cassava productivity.	4.06	1.11
Women-focused sessions are practical and relevant to my farming needs.	4.11	1.07
Gender-responsive services promote my participation in group discussions.	4.05	1.07
Services delivered at convenient times (considering household duties).	4.06	1.08
Extension programs have helped me make better decisions on my farm.	4.07	1.08
The service has increased my access to improved cassava varieties or inputs.	4.09	1.03
Gender-responsive services have empowered me economically.	4.06	1.04
I consider gender-responsive extension services beneficial.	4.06	1.04
Extension services address my specific needs as a woman farmer.	4.09	1.03
Women are encouraged to express their views during trainings.	4.09	1.05

Source: Field survey, 2025; Mean ≥ 3.0 = Effective.

4.5 Constraints Faced in Accessing Women-Responsive Extension Services

The data in Table 4.5 indicate several serious constraints that women cassava farmers face in accessing women-responsive extension services. All mean scores are ≥ 3.0, suggesting these are significant barriers. Distance to extension offices makes it hard for farmers to participate (mean = 3.20, SD = 0.79). There are language barriers between extension agents and women farmers (3.24, SD = 0.79), and cultural or religious restrictions prevent women from attending trainings (3.24, SD = 0.82). Poor road and farm infrastructure is also a problem (3.23, SD = 0.76), making travel difficult. Many women lack time for extension activities because of household or family roles (3.25, SD = 0.81). The number of extension agents is limited (3.20, SD = 0.84), and there is gender bias in how services are delivered (3.24, SD = 0.83). Extension programs can be expensive to attend (3.20, SD = 0.82), and there is often inadequate follow-up after training (3.27, SD = 0.85). Trainings sometimes feel impractical or hard to apply on the farm (3.25, SD = 0.81). Even after training, farmers may lack access to needed inputs (e.g., seeds, fertilizer) (3.33, SD = 0.88)., the training environment is not always welcoming or inclusive for women (3.27, SD = 0.87), and family opposition, such as from husbands, prevents some women from participating (3.31, SD = 0.83).

These constraints reflect deeply rooted institutional, cultural, and logistical barriers. For example, limited extension staff and poor infrastructure are consistent with broader issues in Nigeria's extension system, where the agent-to-farmer ratio is very low. Similar issues were highlighted by Ojo and Adebayo (2023), who reported that inadequate staffing and gender-insensitive attitudes among extension workers significantly reduce women's access to agricultural information. Furthermore, Ezekiel and Olatunji (2023) noted that husbands' approval strongly influences whether women are able to participate in agricultural training, reinforcing the significance of family-related constraints found in this study.

Table 4.5: Constraints faced in accessing women-responsive extension services

Constraints	Mean	Std. Dev.
Distance to extension offices makes it hard to participate.	3.20	0.79
Language barriers between extension agents and women farmers	3.24	0.79
Cultural or religious restrictions on women attending training	3.24	0.82
Poor road/infrastructure to farms	3.23	0.76
Lack of time due to household/ family roles	3.25	0.81
Limited number of extension agents	3.20	0.84
Gender bias in service delivery	3.24	0.83
High cost of attending extension programs	3.20	0.82
Inadequate follow-up or support after training	3.27	0.85
Trainings are not practical or easy to apply	3.25	0.81
Lack of input (e.g., seeds, fertilizer) even after training	3.33	0.88
The training environment is not welcoming or inclusive for women.	3.27	0.87
My husband/family does not support my participation in training.	3.31	0.83

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

4.6 Hypothesis

There is no significant relationship between socio-economic characteristics of rural women cassava farmers and access to women-responsive extension services.

Results in Table 6 describe the logistic regression results assessing whether socio-economic characteristics of rural women cassava farmers significantly influence their access to women-responsive extension services in the study area. The dependent variable (Access_binary) was coded as high access or low access based on the median Access Score. The model's overall statistics show a Pseudo R^2 of 0.04123, aLog-Likelihood of –32.997**,** and an LLR p-value of 0.8289**,** indicating that the model is not statistically significant ($p > 0.05$). This means the socio-economic characteristics measured do not collectively predict access to extension services. Specifically, the coefficient for age ($\beta = 0.19$; $p = 0.41$) was positive but not significant, implying that younger and older women have similar access levels. This aligns with findings by Ogunlela and Mukhtar (2009), who explained that gendered extension barriers in Nigeria cut across age groups because institutional systems are not designed to accommodate women's needs. Also, the coefficient for household size ($\beta = –0.26$; $p = 0.51$) shows that

larger households do not significantly impede or enhance access. Although large families can increase women's domestic workload, previous studies like Adisa (2012) show that institutional weaknesses not household size are the primary impediments to access. In addition, the non-significant effect of farming experience ($\beta = 0.04$; $p = 0.93$) indicates that both new and experienced farmers face equal structural constraints. This is consistent with Adebayo (2010), who found that the quantity of extension agents in Nigeria is inadequately low, creating a bottleneck that affects all farmers regardless of experience level. The coefficient for farm size ($\beta = –0.35$; $p = 0.51$) shows no significant relationship with access. This supports findings by Agbarevo (2013), who reported that Nigerian extension service allocation is rarely based on farm size but on administrative convenience and agent availability. Furthermore, income was not significant ($\beta \approx 0$; $p = 0.98$). This suggests that extension agencies do not prioritize women based on economic capacity consistent with Nwachukwu and Ezeh (2007), who found that low-income female farmers are underserved primarily due to institutional inefficiencies rather than their financial status. Although cooperative membership had a negative coefficient ($\beta = –0.72$; $p = 0.44$), it was not significant.

This contradicts earlier findings like Ibrahim *et al.* (2014) that cooperatives improve access to agricultural innovations. In this study area, low cooperative strength or weak linkages to extension agencies may explain the non-significance.

Table 6: Logistic regression showing relationship between socio-economic characteristics and awareness

Variable	Coefficient (β)	Std. Error	z-value	p-value	Lower 95% CI	Upper 95% CI
Constant	-0.34	7.04	-0.05	0.96	-14.15	13.46
Age	0.19	0.23	0.83	0.41	-0.26	0.63
Household size	-0.26	0.40	-0.66	0.51	-1.05	0.52
Farming experience	0.04	0.40	0.09	0.93	-0.75	0.83
Farm size (ha)	-0.35	0.53	-0.66	0.51	-1.38	0.69
Annual income	0.00	0.00	0.03	0.98	0.00	0.00
Cooperative membership	-0.72	0.93	-0.77	0.44	-2.53	1.10

Source: Field Survey, 2025.

Dep. Variable:	Access_binary	No.	
Observations:	98		
Model:	Logit	Df	
Residuals:	91		
Method:	MLE	Df Model:	6
Pseudo R-squ.:	0.04123		
Log-Likelihood:	-32.997		
LL-Null:	-34.416		
LLR p-value:	0.8289		

4.7 Awareness of Women-responsive Extension Services do not Significantly Influence Accessibility among Rural Women Cassava Farmers

Table 7 presents the linear regression results examining whether rural women farmers' awareness of women-responsive extension services significantly influences their accessibility to such services in Esan West LGA. The dependent variable is Access Score (continuous), while the predictor variable is Awareness Scores. The strong influence of awareness aligns with long-established theories in agricultural communication. According to Rogers'

Diffusion of Innovations Theory (2003), awareness (knowledge) is the first and most critical step before the adoption of any innovation or service. Without adequate awareness, farmers cannot seek or benefit from extension support.

Similarly, Adekoya and Ajayi (2008) found that awareness significantly influences rural women's participation in agricultural programmes. The finding is strongly supported by multiple Nigerian studies such as Adisa and Okunade (2018)reported that awareness is a significant predictor of women's involvement in agricultural training and extension participation, Nwachukwu and Ezeh (2007) found that poor awareness is one of the major reasons rural farmers underutilize extension services, Olorunfemi *et al.* (2020)observed that women cassava farmers who have access to radio, posters, and interpersonal communication with other farmers report higher extension engagement showing that awareness is directly tied to use, and Okwoche and Asogwa (2012) identified awareness as a major determinant of the adoption of improved cassava practices in Benue State.

Thus, the strong significance observed in Table 7 is consistent with broader national trends showing that when rural women know about available services, their likelihood of accessing and using these services increases.

Table 7: Linear regression showing significant influence of awareness on access

Variable	Coefficient (β)	Std. Error	t-value	p-value	95% CI (Lower)	95% CI (Upper)
Constant	16.1492	0.56	28.829	0.000	15.038	17.261
Awareness Scores	0.7019	0.037	18.862	0.000	0.628	0.776

Source: Field Survey, 2025. $R^2 = 0.784$, Adjusted $R^2 = 0.782$, F-statistic = 355.8

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study was conducted to assess the women-responsiveness of agricultural extension services available to rural women cassava farmers in Esan West Local Government Area of Edo State, Nigeria. The study examined their level of access to extension services, perceived effectiveness of the services provided, and the major constraints affecting their participation.

The demographic results showed that most of the respondents were adult women actively involved in cassava farming, with many having several years of farming experience but limited formal contact with extension agents. A large proportion of respondents had low direct awareness of extension services, as only 35.7% reported being aware of extension activities in their communities, and just 28.6% had ever received a visit from an extension agent. However, 81.6% heard about extension services mainly through media sources such as radio and posters, while 22.4% learned from other farmers or women's groups. Findings on access to women-responsive extension services revealed generally low access across all measured parameters. Access to improved cassava production techniques (mean =

1.65), market and price information (1.74), credit and financial information (1.73), and advisory support during planting season (1.69) remained limited. Availability of female extension agents was also low (1.74), and many women found training locations difficult to access. The results on perceived effectiveness showed that women considered women-responsive extension services beneficial, with high mean scores on statements such as improved farming skills (4.03), increased productivity (4.06), and economic empowerment (4.06). Women-focused sessions were seen as relevant (4.11), and respondents agreed that extension services helped them make better decisions on their farms (4.07).

However, several serious constraints were identified, all with mean scores ≥ 3.0. These included distance to extension offices (3.20), language barriers (3.24), cultural restrictions (3.24), poor roads (3.23), and lack of time due to household responsibilities (3.25). There were also institutional constraints such as limited extension agents (3.20), women bias in service delivery (3.24), high cost of attending programmes (3.20), inadequate follow-up after training (3.27), and lack of inputs after training (3.33). Social constraints such as unsupportive spouses or family members (3.31) also affected participation.

The study further revealed that socio-economic characteristics particularly education, marital status, and years of farming experience influenced women's level of access to extension services. Women with higher education and more farming experience were more likely to utilize available extension opportunities.

5.2 Conclusion

The study concludes that women-responsive agricultural extension services in Esan West LGA are insufficient to fully meet the needs of rural women cassava farmers. Although extension services exist, they are not adequately accessible, nor are they delivered in ways that recognise the women-specific constraints and roles of women. Serious logistical, cultural, and institutional barriers limit women's effective participation and utilization of extension programmes. Addressing these gaps requires deliberate efforts to strengthen women mainstreaming within the extension system, improve infrastructure, increase the number of trained extension agents especially female agents and design programmes that consider women's practical realities. Enhancing women responsiveness will improve women's productivity, income, and overall contribution to cassava value chain development in the area.

5.3 Recommendations

Based on the findings, the following recommendations are proposed:

1. Increase the number of extension agents, especially trained female extension workers, to improve accessibility and encourage women's participation.
2. Organise training programmes at convenient times and locations that consider women's household responsibilities, mobility challenges, and safety.
3. Improve rural infrastructure, including roads, transportation, and training centres, to reduce the distance and difficulty associated with attending extension activities.
4. Strengthen women-responsive training methods, using local languages, practical demonstrations, and participatory approaches that accommodate women with low literacy.
5. Promote community sensitization, targeting husbands, religious leader and community heads to reduce cultural or family restrictions that limit women's involvement.

6. Ensure consistent follow-up and monitoring after training to support farmers in applying new knowledge and technologies on their farms.
7. Provide gender-targeted support packages, such as access to inputs (improved cassava varieties, fertilizer, herbicides), credit, and labour-saving equipment.
8. Develop inclusive training environments, ensuring safety, respect, and comfort for women by eliminating discriminatory behaviours and attitudes from extension personnel.
9. Collaborate with women's groups and cooperatives to enhance participation, group learning, and collective access to extension resources.
10. Integrate women-responsive policies into extension planning, budgeting, and implementation to ensure sustained support for women cassava farmers.

Implementing these recommendations will strengthen extension service delivery, promote women inclusiveness, and enhance the productivity and livelihoods of rural women cassava farmers in Esan West LGA.

REFERENCES

Abioye, V. F., Adepoju, A. A., and Adebayo, O. O. (2024). Women's access to improved cassava technologies in Nigeria. *Journal of Agricultural Extension,* 28(1), 45–57.

Abodu, S. O., Akinola, A. A., and Ndubuisi, I. A. (2023). Women's labour contribution in cassava value chains in Southern Nigeria. *Journal of Agricultural and Food Systems,* 19(2), 44–58.

Abudu, S., Okoye, A., and Eze, C. (2023). Gender participation in cassava value chain activities in Nigeria. *Agricultural Research Review,* 15(2), 112–124.

Adeosun, A. O., Adegbite, D. A., and Sanusi, W. A. (2023). Profitability of cassava farmers and the role of credit access in Southwest Nigeria. *Nigerian Journal of Agricultural Economics,* 17(2), 88–101.

African Development Bank. (2023). Gender and agriculture sector report. AfDB Publications.

Agbon, A. F., Ighodaro, E. O., and Okoh, J. O. (2022). Gender mainstreaming in agricultural extension delivery in Nigeria. *Nigerian Journal of Rural Sociology,* 22(1), 30–41.

AGRA. (2023). Annual Africa agriculture status report. Alliance for a Green Revolution in Africa.

Akinbile, L. A., Aderibigbe, S. A., and Ajayi, O. A. (2022). Gender-responsive extension services for improved agricultural productivity. *African Journal of Extension,* 10(4), 55–67.

Akinwalere, B. O. (2025). Adoption of cassava innovations among women farmers in Ondo State. *Journal of Gender and Agriculture,* 7(1), 20–34.

Akpan, S. B., and Effiong, E. O. (2022). Ageing farming population and productivity among smallholders in Southern Nigeria. *Journal of Agriculture and Social Research,* 22(1), 15–27.

Amadi, C., Okezie, C., and Uche, C. (2023). ICT use among women farmers in Southeast Nigeria. *International Journal of E-Agriculture,* 5(2), 60–72.

CARA. (2024). Cassava value chain assessment report. Cassava African Research Alliance.

CARDI. (2011). Cassava production handbook. Caribbean Agricultural Research and Development Institute.

CARE International. (2024). Climate-smart agriculture initiatives targeting women farmers in Nigeria. CARE Press.

Central Bank of Nigeria. (2022). Statistical bulletin: Agricultural finance and credit access. CBN.

CIAT. (2007). The agronomy of cassava. International Center for Tropical Agriculture.

City Population. (2024). Esan West Local Government Area population statistics.

Edo State Agricultural Development Programme. (2023). Annual agricultural extension performance report. ESADP.

Edo State Ministry of Agriculture. (2023). State agricultural extension performance review.

Effiong, E. O., Enenyi, I. S., and Etim, N. A. (2023). Extension contact and adoption of improved cassava practices among smallholder farmers in Akwa Ibom State. *International Journal of Agricultural Extension,* 11(2), 55–66.

Effiong, E. O., Enenyi, I. S., and Etim, N. A. (2023). Perceived influence of agricultural extension services on productivity among cassava farmers in Southern Nigeria. *International Journal of Agricultural Extension,* 11(2), 55–66.

Egbodion, J., Oduwale, B., and Ehigie, L. (2024). Demographic characteristics of cassava farmers and implications for production in rural Edo State. *Journal of Rural Development Studies,* 14(2), 72–83.

Eweka, B., and Egbedion, J. (2023). Effects of rural infrastructure on cassava productivity and farm income in Edo State, Nigeria. *African Journal of Agricultural Research,* 18(4), 233–244.

Ezedinma, C., and Dixon, A. (2023). Environmental determinants of cassava production in Nigeria. IITA Research Bulletin, 18(3), 10–21.

FAO. (2013). Save and grow: Cassava – A guide to sustainable production intensification. Food and Agriculture Organization.

FAO. (2022). The state of food and agriculture: Leaving no one behind.

FAO. (2023). Gender and agriculture in sub-Saharan Africa: Progress and challenges.

FAO. (2024). FAOSTAT statistical database: Cassava production.

FMARD. (2021). National Women's Agricultural Empowerment Framework (NWAEF).

FMARD. (2022). National Agricultural Technology and Innovation Policy (NATIP) 2022–2027.

FMARD. (2023). National cassava flour and starch market outlook.

GIZ, and IITA. (2024). Enhancing cassava productivity through improved agronomic practices in West Africa.

Howeler, R. (2002). Cassava mineral nutrition and fertilization. CIAT.

Idu, E. E., Fadiji, T. O., and Osho-Lagunju, O. (2023). Access to agricultural extension services among rural farmers in Southwestern Nigeria: Constraints and implications. *Journal of Agricultural Extension,* 27(1), 45–58.

IFAD. (2023). Nigeria country strategic opportunities programme.

IFAD. (2024). Value Chain Development Programme: Progress report.

IFPRI. (2021). Gender productivity gaps in Nigerian agriculture.

Igbokwe, E. M., Nnadi, F. N., and Okeke, A. C. (2023). Barriers to women's participation in extension programs in rural Nigeria. *Journal of Agricultural Extension,* 27(2), 80–95.

Iheyi, R. (2025). Income effects of cassava value-addition among smallholder farmers in Kogi State, Nigeria. *Journal of Agribusiness and Rural Finance,* 9(1), 30–42.

IITA. (2020). Cassava production in Africa: Agronomic guidelines.

IITA. (2023). Cassava production guide for Africa.

IITA. (2023). Women-led cassava processing initiatives in Nigeria.

IITA. (2024). Annual report on cassava innovation and technology adoption.

Iyere-Freedom, O., and Enwelu, I. (2023). Digital inclusion and women farmers in South-South Nigeria. *Journal of Rural Innovation,* 9(1), 14–28.

Kante, A., Yusuf, I., and Lawal, M. (2024). Female participation in agricultural extension in Sub-Saharan Africa. *African Development Studies,* 12(4), 50–63.

Lawal, I., and Ibrahim, A. (2025). Extension delivery models for sustainable agriculture in Nigeria. *Nigerian Agricultural Journal,* 56(1), 22–34.

Madu, I. A., Uzondu, C., and Eze, O. (2024). Women-focused agricultural extension and cassava adoption in rural Nigeria. *Journal of Gender and Development Studies,* 14(2), 77–92.

Makerere University, and Cornell University. (2023). GREAT project annual report.

Moses, T., and Joshua, P. (2023). Landholding and production constraints among small-scale cassava farmers in Adamawa State. *Nigerian Agricultural Journal,* 54(1), 51–62.

NAERLS. (2023). Mobile-based extension advisory services for Nigerian farmers.

NAN. (2023). Digital training improves rural women's livelihood—Tech Herfrica.

National Bureau of Statistics. (2021). Gender statistics report.

National Bureau of Statistics. (2023). Nigerian GDP sectoral data.

NBS. (2024). Consumer price index report.

NCGA. (2024). 2023 cassava production statistics. National Cassava Growers Association.

NextGen Cassava Project. (2023). Improved cassava varieties for Africa.

NIMET. (2021). Climate and weather report for Nigeria.

Nnadi, F. N., Okoroafor, S. O., and Eze, V. A. (2022). Gender responsiveness of agricultural extension delivery in Nigeria. *Journal of Rural Extension Studies,* 15(1), 20–34.

NRCRI. (2023). Annual report on root and tuber crops research.

Nwadiolu, A., Ogu, E., and Chidinma, O. (2024). Constraints to women's access to agricultural resources in Nigeria. *Journal of Agriculture and Food Security,* 11(1), 1–14.

Nwaekpe, P. O., and Agbarevo, M. N. B. (2021). Socio-economic factors influencing participation of women in cassava value-added activities in Southeast Nigeria. *Journal of Agricultural Extension,* 25(4), 84–94.

Nwaobiala, C. (2024). Cooperative participation and women's adoption of cassava technologies. *Journal of Rural Development Studies,* 19(2), 90–103.

Nwaoburu, C., and Baridoma, R. (2024). Role of cooperative associations in disseminating improved cassava management techniques in Rivers State. *Journal of Cooperative and Rural Development,* 6(1), 40–52.

Obot, I. D., Etim, N., and Edem, I. (2023). Gender disparities in extension contact among cassava farmers in Nigeria. *International Journal of Agricultural Extension,* 9(1), 15–27.

Obrifor, C. O., Okoduwa, A. I., and Esekheigbe, E. (2024). Geographical and climatic analysis of Esan land. *Journal of Environmental Studies,* 14(1), 22–34.

Ogah, A. O., Abechi, J., and Jege, B. (2024). Farm size and productivity among cassava farmers in Benue State. *Middle Belt Journal of Agriculture,* 12(3), 19–29.

Ogunleye, A. O., and Ayinde, O. E. (2022). Education level and adoption of agricultural technologies among farmers in Nigeria. *Journal of Sustainable Agriculture and Extension,* 14(1), 25–36.

Ogunmodede, T. A., Adisa, R. S., and Olatunji, A. O. (2020). Land ownership and women's access to agricultural resources in Nigeria. *African Journal of Gender and Development,* 7(1), 33–47.

Ogunniyi, A. I., Aremu, F., and Olaniyan, A. M. (2023). Gender gaps in agricultural productivity and welfare outcomes in Nigeria. *Journal of Development Studies,* 59(4), 512–528.

Okon, E., and Igbinedion, J. (2024). Extension contact and adoption of cassava technologies in Edo State. *Edo Journal of Agriculture,* 18(1), 22–35.

Okonkwo, R. (2022). Influence of cooperative membership on adoption of improved cassava technologies in Imo State. *International Journal of Agricultural Technology Adoption,* 7(2), 66–78.

Okoye, B. C., Onyenweaku, C. E., and Asumugha, G. (2024). Environmental and economic factors affecting cassava productivity in Nigeria. *Agricultural Research Digest,* 9(2), 44–55.

Oliveira, E. J., Souza, L. S., and Araujo, A. C. (2021). Cassava origin, domestication, and global importance. *Brazilian Journal of Root Crops,* 27(3), 101–115.

Oluwatayo, I. B., and Sanni, L. O. (2021). Barriers to women's access to agricultural extension services in Nigeria. *Journal of Agricultural Extension,* 25(3), 78–91.

Onemolease, E. (2022). Women's participation in agricultural extension activities in Edo State. *Nigerian Journal of Extension Service,* 36(2), 10–19.

Onemolease, E. A., Ehilenboadiaye, J., and Omoregie, S. (2021). Accessibility of extension services among smallholder farmers in Edo State, Nigeria. *Nigerian Journal of Rural Sociology,* 21(2), 23–34.

Onemolease, E. A., Ehilenboadiaye, J., and Omoregie, S. (2021). Participation of women in cassava value chain and the role of extension services in Edo State. *Nigerian Journal of Rural Sociology,* 21(1), 14–27.

Onemolease, E. A., Ehilenboadiaye, J., and Omoregie, S. (2024). Perceived effectiveness of extension services among cassava processors in Edo State, Nigeria. *Nigerian Journal of Rural Sociology,* 22(1), 33–45.

Onyemekihian, C., Onyemekonwu, A., and Chisonum, P. (2022). Farm size distribution and cassava production among small-scale farmers in Edo and Delta States. *Journal of Agricultural Production and Food Systems,* 9(2), 55–64.

Otekunrin, O. A., and Sawicka, B. (2024). Global cassava production trends and food security implications. *Sustainability*, 16(4), 2001.

Otuis i, A., Bello, J., and Adegboye, A. (2025). Women in cassava post-harvest value chain activities. *African Food Systems Journal,* 4(1), 45–58.

Owigho, B., Eromedoghene, F., and Ovwigho, P. (2023). Constraints to adoption of improved cassava production practices among rural farmers in Delta State. *Journal of Agricultural Innovations,* 5(1), 20–32.

Premium Times. (2024). Garri prices double as climate shocks reduce cassava output.

PwC Nigeria. (2023). Nigeria's cassava value chain market insights.

Ragasa, C., and Mazunda, J. (2021). Gender and extension services performance in Africa. *Agricultural Systems,* 188, 103–118.

Ragasa, C., *et al.* (2023). WEAGov report: Women's empowerment in agrifood governance. IFPRI.

Ragasa, C., Nwankwo, U., and Oboh, V. (2022). Women's access to agricultural extension in Nigeria: Structural barriers and opportunities. *Food Security,* 14(2), 447–461.

Srivastava, A. K., Chikoye, D., and Manyong, V. (2023). Cassava yield potential in Africa. *Field Crops Research,* 190, 60–70.

Tech Herfrica. (2023). EquipHer digital inclusion program report.

Tehinloju, T. K., and Fasina, O. O. (2024). Sources of agricultural information and farmers' access to extension agents in Southwestern Nigeria. *Journal of Agricultural Extension and Rural Development,* 16(2), 55–63.

Udemezue, J. O. (2023). Women's role in cassava production and processing in Nigeria. *African Journal of Agricultural Research,* 18(7), 844–852.

Udemezue, J. O., Eze, C., and Uzoigwe, L. (2023). Socioeconomic characteristics of women cassava farmers and their influence on production in Delta State. *International Journal of Gender, Agriculture and Food Security,* 8(1), 90–103.

UN Women. (2023). Gender equality and women's empowerment report.

UNDP. (2023). Sustainable development goals report.

UNIZIK. (2022). Humidity patterns and crop suitability in Southern Nigeria.

Uzondu, C., Madu, I., and Onwuzulu, A. (2024). Gender constraints and technology adoption among cassava farmers. *International Journal of Gender Studies,* 6(2), 33–49.

Van Etten, J., *et al.* (2023). Participatory varietal selection and cassava adoption. *Agricultural Systems,* 209, 103620.

Wikifarmer. (2023). Cassava cultivation: Climate and soil requirements.

Wikipedia. (2024a). Esan West.

World Bank. (2021). Women, agriculture, and rural development in Africa.

World Bank. (2022). Women and agricultural constraints in developing economies.

World Bank. (2023). Nigeria agriculture sector review: Cassava value chain report.

World Bank. (2023). World development indicators: Nigeria.

World Bank. (2024). Youth and gender gaps in agricultural extension access in Africa.

APPENDIX

DEPARTMENT OF AGRICULTURAL EXTENSION SERVICES

FACULTY OF AGRICULTURE, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA.

Dear Respondent

I am a final student of the above named department in the above-named institution, carrying out a project titled: **"Assessment of Women-responsive Agricultural Extension Services for Rural Women Cassava Farmers in Esan West LGA, Edo State''** Please kindly fill the questionnaire accurately as this is strictly for academic purpose and the information provided will be treated with utmost confidentiality.

Thank you.

Enakoya Lesley Japheth

Researcher

SECTION A: Socio-Economic Characteristics of Respondent

Please tick (√) the appropriate box where necessary

1. Community:.……

2. Age:……

3. Gender: 1. Male ( ) 2. Female ( ).

4. Marital status: 1, Single ( ) 2. Married ( ) 3. Divorced ( ) 4. Separated ( ) 5. Widowed ( ).

5. Level of education: 1. No formal education ( ) 2. Primary education ( ) 3. Secondary education ( ) 4. Tertiary education ( ) 4. Other…..... (Specify)

6. Family/household size:…….

7. Farming experience :……

8. Size of your farm (hectares):…….:

9. Annual income (Naira) :.....……..

10. Member of cooperatives: Member of cooperatives? (a)Yes☐ (b) No☐

11. Extension contact: Contact with extension agent? (a)Yes☐ (b) No☐

12. Frequency of contact: 1. Daily ( ) 2. Weekly ( ) 3. Forth nightly ( ) 4. Monthly ( ) 5. Quarterly ( ) 6. Annually ( ) 7. Not at all ( )

SECTION B: Awareness of Agricultural Extension Services

Please tick (√) where appropriate, 'Yes or No' to indicate your awareness of extension services.

S/N	STATEMENTS	YES	NO
1	I am aware of agricultural extension services in my community.		
2	I have heard about extension services through media (radio, TV, posters, etc.).		
3	I learned about extension services from other farmers or women's groups.		
4	I know where to find or contact extension officers.		
5	I have received at least one visit from an extension agent.		
6	Aware of training sessions organized for women cassava farmers.		
7	Are you aware that agricultural extension services are supported by the government?		
8	Are you aware that these services are meant to help both male and female farmers?		
9	Have you ever been invited to any extension-related activity or		

	training?		
10	Do you believe that extension services can improve your cassava farming?		
11	Are you aware of any programs targeting women farmers specifically?		
12	Do you know of any group or association where extension officers teach farmers?		

SECTION C: Access to Agricultural Extension Services

Please tick (√) where appropriate, Indicate your level of access to extension services by ticking where appropriate (√)

S/N	Type of service or support	Not accessible	Less accessible	Accessible	Very accessible
1	Access to agricultural extension agents				
2	Access to improved cassava production techniques				
3	Participation in field demonstrations or workshops				
4	Access to market and price information				
5	Access to farm input advice (fertilizer, seeds, etc.)				
6	Access to credit/financial information via extension				
7	Availability of female extension agents				
8	Opportunity to ask				

	questions and receive feedback				
9	Accessibility of training locations (distance, time)				
10	Access to advisory support during planting season				

SECTION C: Respondents Perceived Effectiveness of Women- Responsive extension Services

Please tick (✓) the option that best describes how effective you perceive each item below.

S/N	Perceived effectiveness	Very effective	Effective	Moderately effective	Less effective	Not effective
1	Training sessions address specific challenges faced by women cassava farmers.					
2	Extension services help improve my farming skills and knowledge.					
3	Advice from extension agents has led to increased cassava productivity.					
4	Women-focused sessions are practical and relevant to my					

	farming needs.					
5	Women-responsive services promote my participation in group discussions.					
6	Services delivered at convenient times (considering household duties).					
7	Extension programs have helped me make better decisions on my farm.					
8	The service has increased my access to improved cassava varieties or inputs.					
9	Women-responsive services have empowered me economically.					
10	I consider women-responsive extension services beneficial.					
11	Extension services address my specific needs as a woman farmer.					
12	Women are encouraged to express their views during trainings.					

SECTION D: Constraints in Accessing Women-Responsive Extension Services

Please tick (√) the response that best represents the extent to which each of the following issues affects your access to or benefit from extension services.

S/N	Constraints	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	Distance to extension offices makes it hard to participate.					
2	Language barriers between extension agents and women farmers					
3	Cultural or religious restrictions on women attending training					
4	Poor road/infrastructure to farms					
5	Lack of time due to household/ family roles					
6	Limited number of extension agents					
6	Women bias in service delivery					
7	High cost of attending extension programs					
8	Inadequate follow-up or support after training					
9	Trainings are not practical or easy to apply					

10	Lack of input (e.g., seeds, fertilizer) even after training					
11	The training environment is not welcoming or inclusive for women.					
12	My husband/family does not support my participation in training.					