

WOMEN AND AGRICULTURE – A ROADMAP TOWARD ATTAINING SUSTAINABLE DEVELOPMENT GOALS IN NIGERIA.

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Abstract

The study reconnoiters and reinvigorates the age long clamors for women participation toward sustaining growth and nascent development with a view of attaining Sustainable Development Goals (SDGs) in Nigeria. The research examines the role of women in agriculture, their access to resources, and how empowering women can lead to improved agricultural practices, which are essential for achieving long-term sustainability in Biu Local Government, Borno State. The study employs a mix of theoretical- Capability Approach and quantitative methods to assess the current status of women in agriculture, identify barriers to their empowerment, and propose strategies for improving their involvement in sustainable agricultural practices. The findings revealed the importance of integrating the female- gender perspectives into agricultural policies in order to achieve sustainable development and enhance the resilience of communities in Biu Local Government and beyond. The major thrust of the study advocates for better empowerment for Women. As well as, the Policymakers and Development practitioners should prioritize clamor for women's empowerment and provide support to women farmers to enable them to adopt sustainable agricultural practices in order to balance gender equity with a view toward attaining the targets of Sustainable Development Goals in Nigeria.

Keywords: Agriculture, Development, Equity, SDGs, Women.

Introduction

Agriculture plays a significant role in promoting women's economic empowerment and management. Over time agriculture has been the back bone of many developing countries, especially countries within Africa and Asian continent. Women often account for more than half of the work force participating in different farming activities either directly or indirectly. However, in few most developing countries, women's efforts are yet to be recognized by the society. Rural development in Africa cannot be actualized without the active participation of women. Women are, indeed form an integral part of farming household. Historically, agriculture has been the mainstay of Nigeria's economy, but it has been neglected in favour of oil since its discovery. Nonetheless, there is growing recognition of the importance of gender sensitivity in all economic sectors, particularly agriculture. Women's participation in agriculture is multidimensional, encompassing activities like crop cultivation, livestock management, and household chores. Despite their significant contributions, women often have limited rights and decision-making power within rural households. Empowering women in agriculture will have a positive impact on agricultural sustainability in Borno State (the research study area), and at large in Nigeria. Therefore, the whole essence is to galvanize the attainment of sustainable development goals in

Nigeria. Additionally, empowered women can contribute to household food security and generate higher incomes, further contributing to rural development (Ibrahim et.al, 2021) emphasized.

The attainment of Sustainable Development Goals (SDGs) hinges on the intersection of gender equality and environmental sustainability, especially in Biu Local Government area, Borno state. Therefore, the research seeks to address the critical nexus between woman empowerment and agricultural sustainability, recognizing that gender-sensitive approaches can drive transformative change. By amplifying women's voices, enhancing their access to resources, and fostering inclusive agricultural practices, which can unlock the full potential of agriculture to achieve the SDGs, ensuring a more equitable, sustainable, and food-secure future for all.

Statement of the Problem

The role of women in agricultural sector cannot be denied (Oduwole et.al, 2024). They actively participate in the major field crops production and their intensity of participation is directly linked with their age, social class as well as the type of crop to be cultivated. The rural women work almost 12 to 15 hours a day. During sowing and harvesting of farming system, they look too busy to perform their duties honestly. To produce wheat, cotton and vegetables, their participation is higher than that of other crops cultivation. As more women are entering into the work force, the predicament of combining satisfactorily their role as income earners with their role as mothers, leaving her vulnerable to discrimination and even dismissal from employment. By and large, employers, being insensitive to the specific needs of women, would either terminate employment in the events of pregnancy or force them to take earned leave at the time of delivery, or even to take leave without pay. To prevent unfair employment practices and exploitation of women in the labor market, and to safeguard the health and well-being of the woman, it is essential to provide material protection to women who are engage in work activities.

Sustainable agriculture has become an increasingly important concept in recent decades as the world grapples with the challenges of feeding a growing population while protecting the environment (Sarkeret et. al, 2019). The concept of sustainable agriculture encompasses a range of practices and goals that aim to meet current and future societal needs for food and other agricultural products, while ensuring profit-three pillars of sustainability in agriculture include economic, social and environmental sustainability (Fischer et al., 2020). Empowering women, indigenous groups, youth and other marginalized populations contributes to social sustainability in farming systems around the world. Farmers aim to minimize pollution, preserve biodiversity, improve resilience to climate change, and reduce dependence on non-renewable inputs. Technologies like precision agriculture, drought-tolerant crops, and renewable energy help reduce agriculture's environmental footprint (Zhao et al., 2023). The united nation SDGs, adopted in 2015, expanded upon this concept of sustainable development by providing 17 goals and 169 targets to guide inclusive social and economic progress while protecting the environment (Halkos et.al, 2021; Leal Filho et al., 2019). Although not one of the 17 official SDGs, sustainable agriculture is considered an important component for achieving many of the goals. Countries around the world have committed to achieving the SDGs by 2030 through partnerships, policy and investment.

Advancing sustainable agriculture is essential to accomplishing these ambitious global sustainability targets. The focus on agriculture is considered imperative because, it directly connects with most SDGs. It supports the first three goals: eliminating poverty, eradicating hunger and providing good health by ensuring that people can farm, which guarantees food security, good health and physical well-being (Gennari et al., 2019; Abraham et al, 2020). Women's involvement in agriculture and across different value chains ensures gender equality and economic growth for

the country that promotes it (Doss et al., 2018; Agarwal, 2018). Agriculture also contributes to responsible consumption, production and climate action and supports life underwater and on land. This link with most SDGs highlights the importance of agriculture and stakeholder involvement and support (Biglari et al., 2022; Abraham et al, 2020). Therefore, the study investigated the intersection of women empowerment, agricultural sustainability, and sustainable development growth in Biu Local Government, Borno State, Nigeria with a view to providing insights and recommendations for addressing these challenges. Thus, this study seeks to bridge the gap between WEAs/EWS (are proactive monitoring systems designed to safeguard financial institutions against credit deterioration and systemic shocks) and Banks, facilitating a comprehensive understanding of financial institution role on empowering women entrepreneurs within the agricultural sector for broader societal sustainability.

Objectives

The main objective of this study is to identify the role of women in agricultural activities and to suggest possible project that will enhance women participation in Agricultural activities. The other objectives are as follows.

1. To ascertain the factors influencing rural women participation in Agriculture activities in Biu Local Government area of Borno.
2. Analyze the role of women empowerment in achieving sustainable development goal (SDG) in Biu Local Government Area Borno

Hypotheses

The followings are the hypotheses proposed for the study. Thus;

- i. |Ho: There is no significant relationship between women's empowerment and agricultural sustainability.
- ii. Ho: Women's empowerment has no significant influence on agricultural productivity.
- iii. Ho: Women's empowerment has no significant influence on agricultural productivity

Methods

The study adopted a mix of theoretical- Capability Approach and quantitative method to provide a holistic understanding of the subject. The quantitative component involved a survey using a structured questionnaire. The research explored how women's empowerment and agricultural sustainability contributed to achieving relevant Sustainable Development Goals (SDGs), particularly SDG 5 (Gender Equality), SDG 2 (Zero Hunger), and SDG 12 (Responsible Consumption and Production), within the context of Biu. The study specifically focused on Biu Local Government, a region significant for its agricultural economy, socio-cultural dynamics around gender roles, and the local challenges and opportunities related to achieving SDGs. The sample size for this study was arrived at using Taro Yamane formula. Thus,

N is the population of the study

K= is the constant (1)

e= is the merging error

n= is the sample size

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

$$N = 257,500$$

$$n = \frac{257,500}{1 + 50338(0.05)^2}$$

$$n = \frac{257,500}{1 + 50338(0.0025)}$$

$$n = \frac{257,500}{645}$$

$$n = 400$$

In relation to the above calculation, the study was initially designed to include a sample size of 400 participants. However, due to time constraints and financial limitations, the researcher limited the sample to 252 questionnaires. Perhaps, further studies may take it up at this point. The 252 questionnaires were evenly distributed across the six electoral wards in Biu, in the following order. Dugja=52 Galdimare= 32, Yawi=33, Zarawuyaku= 47 and Sulumthla=43, Gunda= 45. To ensure effective distribution of the questionnaires throughout the six wards of Biu, a Cluster sampling strategy was employed. The respondents were selected randomly from each ward mentioned and both male and female of 18 years and above were the respondents. A total of 252 questionnaires was distributed. The study adopted multistage sampling to arrive at the target respondents, multistage stage cluster sampling which enable one to draw a sample from a population using smaller and smaller groups (units) at each stage. It's often used to collect data from larger population. This was divided into cluster, district and wards. Therefore, the multistage sampling was used in selection of respondents in order to get reliable information from respondents. The use of secondary data was collected from journals and relevant academic publications related to the research. All data collected were arranged, presented, and subsequently analyzed using (SPSS) version 20 accordingly. As regards to this study, the data collected from primary source were presented through frequency tables, percentile, chi-square/t-test analysis and a juxta- positioning with the theoretical propositions asserted. This helped in making the data comprehensive and also aid the process of data analysis.

Findings

This segment cross-examined the women activities in agriculture with a view of attaining the targets of SDGs in Biu and at large in Nigeria. The empirical findings which, revealed socio-demographic analysis of women involvement in agriculture, the challenges been faced were hypothesized, analyzed and interpretation reached for the study were gathered in an attempt to justify the assertion – Women and Agriculture: A roadmap of attaining SDGs in Nigeria.

1.1 Section A: Demographic Information:

Table 1.1: Socio-Demographic of the Respondents

Variables	Frequency	Percent %
<i>Age Distribution</i>		
18-24	42	16.7
25-34	75	29.8
35-44	60	23.8
45-54	30	11.9
55-66	15	6.0
67-above	30	11.9
Total	252	100.0
Marital Status		
	Frequency	Percentages
Married	150	59.5
Single	50	19.8
Divorced	20	7.9
Widowed	20	7.9
Separated	12	4.8
Total	252	100.0
Education Level		
	Frequency	Percentages
Primary	30	11.9
Secondary	120	47.6
Tertiary	60	23.8
Others	42	16.7
Total	252	100.0
Occupation		
	Frequency	Percentages
Famer	120	47.6
Trader	30	11.9
Civil Servant	20	7.9
Self-Employed	30	11.9
Others	52	20.6
Total	252	100.0

Source: *Field Survey, 2025*

Table 1.1: shows age distribution of the respondents 50 which represent 16.7% are between 18-24 years, 75 respondents which represent 29.8% of the population is between 25-34. And 60 respondents which represent 23.8% percent of the population are between 35-44 yrs. 30 respondents which represent 11.9% percent of the population are between 45-54yrs, 15 respondents which represent 6% percent of the population are 54yrs and 30 respondents which represent 11.9% of the respondents are 67 and above. The marital status of respondents used for this study 150 respondents which represent 59.5% are married while 50 respondents which represent 19.8% are singles, 20 respondents which represent 7.9% are Divorced and 20 respondents represent 7.9% are Widowed and 12 (4.8) are separated. Educational Level: The educational level of the parents is diverse, with a balanced distribution across primary (30) 11.9%, secondary (120) 49.6%, and tertiary (60) 23.8% education while (42) 16.7 of the respondents are other. This diversity in educational backgrounds is crucial for understanding the varied perspectives and experiences within the sample. Occupationally, the parents exhibit diversity as well. The Civil Servant (20) 7.9%, Farmers for (120) 47.6%, and the Traders are (30) 11.9% of the population of this study.

Research Hypothesis

Test of Hypotheses

Null Hypothesis (H0)	Test Statistics	P-Value	Result	Supporting Findings
Ho: There is no significant relationship between women's empowerment and agricultural sustainability	Chi-square = 23.45	0.001	Reject Ho	57.1% of respondents who had control over financial decisions practiced sustainable agricultural methods
Ho: Women's empowerment has no significant influence on agricultural productivity.	t-test = 3.21	0.01	Reject Ho	Respondents who had control over financial decisions had higher agricultural productivity (mean = 2.5) compared to those who did not (mean = 1.8).
Ho: There is no significant relationship between agricultural sustainability and SDGs.	Chi-square = 18.23	0.003	Reject Ho	66.7% of respondents who practiced sustainable agricultural methods believed that agricultural sustainability is important for achieving SDGs.

1.2 Interpretation of the Hypotheses:

HO₁: Women's Empowerment is Positively Related to Agricultural Sustainability, Women's empowerment, particularly in terms of financial decision-making, is an important factor in promoting sustainable agricultural practices. Programme aimed at empowering women, such as

providing access to credit and training, can contribute to the adoption of sustainable agricultural practices.

HO₂: Women's Empowerment has a Significant Influence on Agricultural Productivity, Women's empowerment, particularly in terms of financial decision-making, has a positive impact on agricultural productivity, Empowering women can lead to increased agricultural productivity, which can contribute to improved food security and economic development.

HO₃: Agricultural Sustainability is Positively Related to SDGs, Sustainable agricultural practices are an important factor in achieving the Sustainable Development Goals (SDGs), Programme aimed at promoting sustainable agricultural practices can contribute to the achievement of the SDGs, particularly SDG 2 (Zero Hunger), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action).

Discussions of Findings

The results of this study show that women's empowerment, agricultural sustainability, and the SDGs are interconnected and interdependent. To begin with, the **Capability Approach**- the theory used to benchmark the study. This theory was developed by Amartya Sen, offers a robust theoretical framework for understanding the intersection of women's empowerment, agricultural sustainability, and the achievement of Sustainable Development Goals (SDGs). This approach is particularly relevant to research on women and agricultural sustainability because it prioritizes expanding individuals' capabilities allowing them the freedom to choose and achieve valuable functioning's in life, such as economic participation, education, and social well-being (Sen, 1999). In the context of women in agriculture, the Capability Approach emphasizes that empowering women involves providing them with the resources, opportunities, and agency to make decisions that affect their livelihoods. This aligns with the SDGs, particularly those related to gender equality (SDG: 5) and economic growth (SDG: 8), by focusing on enhancing the agency of women, thus fostering an inclusive and sustainable economic environment (Nussbaum, 2011).

The theory also highlights the need for addressing gender disparities that limit women's access to resources like land, credit, education, and training, all of which are crucial for improving agricultural productivity and sustainability. For instance, women farmers who are empowered with education and decision-making abilities are more likely to adopt sustainable agricultural practices, thereby contributing to greater agricultural resilience in rural communities (Duflo, 2012). Moreover, the Capability Approach is highly adaptable to the unique socio-economic and cultural context of places like Biu Local Government Area in Borno State, where gender inequalities and agricultural challenges intersect. The flexibility of the Capability Approach allows for a nuanced analysis that considers both local challenges and global development goals, ensuring that women's empowerment can be understood as a driver of both agricultural sustainability and broader socio-economic transformation (Robeyns, 2017). Thus, this framework provides a comprehensive lens to examine how improving women's capabilities in agricultural settings can contribute to achieving SDGs in a sustainable and equitable manner.

Women Empowerment – the likely truce to attaining SDGs in Nigeria

Women usually have limited accesses to resources; opportunities and their productivity remain relatively low to their potentials due to lack of awareness in society. Women's role has not been recognized. Lynda (1991) noted that we live in a society in which there is substantial level of gender inequality. This inequality, in terms ownership of property, the women in this part of the world have no equal right as men, in addition, the dominance of men in various income generating activities highly affects the economic empowerment of women. In most parts of Borno, land ownership is traditionally vested in men. Women often lack secure land tenure and can only access

land through male relatives, limiting their ability to invest in long-term agricultural projects (Aliyu et al., 2022). Without control over land, women have limited capacity to make decisions that improve productivity and sustainability.

The negative and gender-differentiated impact on women has become visible through dimensions of food security, decreased purchasing power and diminished distribution capacities. While this affects rural farmers in general, women face greater disadvantages because they have limited access to different products and markets, services such as finance, and information. Research shows that women's assets are more likely to be impacted under an illness shock or a family death (Quisumbing et al, 2017).

Despite significant contributions to agriculture, women farmers face persistent barriers to empowerment, hindering their ability to drive sustainable agricultural growth and achieve Sustainable Development Goals (SDGs). The intersectional challenges include: Sustainable agriculture plays a transformative role across a spectrum of SDGs, contributing to economic social and environmental dimensions. In the economic realm, it addresses SDG 1 (No Poverty) by enhancing the economic resilience of farming communities, offering income-generating opportunities through diversified and sustainable farming practices (Rahman, 2022). Goal 2 (Zero Hunger) is pursued as sustainable agriculture ensures food security by promoting resilient and diverse crop cultivation, thereby mitigating hunger and malnutrition (Arora and Mishra, 2022).

Socially, sustainable agriculture supports Goal 3 (Good Health and Well-being) by reducing reliance on harmful pesticides, fostering healthier ecosystems, and improving food quality, thereby positively impacting community health (McElwee et al., 2020). It also contributes to Goal 5 (Gender Equality) by empowering women in agriculture, ensuring their equal participation, and promoting gender-inclusive farming practices. Additionally, in advancing SDG 10 (Reduced Inequality), sustainable agriculture advocates for fair trade practices and impartial distribution of resources, addressing disparities among farming communities (Sexsmith et al, 2015). Enabling responsible consumption and production patterns (SDG 12), sustainable agriculture minimizes waste, promotes efficient resource utilization, and advocates for environmentally conscious farming practices (Arora et al, 2023).

In the environmental domain, sustainable agriculture supports Goal 6 (Clean Water and Sanitation) by endorsing water-efficient practices and minimizing agricultural runoff, ensuring sustainable water management (Mujtaba et al., 2024). Goal 13 (Climate Action) is addressed through climate-resilient agricultural practices, such as agroforestry and conservation agriculture, mitigating the sector's impact on climate change and fostering climate adaptation (Campbell et al., 2018). In promoting sustainable land use SDG 15 (Life on Land), agriculture becomes a vital ally in halting biodiversity loss, preserving ecosystems, and ensuring the long-term health of terrestrial environments (Octavia et al., 2022).

In addition, sustainable agriculture aligns with SDG 17 (Partnerships for the Goals) by emphasizing collaboration between governments, private sectors, and local communities to enhance the scalability and impact of sustainable agricultural practices globally (Mariani et al., 2022). In essence, sustainable agriculture emerges as a cornerstone for a holistic approach to achieving these interconnected SDGs, integrating economic prosperity, social equity, and environmental stewardship within the fabric of global development.

Furtherance to the aforementioned propositions, the empirical findings of the study suggest that empowering women can lead to increased adoption of sustainable agricultural practices, which can contribute to the achievement of the SDGs. The positive relationship between women's empowerment and agricultural sustainability is consistent with previous research that has shown

that women's empowerment can have a positive impact on agricultural sustainability (e.g., [1]). The findings suggest that women who have control over financial decisions are more likely to practice sustainable agricultural methods. The positive relationship between women's empowerment and agricultural productivity is also consistent with previous research that has shown that women's empowerment can have a positive impact on agricultural productivity (e.g., [2]). The findings suggest that women who have control over financial decisions have higher agricultural productivity. The positive relationship between agricultural sustainability and the SDGs is consistent with previous research that has shown that sustainable agriculture can have a positive impact on the SDGs (e.g., [3]). The findings suggest that farmers who practice sustainable agricultural methods are more likely to achieve the SDGs. The positive relationship between women's empowerment and the SDGs is consistent with previous research that has shown that women's empowerment can have a positive impact on the SDGs (e.g., [4]). The findings suggest that women who have control over financial decisions are more likely to achieve the SDGs.

Discussion of the Hypotheses

HO₁: Women's empowerment is positively related to agricultural sustainability: The results of this study support the hypothesis that women's empowerment is positively related to agricultural sustainability. The findings show that 57.1% of respondents who had control over financial decisions practiced sustainable agricultural methods. This suggests that women's empowerment, particularly in terms of financial decision-making, is an important factor in promoting sustainable agricultural practices. This finding is consistent with previous research that has shown that women's empowerment can have a positive impact on agricultural sustainability (e.g., [1]). Women's empowerment can lead to increased access to resources, improved decision-making, and enhanced capacity to adopt sustainable agricultural practices.

HO₂: Women's empowerment has a significant influence on agricultural productivity: The results of this study support the hypothesis that women's empowerment has a significant influence on agricultural productivity. The findings show that respondents who had control over financial decisions had higher agricultural productivity (mean = 2.5) compared to those who did not (mean = 1.8). This finding is consistent with previous research that has shown that women's empowerment can have a positive impact on agricultural productivity (e.g., [2]). Women's empowerment can lead to increased access to resources, improved decision-making, and enhanced capacity to adopt productive agricultural practices.

HO₃: Agricultural sustainability is positively related to SDGs: The results of this study support the hypothesis that agricultural sustainability is positively related to SDGs. The findings show that 66.7% of respondents who practiced sustainable agricultural methods believed that agricultural sustainability is important for achieving SDGs. This finding is consistent with previous research that has shown that agricultural sustainability is an important factor in achieving SDGs (e.g., [3]). Sustainable agricultural practices can contribute to several SDGs, including SDG 2 (Zero Hunger), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action).

In conclusion, the results of this study suggest that women's empowerment, agricultural sustainability, and the SDGs are interconnected and interdependent. The findings highlight the importance of empowering women, promoting sustainable agriculture, and achieving the SDGs in order to promote sustainable development. The results of this study show that women's empowerment, agricultural sustainability, and the SDGs are interconnected and interdependent. The findings suggest that empowering women can lead to increased adoption of sustainable agricultural practices, which can contribute to attaining SDGs. This is because women play a

crucial role in agriculture, and their empowerment can lead to improved agricultural productivity, reduced poverty, and improved food security.

Conclusion/ Recommendations

In conclusion, this study has provided a comprehensive examination of the relationships between women as integral part of Gender, agricultural sustainability, and the roadmap toward attaining Sustainable Development Goals (SDGs) in Nigeria, with a specific focus on Biu Local Government Area of Borno State, Nigeria. The findings of the study have shown that women's empowerment (as integral part of Gender) is positively related to agricultural sustainability, and that agricultural sustainability is positively related to the SDGs. The study has also found that women's empowerment is positively related to the SDGs, and that the SDGs have a significant influence on agricultural productivity. These findings suggest that empowering women, promoting sustainable agriculture, and achieving the SDGs are interconnected and interdependent, and that policymakers and development practitioners should prioritize these issues in their development interventions.

In capsule form, the study recommends following:

- that policymakers and development practitioners should provide access to credit and training for women, promote sustainable agricultural practices, and support the achievement of the SDGs.
- Additionally, the study recommends that future research should investigate the impact of women's empowerment and sustainable agriculture on the SDGs, and explore the potential of innovative technologies and practices to promote sustainable agriculture and achieve the SDGs.
- Overall, this study has contributed to the existing literature on women's empowerment, agricultural sustainability, and the SDGs, and has provided valuable insights and recommendations for policymakers and development practitioners to promote sustainable development in Nigeria.

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