

Agripreneurship as a Catalyst for Rural Women Empowerment and Sustainable Livelihoods in Northeastern Nigeria

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ABSTRACT

This study develops and validates the Rural Women Agripreneurship's Empowerment Index (RWAEI), a multidimensional framework designed to measure the empowerment outcomes of women agripreneurs in conflict-affected communities of Northeastern Nigeria. Anchored on Sen's Capability Approach and Gendered Institutions Theory, the study assesses how agripreneurial engagement enhances women's agency, access to productive resources, decision-making autonomy, and livelihood sustainability. Using data from 1,146 women across Gombe, Bauchi, and Adamawa States, and employing Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM), the study identifies significant empowerment pathways through mechanization, hired labour, production participation, and market integration. The RWAEI demonstrated high internal consistency (Cronbach's $\alpha = 0.812$), validating its utility for gendered rural development assessment. Findings reveal that agripreneurship significantly strengthens women's economic inclusion and leadership capabilities, thereby promoting sustainable livelihoods and post-conflict resilience. The paper recommends integrating empowerment indicators into agricultural policy, expanding access to mechanization finance, and supporting women-led agribusiness networks to accelerate progress toward SDGs 1, 5, and 8.

1. Introduction

Agripreneurship is a critical vehicle for attaining economic energy and inclusive growth, especially in developing countries where there are persistent unemployment and poverty. International efforts like the Infrastructure Investment and Jobs Act (2021) highlight productivity-and-enterprise-based initiatives for sustainable development (Zhan and Santos-Paulino, 2021). Despite huge macroeconomic achievements, more than 63 percent of Africa's workforce is still involved in low-productivity, subsistence-level activities (Cieslik et al., 2022). In Nigeria, there was a decrease in the working-age employment and participation

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rate by about 2 percentage points, reported by the Labour Force Survey (2024), from 79.5 percent growth in Q3 2023 to 77.3 percent growth in Q1 2024, accompanied by a decrease of 2.4 points in employment-to-population ratio, a measure of structural vulnerability recurring persistently across the labour market.

Hence, in the post-insurgency environment of Northeastern Nigeria, agripreneurial participation extends beyond economic relevance; it functions as a peacebuilding and social inclusion tool (Ali and Ali, 2024). Agriculture is the mainstay of rural livelihoods, although women's participation is systematically hindered by structural inequities limited access to land, loans, mechanization, and extension services exacerbated by patriarchal norms and poor institutional frameworks (Kapiamba, 2024). These constraints not only decrease productivity but also hinder women's autonomy and decision-making authority within rural households and value chains.

However, agripreneurship has the ability to eliminate poverty and unemployment while enhancing productivity, promoting creativity, and generating empowerment through income production, leadership development, and market linkage (Singh et al., 2022; Sathiyabama et al., 2023). The National Centre for Agricultural Mechanization (NCAM) demonstrated that domestically generated mechanization and homegrown technology, cultivated through indigenous expertise and resources, may enhance Nigeria's agricultural progress. (Mahmood et al., 2025). Beside economics, agripreneurship improves entrepreneurial skill for women, self-esteem, and social capital key drivers of sustainable development of rural areas (Adeyanju et al., 2023).

Despite of such a promise, empirical analysis of women's empowerment fails to remain multidimensional, concentrating on some slender economic indicator's income, access to credit, or asset holdings but failing to capture its multidimensional nature, encompassing agency, leadership, mobility, and social inclusion (Quisumbing et al., 2023; Ferdous, 2024). Such a gap hinders comprehension of how agripreneurship leads to comprehensive empowerment, particularly in volatile, post-conflict environments like Northeastern Nigeria. Fill the gap, this study creates and empirically tests the Rural Women Agripreneurship Empowerment Index (RWAEI) a multidimensional, context-specific framework combining four sub-domains: economic, human, social, and market capital. Use it as a comprehensive analytical framework for evaluating how agripreneurship drives empowerment and sustainable livelihood for rural women.

Accordingly, the study follows the following objectives: To assess the influence of automation on women's empowerment in agripreneurial operations., To evaluate how hired labour mediates the relationship between agripreneurship participation and empowerment results., To analyse the extent to which production engagement increases women's agency and livelihood sustainability., To analyse how market engagement enhances women's decision-making power and income stability and To create and validate a multidimensional empowerment framework (RWAEI) that reflects the combined effects of agripreneurship dimensions on rural women's empowerment. The novelty of this study lies in its (i) integration of feminist empowerment and entrepreneurship perspectives into a measurable, context-specific empowerment index; (ii) focus on post-insurgency regions where empowerment has direct peacebuilding implications; and (iii) contribution of policy-relevant insights for designing inclusive agripreneurial programmes that advance gender equality, sustainable livelihoods, and rural resilience.

2. Literature Review

2.1 Agripreneurship and Women Empowerment

Agripreneurship serves as a vital catalyst for innovation, value creation, and job generation across the agricultural value chain (Singh et al., 2023). For women, it presents meaningful opportunities for ownership, leadership, and active engagement—key indicators of empowerment (Nwagwu et al., 2023).

Empowerment, as defined by Kabeer (1999) and reaffirmed by UN Women (2022), involves gaining control over productive assets and making decisions that directly influence one's livelihood. In this context, agripreneurship functions both as a process that enhances women's agency and as an outcome that reflects their empowerment.

2.2 Mechanisation and women Empowerment

Mechanisation improves efficiency and reduces manual labor, enabling women to become more productive and confident over time (Alex, 2013). Access to mechanized tools represents a critical empowerment resource within Sen's Capability Approach, symbolizing both technological access and autonomy. Mechanization also stimulates employment through machine operation, repair, and leasing services (Adeyanju et al., 2024). By hiring labor, female agripreneurs expand their operations, strengthen leadership and negotiation skills, and create local employment opportunities—advancing the Sustainable Development Goal on decent work and economic growth (Kerrigan et al., 2023).

2.3 Production Participation

Women's participation in production decisions enhances their control over crop selection, input utilization, and profit distribution (Aada, 2024). Active involvement in production not only builds confidence and decision-making capacity but also strengthens women's sense of ownership and accountability in agricultural enterprises.

2.4 Marketing and Economic Inclusion

Marketing serves as a bridge between production and value creation, expanding visibility and ensuring income stability (Tshikovhi et al., 2023). Through greater access to markets, women develop broader social networks and stronger decision-making independence, fostering both economic inclusion and empowerment.

2.5 Job Creation

Agripreneurship directly contributes to job creation within mechanization, processing, and marketing value chains (Adeyanju et al., 2024; Bihari & Priya, 2024). Empowered female agripreneurs not only sustain their own livelihoods but also create employment for others, thereby reducing rural unemployment and stimulating local economies (JIBE, 2023).

2.6 Gendered Institutions Theory

Mackay, Kenny, and Chappell's (2010) Theory of Gendered Institutions explains how formal and informal norms can reinforce gender inequality by shaping access to resources and decision-making power. In Northern Nigeria, these gendered structures manifest through patriarchal landholding systems, limited female mobility, and male-dominated leadership (Abubakar & Bala, 2024). Agripreneurship, however, provides a platform for challenging these institutional barriers, allowing women to gain legitimacy and visibility in traditionally male-dominated economic spaces (Obi & Onyeneke, 2023).

2.7 Combination of Theories

Merger of Capability Approach and Theory of Gendered Institutions gives an all-encompassing analytical framework. As for the Capability Approach, it highlights individual agency and freedoms, while the Theory of Gendered Institutions determines the constitutional constraints that inhibit these capabilities.

Both of these combines to give conceptual footing to the RWAEI, that gives empowerment concrete form through three related dimensions access, agency, and achievement

2.8 Empirical Review on the effect of job creation and rural women empowerment.

Alex, (2013) research on powering the women in agriculture: Lessons on women led farm mechanization in South India. The study aimed to explore the role of women-led farm mechanization in empowering communities, improving agricultural sustainability, and fostering institutional collaboration. Using a case analysis method, data were collected through interactions and focus group discussions with representatives, trained organization members, farmers, and experts from the state agricultural university. A semi-structured questionnaire was employed to systematically capture responses. Findings reveal that women-led farm mechanization, supported by democratized planning and decision-making, significantly enhanced the livelihoods of women and marginal farmers while revitalizing rice production. The study concludes that women-led farm mechanization can serve as a trans-formative tool for agricultural renewal and livelihood enhancement. It emphasizes the importance of fostering new institutional models and linkages that empower grassroots communities. To sustain these gains, it is recommended that local governments strengthen democratization efforts and invest in capacity-building initiatives for women and farmers. Additionally, research and extension institutions should actively collaborate to support innovative, context-specific solutions for emerging agricultural challenges. This case underscores the critical need for inclusive and participatory approaches in designing and implementing agricultural interventions.

Chelliah, and Bagavan (2023) in their study, empowering women agripreneurs through precision agriculture technology adoption. The objectives of the study were to analyses existing literature on PAT adoption theories, uncover barriers faced by women agripreneurs, and provide recommendations for overcoming these challenges. A systematic review method was employed to gather insights from diverse sources, focusing on social, policy, and educational implications. Findings reveal that barriers to PAT adoption among women agripreneurs include digital literacy, access to training programs, and limited institutional support. Social norms, inadequate resources, and policy shortcomings exacerbate the disparity. The study also highlights innovative approaches, such as peer mentorship programs connecting technically skilled young women with less technologically literate older women farmers, as an effective strategy to bridge the digital literacy divide. The study concludes that addressing the technological gap requires multi-pronged interventions involving tailored training programs, supportive policies, and enhanced access to resources for women agripreneurs. It recommends policymakers prioritize mentorship initiatives, create accessible PAT training programs, and foster inclusive digital agriculture strategies. The recent research addresses these gaps, women agripreneurs are empowered to adopt precision agriculture technology, ultimately benefiting rural farming communities and contributing to sustainable agricultural practices.

Adeyanju et al., (2024) studied, harnessing the job creation capacity of young rural agripreneurs: A quasi-experimental study of the ENABLE program in Africa's growing investments in youth agribusiness empowerment programs underscore the potential of youth-led agribusinesses in creating employment and revitalizing rural economies. However, the extent to which these programs unlock job creation capacity remains underexplored. This study examines the evolving role of youth and small agribusinesses in employment generation in rural areas and evaluates the impact of the African Development Bank's (AfDB) Technologies for African Agricultural Transformation (TAAT) Empowering Novel Agribusiness-Led Employment (ENABLE) program implemented in Kenya, Nigeria, and Uganda. A survey of 1,435 respondents, including 737 program participants and 698 non-participants, was conducted across the three countries. Using an Endogenous Switching Regression (ESR) model, the study analysed determinants of program participation, factors influencing job creation, and the program's impact on employment outcomes. The findings reveal that youth-owned agribusinesses significantly contribute to job creation, hiring an average of four employees per business. The ESR results confirm the positive impact of ENABLE-TAAT on participants' job creation capacity, with non-participants showing potential for increased job

creation if they had participated. Key factors influencing job creation include socioeconomic characteristics such as age and marital status, as well as business attributes like agribusiness experience, business level, income, and access to land. The study concludes that targeted agribusiness empowerment initiatives have substantial potential to enhance youth employment and reduce rural unemployment. It recommends increased investments in youth agribusiness programs to strengthen their job creation impact. Policymakers should focus on addressing barriers to program participation and supporting young agripreneurs with resources and capacity-building initiatives to expand their businesses and create sustainable employment opportunities. These efforts will contribute to reducing unemployment rates and fostering rural economic growth in the study countries and across Africa.

Bihari and Priya, (2024) Economic Development of Women Agripreneurs Through Interventions of Government Livelihood. This study evaluates the impacts of these interventions on the socio-economic conditions of rural beneficiaries, forming part of a Ph.D. thesis. The study surveyed 260 beneficiaries selected from 13 blocks across three districts in Jharkhand. Descriptive and inferential statistics, including paired t-tests and Principal Component Analysis (PCA), were employed to analyze the data. The findings indicate that all respondents were beneficiaries of the National Rural Livelihood Mission (NRLM), followed by JOHAR (92.7%) and JHIMDI (14.2%). Substantial improvements were observed in asset ownership, including poly houses, vermi pits, poultry sheds, and micro-drip systems. Statistically significant increases were also noted in income, expenditure, and savings related to these assets, except for expenditure on poultry sheds. Additionally, the income from agriculture, livestock, fisheries, and agribusiness activities significantly improved post-program participation. PCA identified three principal components with an Eigen value greater than 1.0, collectively explaining 71.03% of the variance in the data. Principal Component 1 (PC1), accounting for 29.6% of the variance, was strongly associated with entrepreneurial traits such as innovativeness, risk-bearing ability, self-confidence, and planning orientation. The study concludes that targeted interventions have significantly enhanced the economic empowerment of rural women by improving their incomes, asset ownership, and entrepreneurial capacities. It recommends scaling up successful interventions like NRLM and JOHAR while focusing on capacity-building efforts to foster entrepreneurial behaviours among beneficiaries. Policymakers should also consider integrating additional training and support mechanisms to sustain the socio-economic benefits and foster long-term rural development.

Hypotheses Development

H₁: Mechanization positively influences women's empowerment.

H₂: Hired labour mediates the relationship between agripreneurship participation and empowerment outcomes.

H₃: Production participation enhances agency and livelihood sustainability.

H₄: Market participation strengthens decision-making power and income stability.

H₅: Combined agripreneurship dimensions significantly predict multidimensional empowerment (RWAEI)

3. Methodology

The study utilizes a quantitative cross-sectional design to assess the role of agripreneurship in enhancing the empowerment of women and achieving sustainable livelihoods in conflict-plagued communities of Northeastern Nigeria. The design was utilized due to its ability to capture the measurement of various empowerment aspects at one point in time, in accordance with the Capability Approach as well as the Theory of Gendered Institutions. The study was limited to Gombe, Bauchi, and Adamawa States, being some of the six states that form the Nigerian geopolitical zone of the Northeast. The region is largely agrarian but highly torn by insecurity, displacements, and gender imbalance. The population of interest was rural women agripreneurs who were participating in crop and livestock activities, processing, as well as in

agro-trading. Multistage sampling was utilized. In the first stage, the researcher purposefully chose three states in accordance with their involvement in agricultural activities and post-conflict rehabilitation initiatives. Stage two consisted of randomly selecting two Local Government Areas per state, followed by randomly selecting four communities per LGA. The respondents were randomly chosen through proportional sampling in order to include all the communities. The population of 1,146 was realized in the study, as per Krejcie and Morgan's (1970) table for arriving at the appropriate sample size.

Data were collected using structured questionnaires, conducted with KoBoCollect mobile tools in order to reduce mistakes and missing responses. Instrument Development: The questionnaire was borrowed (not adapted) from established empowerment scales that were validated (A-WEAI, Alkire et al., 2013; Ferdous and Zahan, 2024). It consisted of: Economic Capital: possession of assets, access to credit., Human Capital: training access, autonomy in decision., Social Capital: being a member of groups, leadership and Market Capital: access to markets, value-chain connections. Dimensions of agripreneurship were mechanization, paid labour, production involvement, and promotion, scored on a 5-point Likert scale. Pilot-tested with 60 respondents (Cronbach's $\alpha = 0.812$).

CFA fit statistics: $\chi^2/df = 2.51$, CFI = 0.94, RMSEA = 0.048.

SEM assessed direct and indirect paths from agripreneurship factors to empowerment, while controlling for access to finance and education.

4. Findings

The study finds that, 63.4% of the ages of beneficiaries who were aged between 30–49, their mean family size was 6. Over 70% of them had a secondary or post-secondary school background, while 83% were engaged in growing crops. State-level estimates put out the rates of agripreneurial engagement of Gombe (100%), Bauchi (94%), and Adamawa (92%), verifying gendered predominance in farmlands' agrarian livelihood activities in the face

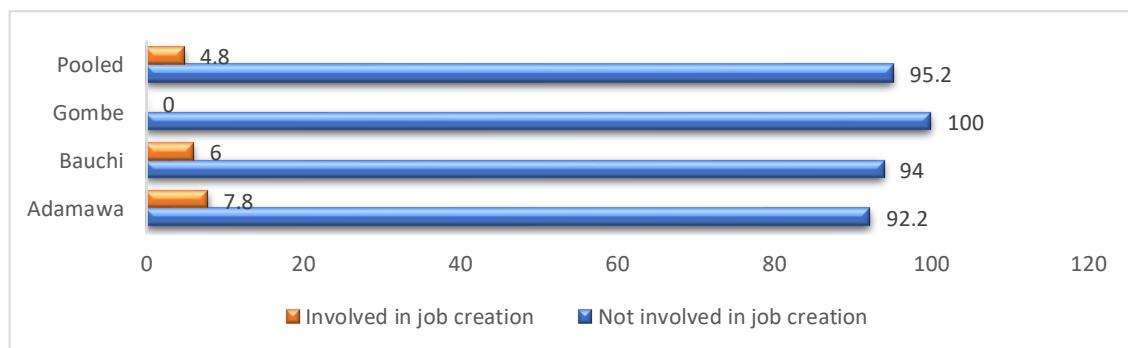


Figure 1.0: Response Rate by Involvement in Job

Source: Field Survey, 2024

The findings reveal a strong level of participation in job creation among rural women agripreneurs across the Northeastern states of Nigeria. In Gombe, all respondents reported being actively engaged in job creation through agripreneurship activities, while 94 percent of respondents in Bauchi and 92.2 percent in Adamawa indicated similar involvement. These results suggest that nearly all rural women agripreneurs in the region contribute significantly to employment generation through their agricultural enterprises, drawing on both formal and informal learning experiences.

Their participation in agripreneurship has far-reaching economic and social implications. Beyond creating self-employment opportunities, these women provide jobs for others through mechanized farming, paid labor, and market operations. This collective effort contributes to local revenue generation, poverty reduction, and improvements in health, nutrition, and overall food security. These findings align with the work of Adeyanju et al. (2024), who observed that young agripreneurs in Kenya are motivated to participate in empowerment programs, with measurable effects on their skills and livelihoods. Overall, the evidence underscores that rural women agripreneurs in Northeastern Nigeria play a vital role in fostering community development and inclusive economic growth through job creation.

According to the survey, many rural women in the Northeastern states who depend on farming or live in rural communities continue to face persistent cycles of unemployment and poverty. These challenges are largely the result of ongoing insurgent activities that have disrupted agricultural livelihoods and limited access to farmlands. Consequently, the search for sustainable livelihood alternatives has become increasingly urgent, with agripreneurship emerging as a viable and empowering solution. Based on the statistical analysis, all the hypotheses formulated in this study were supported, confirming the significant role of agripreneurship in improving the economic well-being of rural women in the region.

Table 1. Summary of Hypotheses Testing Results

Hypothesis	Statement	p-value	Decision	Interpretation
H ₁	Mechanization → Empowerment	< 0.001	Supported	Access to technology enhances productivity and decision-making autonomy.
H ₂	Hired Labor → Empowerment	< 0.001	Supported	Labor management fosters leadership and employment creation.
H ₃	Production → Empowerment	< 0.01	Supported	Active production participation strengthens economic independence.
H ₄	Market Participation → Empowerment	< 0.001	Supported	Market access increases income stability and bargaining power.
H ₅	Combined Agripreneurship Dimensions → Empowerment	< 0.001	Supported	Integrated agripreneurship pathways enhance multidimensional empowerment

The whole model showed noteworthy positive correlation of agripreneurship with empowerment ($\beta = 0.58$, $p < 0.001$), in turn supporting the multidimensionality of RWAEI. Outcomes indicate large positive paths:

- Mechanization → Empowerment ($\beta = 0.56$, $p < 0.001$)

- Hired labour → Empowerment ($\beta = 0.52$, $p < 0.001$)
- Production participation → Empowerment ($\beta = 0.41$, $p < 0.01$)
- Market participation → Empowerment ($\beta = 0.63$, $p < 0.001$)

The results also correspond with Akanbi et al. (2024) and Ojong et al. (2024), validating that agripreneurship strengthens agency, earning, and leadership. Labour hired mediating is in support of Gendered Institutions Theory, as it illustrates that managerial control by females shifts the established hierarchies. Deeper integration into the market increased bargaining power, in accordance with Sen's freedoms framework.

5. Discussion

The findings substantiate previous research that profiled agripreneurship as a prominent empowerment tool among rural women in developing economies (Akanbi et al., 2024; Ojong et al., 2024). Access to mechanization was also a main driver, signifying that it is not only more productive but also strengthens production decisions by ladies Ivan Bernard Dadinah(n.d.) in accordance with Capability Approach that connects empowerment with functional freedoms (Sen, 1999).

Mediating function of paid labour is consistent with Gendered Institutions Theory (Mackay et al., 2010), as labour involvement reconsolidates patriarchal power rankings of the house, promoting female leadership in the family as well as community settings. Likewise, involvement in marketing functions consolidates the ability for negotiations as well as income management, supporting financial independence and personal competence (Ferdous and Zahan, 2024). Empirical verification of RWAEI reveals that empowerment in agripreneurship is multidimensional with bases not only in economic results but in broadened capabilities, institutional approval, and persistent livelihood resilience. These results contribute to advancements of SDG 1 (No Poverty), SDG 5 (Gender Equality), and SDG 8 (Decent Work and Economic Growth).

6. Recommendations

To strengthen women's empowerment and promote sustainable agripreneurship in Northeastern Nigeria, several strategic actions are recommended. First, the Rural Women Agripreneurship Empowerment Index (RWAEI) should be institutionalized within agricultural programs by both government agencies and non-governmental organizations. Using RWAEI as a monitoring and evaluation tool will help ensure that gender-oriented interventions effectively capture empowerment outcomes beyond income indicators.

Expanding access to mechanization is also essential. The government should provide subsidized machinery and tailored credit facilities for women-based cooperatives to enhance productivity, efficiency, and economic independence. Furthermore, supporting women-led employment schemes can enable female agripreneurs to organize and manage local labor for community development and leadership roles.

In addition, improving market access is critical. Establishing stronger market linkages and value chains will encourage women's active participation in both regional and export markets, increasing their economic visibility and competitiveness. Finally, implementing gender-sensitive policy reforms is necessary to address structural inequalities in land ownership, access to finance, and agricultural extension services. Such affirmative policy measures will help create a more inclusive and equitable environment for women in agripreneurship.

7. Conclusion

This study concludes that agripreneurship serves as a powerful driver of empowerment and sustainable livelihoods among rural women in Northeastern Nigeria. The Rural Women Agripreneurship Empowerment Index (RWAEI) developed through this research offers a practical and consistent framework for measuring empowerment beyond traditional income-based metrics. It captures how key factors such as mechanization, access to paid labor, participation in production, and market opportunities collectively strengthen women's access to resources, enhance their decision-making agency, and improve their overall well-being.

By combining Amartya Sen's Capability Approach with the Theory of Gendered Institutions, the study reveals that empowerment emerges through the expansion of freedoms and the transformation of institutional structures. In post-conflict settings, agripreneurship thus stands out as a strategic tool for inclusive recovery, gender-balanced development, and community resilience. Consistent with JIBE's emphasis on sustainable business innovation and inclusive economic progress, the study highlights how agricultural entrepreneurship can foster equitable transformation and long-term development in emerging economies.

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Conflict of Interest

The authors of this manuscript declare that there is no conflict of interest pertaining to the contents presented in this research.

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