World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

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Impact of Agricultural Empowerment Programs on Women Agripreneurs in Upland Rice Production in Ayamelum, Anambra State, Nigeria

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World Journal of Advanced Research and Reviews, 2025, 27(03), 206-212

Publication history: Received on 20 July 2025; revised on 28 August 2025; accepted on 03 September 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.27.3.3086

Abstract

Women agripreneurs are pivotal to agricultural development and food security in Nigeria, yet they often face significant constraints that limit their productivity. This study assessed the effect of agricultural empowerment programs on women engaged in upland rice production in Ayamelum Local Government Area, Anambra State. Primary data were collected from 90 respondents selected via a multi-stage sampling technique using structured questionnaires. Data analysis employed descriptive statistics, a productivity model. The respondents had a mean age of 47.8 years, were predominantly married (85.56%), with an average household size of 6 persons, mean farm size of 2.1 hectares, and 22.8 years of farming experience. Key empowerment programs accessed included subsidized planting equipment (mean impact score=3.84) and agrochemical gifts (mean=3.80). Productivity increased markedly from 0.31 kg/₦ before empowerment to 1.44 kg/₦ after empowerment. Empowerment programs significantly boost the productivity of women agripreneurs. For sustained impact, it is recommended that such schemes be institutionalized, depoliticized, and supported with robust monitoring and evaluation frameworks to ensure accountability and longevity.

Keywords: Women Empowerment; Agripreneurs; Upland Rice; Agricultural Productivity; Regression Analysis; Nigeria

1. Introduction

Women entrepreneurs have increasingly become central to economic growth and innovation through their roles in small- and medium-scale businesses (Carvalho, 2021). Women entrepreneurs are risk-takers who utilize available resources, identify opportunities within their communities, and create innovative products and services that benefit their households, communities, and the broader economy. Supporting women entrepreneurs fosters not only economic growth but also social transformation, sustainability, and gender equity (Ogosi *et al*., 2025).

Women agripreneurs, specifically, engage in agricultural enterprises by starting, organizing, and managing ventures while bearing the associated risks (Laveti *et al*., 2022). In rural Nigeria, women make substantial contributions to rice farming through tasks such as sowing, transplanting, weeding, and processing, while men are often responsible for land preparation, ploughing, and irrigation (Kabiru *et al*. 2024). These gender roles, however, are dynamic and increasingly overlapping.

Rice (Oryza sativa) remains one of Nigeria's most important staple foods, especially in Anambra State where Ayamelum Local Government Area (LGA) is recognized as the "rice basket" of the state (Nwalieji, 2021). Women farmers in this region play critical roles in sustaining household food security and market supply.

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To strengthen women's roles in agribusiness, several empowerment programs have been implemented in Ayamelum, including access to land, interest-free loans, improved seedlings, subsidized equipment, and agrochemical inputs (Abeku, 2023). For instance, in 2023, the Federal Government of Nigeria in partnership with Green Agriculture West Africa Limited (GAWAL), a subsidiary of the Chinese General Construction Company, trained over 5,000 women, including farmers in Ayamelum, on modern rice production technologies. Women were also provided with irrigation facilities, including water pumps, to improve yields.

Empowerment refers to enabling individuals, especially those previously disadvantaged, to make informed decisions and gain control over their livelihoods. Mobarok, Skevas, and Thompson (2021) define empowerment as the capacity to make informed life choices that were previously denied. Rathnachandra (2020) emphasized that women's empowerment encompasses decision-making autonomy, access to resources, and social participation. In agriculture, empowerment also includes increased access to technology, information, and financial capital, all of which improve livelihoods (Abushe *et al*., 2023; Adeyeye *et al*., 2019; Adeleke & Akinbile, 2019).

Empirical evidence suggests that closing the gender gap in access to productive resources could increase farm output by 20–30%, thereby boosting agricultural production in developing countries by 2.5–4% (Puskur *et al*. 2023). Similarly, initiatives such as the WACOT–USAID partnership have equipped women smallholders with skills, financial assistance, quality seeds, and improved fertilizers, enabling yield increases of up to 100% (Habiba & Abdullahi, 2024).

Women agripreneurs contribute significantly to food production, processing, marketing, and preservation. Despite their pivotal roles in upland rice production, they face limited access to land, credit facilities, modern farm inputs, training, and technology. Additionally, empowerment programs are sometimes politicized, with access restricted to those affiliated with ruling political parties (Omiunu, 2014). If these barriers are addressed, women in Ayamelum could substantially increase upland rice production, contributing to household welfare and national food security. Although numerous studies have examined women's empowerment in agriculture, few have specifically focused on Ayamelum. This study therefore fills a critical research gap by assessing women agripreneur empowerment in this rice-producing hub.

While several studies have examined women's empowerment in agriculture, a specific focus on upland rice production and the efficacy of empowerment programs in the Ayamelum LGA remains a gap in the literature. This study aims to fill this void by analyzing the impact of these programs on women agripreneurs. The specific objectives are to: describe the socio-economic characteristics of the women upland rice farmers, identify the agricultural empowerment programs accessed, and estimate the change in productivity before and after empowerment.

2. Methodology

The study was conducted in Ayamelum LGA, Anambra State, South-East Nigeria. It is located at Latitude 6.4878°N, Longitude 6.9639°E. The area covers a landmass of 588.8 km^2 and comprises eight autonomous communities: Omasi, Umueje, Ihite, Owuari, Igbakwu, Omor-Umerum, Umumbo, and Anaku. The LGA headquarters is located at Anaku. The population was 225,400 as of the 2006 census. The predominant economic activity is agriculture, with key crops including rice, yam, cassava, and maize. A multi-stage sampling technique was employed. In the first stage, three communities prominent in upland rice production with high women participation were purposively selected. In the second stage, three villages were randomly selected from each chosen community, making a total nine villages. In third stage, ten women rice farmers were randomly selected from each village, yielding a total sample size of 90 respondents.

Primary data were collected using a structured questionnaire administered to the respondents, covering socio-economic variables, details of empowerment programs accessed, production inputs, and outputs. Secondary data were sourced from relevant publications and journals.

2.1. Model Specification

The data were analyzed using descriptive statistics (frequencies, percentages, and means)

Productivity model as used by Anyiam *et al*. (2019), was specified as

$$P = \frac{y}{x} \quad \text{- - - equation (1)}$$

$$P = \frac{valueofoutput}{valueofinput} \quad \text{- - - equation (2)}$$

Where

P is productivity (kg/₦), Y is the total value of output (₦), and X is the total value of variable inputs (₦).

3. Results and Discussion

3.1. Socio-Economic Characteristics of Women Arbitrageurs

Table 1 Distribution according to socio-economic characteristics

Age (year)	**Frequency**	**Percentage**
20 – 28	2	2.22
29 – 37	16	17.78
38 – 46	20	22.22
47 – 55	31	34.44
56 – 64	16	17.78
65 – 73	5	5.56
$\bar{X}$ = 47.8 Years		
Marital Status		
Married	77	85.56
Single	9	10.00
Widowed	4	4.44
Levels of Education (Year)		
Never Attended	2	2.22
Primary Education	12	13.33
Secondary Education	62	68.89
Tertiary Education	14	15.56
Household Size		
1 – 3	4	4.44
4 – 6	56	62.22
7 – 9	30	33.33
$\bar{X}$ = 6 Persons		
Farming Experience (Year)		
< 10	5	5.56
11 – 20	38	42.22
21 – 30	26	28.89
31 – 40	18	20.00
>50	3	3.33
$\bar{X}$= 22.8 Year		
Farm Size (Hectare)		
1 – 3	87	96.70
4 – 6	3	3.30
Total	90	100
$\bar{X}$ = 2.1 Hectare		

Source: Computed from Field Survey Data, 2024

Table 1 presents the socio-economic characteristics of women agripreneurs engaged in upland rice production. The results show that only 2.22% of the respondents were between 20–28 years, while the majority fell within the age brackets of 38–55 years (56.7%), with a mean age of 47.8 years. This indicates that most respondents are in their middle age, an active and productive stage of life. This finding aligns with Anyasie *et al*. (2023), who noted that farmers aged 40–50 years are generally energetic and highly productive, with positive implications for rice output.

The marital status distribution indicates that 85.56% of the women were married, 10.00% were single, and 4.44% were widowed. This dominance of married respondents implies a higher likelihood of family labour participation, which can enhance productivity. The result is consistent with Abdisa *et al*. (2024), who similarly found that most female farmers were married, suggesting that rice farming supports household sustenance.

In terms of education, 2.22% of the respondents had no formal education, 13.33% had primary education, 68.89% attained secondary education, and 15.56% reached tertiary level. The predominance of secondary education suggests that respondents value education for acquiring improved farming skills and adopting modern practices. Education plays a critical role in maximizing scarce empowerment resources. This finding corroborates Anyasie *et al*. (2023), who emphasized that married women often engage in rice farming to sustain their households and can leverage educational attainment for better farm management.

Household size analysis reveals that 62.22% of respondents lived with 4–6 persons, 33.33% with 7–9 persons, and only 4.44% with 1–3 persons, with a mean of 6 members per household. Larger households provide access to family labour, reducing reliance on hired labour and potentially increasing profitability. This is consistent with Abdisa *et a*l. (2024B, who noted that household size enhances labour supply, and larger households improve production efficiency.

Regarding farming experience, 42.22% of respondents had 11–20 years of experience, 28.89% had 21–30 years, 20.00% had 31–40 years, and only 5.56% had less than 10 years of experience, with a mean of 22.8 years. This indicates a strong pool of experienced farmers with accumulated knowledge and adaptive capacity. The relatively small proportion of less experienced farmers suggests a need for targeted training to build their capacity.

Finally, farm size distribution shows that 96.70% of respondents cultivated between 1–3 hectares, while only 3.30% cultivated 4–6 hectares, with a mean farm size of 2.1 hectares. Although farm sizes are relatively small, this access to land underscores the importance of empowerment initiatives that support women's land use rights in the study area. Such empowerment directly enhances their productive capacity and aligns with the broader goals of agricultural transformation programs.

3.2. Various Agricultural Empowerments Received by Women Upland Rice Agripreneurs

Table 2 Agricultural empowerment and its effect on production output

Agri. Empowerment	EE (5)	SE (4)	ME (3)	LE (2)	NE (1)	$\bar{X}$	Remark
Interest-free Loan	12(13.3%)	70(77.8%)	7(7.8%)	1(1.1%)	0(0%)	4.07	EE
Land Empowerment	22(24.4%)	68(75.6%)	0(0%)	0(0%)	0(0%)	4.24	EE
Skilled Training	38(42.2%)	51(56.7%)	0(0%)	1(1.1%)	0(0%)	4.40	EE
Seedlings gift	1(1.1%)	88(97.8%)	1(1.1%)	0(0%)	0(0%)	4.00	EE
Subsidized Planting Equipment	17(18.9%)	42(46.7%)	31(34.4%)	0(0%)	0(0%)	3.80	SE
Fertilizer Gift	8(8.9%)	78(86.7%)	4(4.4%)	0(0%)	0(0%)	4.04	EE
Agrochemical Gift	1(1.1%)	67(74.4%)	22(24.4%)	0(0%)	0(0%)	3.80	ME
Financial Empowerment	13(14.4%)	76(84.4%)	1(1.1%)	0(0.0%)	0(0.0%)	4.13	EE
Networking and Mentorship	7(7.8%)	83(92.2%)	0(0.0%)	0(0.0%)	0(0.0%)	4.08	EE
Market Linkages	6(6.7%)	78(86.7%)	6(6.7%)	0(0.0%)	0(0.0%)	4.00	EE

Source: Computed from Field Survey Data, 2024, EE (Extreme effect), SE (Serious effect), ME (Moderate effect), LE (Low effect), NE (No effect), $\bar{X}$ = (4.5 to 5.0) indicates an Extreme effect (EE) on women rice production output, $\bar{X}$ = (3.5 to 4.49) indicates a Serious effect (SE) on the women rice production output, $\bar{X}$ = (3.01 to 3.49) indicates moderate effect (ME) on women rice production output, $\bar{X}$ = (2.0 to 3.0) indicates low effect, $\bar{X}$ = (1.0 to 1.99) indicates No effect

The results in Table 2 reveal that agricultural empowerment initiatives had substantial effects on the production output of women agripreneurs in upland rice farming. Interest-free loans ($\bar{x}$ = 4.07), land empowerment ($\bar{x}$ = 4.24), skilled training ($\bar{x}$ = 4.40), financial empowerment ($\bar{x}$ = 4.13), networking and mentorship ($\bar{x}$ = 4.08), and market linkages ($\bar{x}$ = 4.00) were all perceived as extremely effective (EE) interventions. These findings reinforce recent evidence that integrated approaches, combining access to credit, secure land tenure, skills training, and market facilitation are the most transformative empowerment tools for women farmers in Nigeria (Agro-Women Group, [AWG] 2025).

Land empowerment emerged as one of the most impactful interventions. This is consistent with current debates highlighting that unequal access to land remains a major barrier to women's agricultural productivity in Nigeria. Recent reports argue that addressing gender disparities in land rights could significantly improve women's output and income, thereby contributing to household and national food security.

Similarly, skilled training was rated as extremely effective ($\bar{x}$ = 4.40), underscoring the importance of capacity-building programs. Women farmers in Ayamelum valued technical knowledge and extension services that improve production efficiency. This resonates with the objectives of Nigeria's National Agricultural Extension Policy (NAEP), which emphasizes modernized extension delivery and skill transfer as key drivers of women's empowerment.

Seedling gifts ($\bar{x}$ = 4.00) and fertilizer support ($\bar{x}$ = 4.04) were also ranked highly. This demonstrates the importance of input support programs in bridging the resource gap faced by women farmers. Refocusing agricultural subsidies on women farmers has been identified as a critical pathway to boosting national food production (CBN, 2024). Fertilizer and seed subsidies are particularly relevant given the cost inflation in agricultural inputs in Nigeria.

Subsidized planting equipment ($\bar{x}$ = 3.80) and agrochemical gifts ($\bar{x}$ = 3.80) were rated as strong effects (SE) but not extreme. This suggests that while mechanization and agrochemicals are beneficial, adoption may be constrained by affordability, technical know-how, or environmental concerns. Women farmers often face challenges in accessing mechanization services due to cost and limited training, despite their recognized role in boosting productivity.

Networking, mentorship, and market linkages ($\bar{x}$ = 4.08 and $\bar{x}$ = 4.00, respectively) also ranked among the most effective empowerment tools. This highlights the role of social capital and market integration in scaling productivity. These findings affirm that empowerment initiatives that combine financial, institutional, technical, and social support yield the most significant improvements in women's agricultural productivity, which are evident in Ayamelum.

3.3. Productivity of Women Upland Rice farmers before and After Empowerment

Table 3 Distribution according to the productivity before and after empowerment of the women upland rice producers

Production History of Women Entrepreneurs Before Agricultural Empowerment			**Production History of Women Entrepreneurs After Agricultural Empowerment**		
Mean Output(kg)	Mean Value Input (₦)	Mean Productivity ($\frac{MO}{mvi}$)	Mean Output (kg)	Mean Value Input (₦)	Mean Productivity ($\frac{MO}{mvi}$)
5822.22	18827.78	0.31kg/₦	12966.67	9027.778	1.44 kg/₦

Source: Field survey data, 20242024 PI = 0.5, which means the enterprise is productive, PI >0.5 means highly productive, and PI <0.5 means low production

Table 3 shows that the productivity value before the empowerment was 0.31kg/N, and productivity of the women after the empowerment was 1.44kg/N. This shows that the women upland rice producers were not productive when there were no agricultural empowerments given to them, but became highly productive when they were given agricultural empowerment. This implies that agricultural empowerment on the women upland rice farmers significantly improved their production output at a reduced cost of securing the inputs themselves. This finding is in line with those of Oluyomi *et al* (2025), which suggest that up to 30% of global agricultural productivity could be saved if women are empowered with access to productive resources. Though many issues impede gender equality, including the technical, political and financial, are most responsible for preventing women's empowerment and food security.

4. Conclusion

Women agripreneurs remain central to agricultural transformation and food security in Nigeria; however, structural and institutional barriers continue to limit their full potential. This study has shown that agricultural empowerment programs, particularly access to subsidized planting equipment and agrochemical support, significantly enhance the productivity of women engaged in upland rice farming in Ayamelum Local Government Area, Anambra State. Evidence from the findings revealed a substantial rise in productivity from 0.31 kg/₦ before empowerment to 1.44 kg/₦ after empowerment, underscoring the transformative role of targeted interventions. Given these outcomes, empowerment initiatives should not only be scaled up but also institutionalized, depoliticized, and anchored on transparent monitoring and evaluation mechanisms to ensure sustainability, inclusiveness, and accountability. Strengthening women's access to resources, technology, and decision-making spaces will not only accelerate agricultural growth but also contribute directly to poverty reduction and household food security in Nigeria.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Statement of informed consent

The authors declare their consent to the publication of this paper.

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