

Formative Barriers to Agricultural Value Addition: A Multi-Dimensional Analysis of Resource and Institutional Constraints Facing Groundnut Women Processors in North-Western Nigeria

¹Abdullahi Auwal Gindi*, ²Yahaya Kaka & ³Buhari Armiyau Khalid

^{1,2,3}Department of Agricultural Economics and Extension, Faculty of agriculture Abdullahi Fodio University of Science and Technology Aliero, P.M.B 1144, Birnin Kebbi, Kebbi State, Nigeria.



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Corresponding Author:
Abdullahi Auwal
Gindi*

Abstract: Women are the primary drivers of agricultural value addition in Sub-Saharan Africa, yet their economic potential remains stifled by systemic barriers. This study investigates the resource and institutional constraints limiting women's participation in groundnut value addition in North-Western Nigeria. Using a cross-sectional survey of 142 female processors and farmers, the study initially attempted dimensionality reduction via Principal Component Analysis (PCA). However, a Kaiser-Meyer-Olkin (KMO) measure of .371 indicated a lack of shared variance, revealing that these constraints operate as distinct, orthogonal formative indicators rather than reflective latent constructs. Consequently, a theoretical composite approach was adopted. Descriptive analysis identified lack of access to credit ($M = 4.67$, $SD = 0.555$) and market access problems ($M = 4.39$, $SD = 0.673$) as the most severe barriers. Furthermore, institutional support deficits, particularly in extension services ($M = 4.32$, $SD = 0.820$), compound these resource limitations. The findings challenge the conventional methodological assumption that agricultural constraints can be neatly clustered into single latent factors. Instead, they demonstrate that vulnerabilities are formative and multi-causal. The study concludes that targeted, collateral-free microfinance and the deployment of gender-sensitive extension services are critical to dismantling these distinct, intersecting barriers, thereby enhancing women's economic resilience in rural agri-food systems.

Keywords: Resource, Value Addition, Women Processor.

Cite this Article

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Introduction

Agricultural value addition is widely recognized as a critical pathway for poverty alleviation and rural economic transformation in Sub-Saharan Africa (FAO, 2011). In Nigeria, groundnut (*Arachis hypogaea*) processing represents a vital node in this chain, historically anchoring the regional economy. Women constitute the majority of the labor force in the processing and marketing segments of this value chain (Doss *et al.*, 2018). However, a persistent paradox defines their participation: despite performing the bulk of value-adding labor, women remain disproportionately marginalized, capturing minimal economic returns compared to their male counterparts who often dominate primary production and large-scale trade (Kilic *et al.*, 2015).

Existing literature extensively documents the barriers facing female farmers, typically categorizing them into resource constraints (land, credit, inputs) and institutional deficits (extension, information) (Deininger *et al.*, 2019). However, a critical methodological and conceptual gap persists. Many studies attempt to reduce these diverse barriers into single, reflective latent

constructs using factor analysis, assuming that variables like "lack of credit" and "gender discrimination" are highly correlated symptoms of a single underlying "vulnerability" trait. In reality, agricultural constraints are often *formative*; a woman may face severe credit constraints due to land tenure laws, yet simultaneously have adequate access to local market information. Treating formative indicators as reflective can lead to statistical artifacts and obscure the distinct, independent nature of specific barriers (Jarvis *et al.*, 2003).

This study addresses this gap by examining the socio-economic and institutional factors influencing women's groundnut value addition in North-Western Nigeria. Specifically, it aims to: (1) empirically rank the severity of distinct resource and institutional constraints, and (2) methodologically demonstrate the validity of treating these constraints as formative indicators rather than forcing dimensionality reduction. By anchoring the analysis in the Sustainable Livelihoods Framework (Scoones, 2015), this research provides a nuanced understanding of how specific, independent deficits in financial and human capital restrict women's value-chain participation.

Methodology

Study Design and Population

A descriptive cross-sectional survey design was employed, targeting women engaged in groundnut farming and processing in three major producing states in North-Western Nigeria (Sokoto, Kebbi and Zamfara). A multi-stage sampling technique was utilized, involving the purposive selection of states, random selection of two Local Government Areas (LGAs) per state, purposive selection of 24 women engage in Groundnut processing were made. The final analytical sample comprised 142 women (N = 142) were used for the study with only two questionnaire were unreturned.

Instrument and Analytical Strategy

Data were collected using a structured questionnaire measuring constraints on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Initially, a Principal Component Analysis (PCA) with Varimax rotation was conducted to assess the dimensionality

of the constraint variables. However, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy yielded a value of .371, falling significantly below the acceptable threshold of .60 (Hair *et al.*, 2019). While Bartlett's Test of Sphericity was significant ($\chi^2 = 151.188$, $p < .001$), the extremely low KMO and the emergence of multiple single-item factors indicated that the variables lacked the shared variance required for reflective latent construct modeling.

Consequently, following methodological best practices for formative indicators (Jarvis *et al.*, 2003), PCA was abandoned. The 14 constraint items were retained as distinct, observed variables. Descriptive statistics (means and standard deviations) were used to rank the relative severity of each independent barrier, providing a transparent and empirically sound representation of the multi-dimensional constraints facing these women.

Results and Discussion

The descriptive analysis of the 14 distinct constraint variables reveals a clear hierarchy of barriers impacting women in the groundnut value chain.

Table 1: Descriptive Statistics and Severity Ranking of Constraints (N = 142)

Variable (Construct)	Mean (M)	Std. Deviation (SD)	Severity Rank
Lack of Access to Credit (LAC)	4.67	0.555	1
Value Addition Income Pressure (VALADINC)*	4.42	0.793	2
Market Access Problems (MRKPROB)	4.39	0.673	3
Need for New Processing Tech (NEWPRC)	4.38	0.751	4
Gender-Based Discrimination (GENDISC)	4.37	0.739	5
Lack of Adult Literacy/Training (PATADULTLIT)	4.34	0.752	6
Socio-Cultural Limitations (LACSOCIOCUL)	4.33	0.731	7
Lack of Extension Services (LACKEXT)	4.32	0.820	8
Lack of Improved Seeds (LACINPS)	4.30	0.770	9
Lack of Land Access (LACLND)	4.26	0.711	10
Lack of Market Information (LACKINF)	4.26	0.731	11
High Cost of Raw Materials (HIGCOSTRM)	4.20	0.786	12
Lack of General Inputs (LACINPUT)	4.15	0.724	13

Note: VALADINC reflects the perceived pressure/impact on income dynamics.

Source: Field Survey, 2026.

The data indicates that financial capital is the most acute bottleneck. "Lack of Access to Credit" (LAC) emerged as the most severe constraint (M = 4.67, SD = 0.555), suggesting near-universal agreement among respondents that financial exclusion is the primary barrier to scaling their operations. Closely following are market and technological barriers, with "Market Access Problems" (M = 4.39) and the "Need for New Processing Technology" (M = 4.38) ranking highly.

Notably, institutional and socio-cultural variables operate as distinct, heavy burdens rather than overlapping ones. "Gender-Based Discrimination" (M = 4.37) and "Lack of Extension Services" (M = 4.32) show high means with relatively high standard deviations, indicating that while these are severe barriers on average, their intensity varies significantly depending on the specific community or household dynamics of the respondent. The

failure of these variables to cluster in the initial PCA confirms that a woman's experience of gender discrimination is statistically independent of her experience with extension services; they are separate, formative hits to her livelihood portfolio.

The findings of this study provide critical empirical validation for treating agricultural constraints as formative rather than reflective indicators. The initial PCA failure (KMO = .371) is not a methodological flaw of the dataset, but rather a reflection of the complex, fragmented reality of rural women's livelihoods. As Jarvis *et al.* (2003) argue, formative indicators are defining characteristics that cause the construct, not effects of it. A woman's "vulnerability" in the groundnut value chain is *caused* by the independent accumulation of high raw material costs, lack of collateral for credit, and poor extension access. These factors do

not necessarily correlate with one another, explaining the low shared variance.

The paramount severity of credit constraints ($M = 4.67$) aligns with broader literature on gendered agricultural finance in Sub-Saharan Africa. Deininger *et al.* (2019) note that formal financial institutions frequently require landed property as collateral, a resource systematically denied to women due to patriarchal inheritance norms in Northern Nigeria. This creates a binding constraint: without credit, women cannot purchase improved seeds (ranked 9th, $M = 4.30$) or mechanized processing equipment (ranked 4th, $M = 4.38$), trapping them in low-margin, labor-intensive processing methods.

Furthermore, the high ranking of institutional deficits, specifically the lack of extension services ($M = 4.32$), highlights a systemic gender bias in agricultural support. Ragasa *et al.* (2018) demonstrate that extension agents in Nigeria predominantly target male "household heads," assuming knowledge will trickle down to women. This study's data refutes that assumption; women explicitly report that this exclusion restricts their knowledge of best practices and new technologies. The independence of this variable from socio-cultural norms ($M = 4.33$) in the statistical model suggests that even in households where women have some decision-making power, the institutional apparatus remains blind to their specific needs as processors.

Unlike studies that aggregate these barriers into a single "empowerment index," this study's formative approach reveals that interventions must be highly targeted. A program that only addresses literacy (ranked 6th) will fail if it does not simultaneously address the primary bottleneck of credit access (ranked 1st) and market linkages (ranked 3rd).

Conclusion

This study demonstrates that women's participation in groundnut value addition in North-Western Nigeria is constrained by a distinct, multi-dimensional array of formative barriers, primarily led by acute financial exclusion and market access deficits. The methodological pivot away from forced dimensionality reduction (PCA) toward a formative indicator framework provides a more accurate, nuanced representation of rural livelihood vulnerabilities. To unlock the economic potential of female processors, policymakers must move beyond blanket agricultural interventions. Priority must be given to establishing collateral-free, women-centric microfinance facilities, subsidizing small-scale mechanized processing technologies, and deploying dedicated female extension agents who can bypass socio-cultural mobility restrictions to deliver targeted, value-addition training.

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