

DISTRESS SALES AS LIVELIHOOD STRATEGY: COMMERCIALIZATION AND THE PERSISTENCE OF POVERTY AMONG WIDOWED FARMERS IN CONFLICT-AFFECTED NIGERIA

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Abstract: *Widowhood is a catastrophic event for women farmers at any stage of their lives, with serious implications for their well-being. We examined the effect of household commercialization on poverty of the widowed cowpea farmers in North-east Nigeria. Multistage sampling procedure was employed which arrived at 525 respondents. The data were collected using schedule interview and analysed using both descriptive and inferential statistics (multiple regression). The result revealed that Household commercialization index (HCI) was 55.44% and 54.19% for the IDPs and host communities respectively. The average progress out of poverty index (PPI) score was lower for IDP farmers (33.55) compared to host community farmers (42.96) with homogeneity in both. Explanatory variables influencing PPI explained 35.30% of its variation, Legume farming experience and value harvest were found to improve PPI, Household size and IDP status reduce the PPI. The HCI explained 4.7% of Poverty of widowed cowpea farmers, and the HCI had an inverse relationship with poverty. All in all, widowed cowpea farmers' household commercialization increases poverty by 0.126, with heterogeneity among households with higher legume farming experience, lower household sizes, IDPs host communities and higher value of cowpea which experienced less poverty in the study area. Strengthening cooperative development, promoting value addition of cowpea products, expanding access to financial services and targeted support for widowed farmers is hence recommended.*

Keywords: *Boko Haram, Market participation, Female headed household, Vulnerability, IDPs, Borno*
(JEL code: Q12, I32, Q13, J16)

INTRODUCTION

Cowpea (*Vigna unguiculata*) is a hardy and nutritious legume, highly adaptable to diverse soils and cropping systems, and holds considerable economic and nutritional importance in Nigeria, the world's largest producer and consumer. This is especially true in the arid and semi-arid North-East region, where it serves as a staple food, a critical source of income, and a component of soil fertility management (IITA, 2024;

Bolarinwa et al., 2022). Historically, cowpea production has been a cornerstone of rural livelihoods in this region (Nwagboso et al., 2024).

However, the North-East has been subjected to profound socio-economic disruption due to the Boko Haram insurgency, recurrent flooding, climate change vulnerability, and farmer-herder conflicts, resulting in over two million internally displaced persons (IDPs) (IOM, 2023; FAO, 2017). These crises disproportionately affect women, leaving many widowed and

severed from their traditional agrarian livelihoods (UNHCR, 2017). The resultant loss of spousal support, land access, and social networks has exacerbated poverty and vulnerability among these women, compelling a re-evaluation of their livelihood strategies (Barbelet et al., 2021).

Agricultural commercialization, the shift from subsistence to market-oriented production is widely posited as a viable pathway out of poverty for smallholder farmers. Empirical studies, such as those by Ogutu, Gödecke, and Qaim (2019) in Kenya and Simtowe et al. (2017) in the Democratic Republic of Congo, demonstrate that commercialization can increase household incomes, improve livelihoods, and build resilience to shocks. This perspective is reinforced by Cazzuffi, McKay, and Perge (2020), who found a positive linkage between commercialization and household welfare in rural Vietnam, and by De Janvry and Sadoulet (2009), who argue for its primacy due to farmer heterogeneity.

The gender dimension of this pathway, however, revealed significant constraints. Women, particularly in sub-Saharan Africa, consistently face gender-based barriers in accessing land, credit, and extension services, limiting their full participation in commercial agriculture (Horn et al., 2022; Mukaila, 2024; Shehu et al., 2025). Recent research by Shehu et al. (2024a) on smallholder cowpea farmers in Nigeria explicitly highlights these gendered paths to market participation, the finding showed that female farmers face distinct socio-structural obstacles compared to their male counterparts. This suggests that the poverty-reduction potential of commercialization cannot be assumed to be gender-neutral.

Furthermore, the relationship between commercialization and poverty is nuanced and may be mediated by the type of crop and household vulnerability. Studies focusing on staple food crops present a more complex picture. Birhanu, Tsehay, and Bimerew (2021), in their study on cereal commercialization in Ethiopia, hypothesize that commercializing staple foods could increase multidimensional poverty if it occurs at the expense of household food consumption, a scenario of "distress sales." This contrasts with findings from Chinese contexts, where Wang et al. (2024) found agricultural commercialization significantly reduced multidimensional poverty, and from a multi-country study in Africa where Mgonezulu et al. (2024) concluded poverty was higher among subsistence farmers than commercial ones in Malawi, Tanzania, and Nigeria. This divergence underscores that commercialization's impact is context-dependent, influenced by initial resource endowments, market structures, and household vulnerability profiles.

Despite this growing body of literature, a critical gap remains. There is a paucity of research that specifically examines the commercialization experiences of widowed women farmers in conflict-affected areas. This group represents a unique intersection of gender and vulnerability, often managing households alone under the compounded stresses of displacement, asset loss, and psychological trauma. As noted by Vasilyeva et al. (2023), institutional factors such as conflict and displacement profoundly shape economic mobility. The specific mechanisms through which widows in settings like North-East Nigeria engage with markets, and whether such

engagement alleviates or exacerbates their poverty, are poorly understood.

Existing humanitarian analyses, such as those by Barbelet and Wake (2020), report a high rate of exclusion of women, particularly widows, from formal support systems, pushing them towards independent but precarious livelihood strategies like small-scale farming. This makes the study of their agricultural decisions, especially regarding a key crop like cowpea, not only an academic exercise but a pressing policy concern.

This study, therefore, aims to fill this gap by investigating the effect of household cowpea commercialization on poverty among widowed farmers in North-East Nigeria, with explicit attention to differences between those in IDP settings and host communities. The study is grounded in an income-based concept of poverty, operationalized through the Progress out of Poverty Index (PPI), which assesses the likelihood of a household living below a given poverty line based on proxy indicators of wealth and capacity.

The research seeks to answer the central question: Does household commercialization of cowpea contribute to progress out of poverty for widowed farmers in this conflict-affected context, or does it represent a distress strategy that undermines food security and well-being?

In doing so, this paper contributes to the literature in three key ways: It provides empirical evidence on the livelihood strategies of a critically vulnerable yet understudied group (widowed women) in a protracted crisis zone; It interrogates the universal poverty-reduction narrative of agricultural commercialization by testing it in a context of acute gender and displacement-induced vulnerability; It offers evidence-based insights for policymakers and humanitarian actors aiming to design targeted interventions that support sustainable livelihoods for widowed farmers, aligning with the Sustainable Development Goals (SDGs), particularly SDG 1 (No Poverty), SDG 5 (Gender Equality), and SDG 10 (Reduced Inequalities).

LITERATURE REVIEW

The relationship between agricultural commercialization and poverty is a central theme in development economics, drawing from theories of market integration, household economics, and livelihood resilience. The prevailing orthodoxy, rooted in the market integration model (Timmer, 1997; Pingali & Rosegrant, 1995), the model posits that increased market participation allows smallholder farmers to specialize according to comparative advantage, achieve economies of scale, and realize higher incomes from cash sales. This enhanced income is theorized to catalyse a virtuous cycle of investment in productivity-enhancing inputs, improved household consumption, and ultimately, a sustained exit from poverty (De Janvry & Sadoulet, 2009; Cazzuffi et al., 2020). This framework underpins numerous policy prescriptions advocating for the commercialization of smallholder agriculture as a primary engine for rural poverty reduction.

However, this linear, optimistic model is increasingly challenged by empirical evidence highlighting the contingent and

often heterogeneous outcomes of commercialization, particularly for vulnerable groups. The New Economics of Labour Migration (NELM) perspective (Stark & Bloom, 1985) and Livelihoods Approaches (Scoones, 1998; Ellis, 2000) provide more nuanced frameworks. They conceptualize households not as profit-maximizing firms but as complex units managing a portfolio of assets (natural, human, financial, social, physical) to navigate risks and secure well-being. From this viewpoint, market participation is one strategy among many, and its adoption and impact depend critically on a household's initial asset endowment, its vulnerability context, and intra-household dynamics.

When farmers sell surplus produce beyond subsistence needs, commercialization directly increases disposable income (Ogutu et al., 2019). This income can be used to purchase a more diverse basket of goods and services, invest in children's education or health, and acquire productive assets, thereby reducing multidimensional poverty as measured by indices like the PPI (Wang et al., 2024). This pathway aligns with the classical market integration theory.

Conversely, commercialization can be a symptom of vulnerability rather than an opportunity. Faced with liquidity constraints, debt, or immediate shocks (e.g., illness, school fees), households may engage in distress sales of food staples, selling a portion of their harvest needed for home consumption (Birhanu et al., 2021). This reduces the quantity and quality of food available for the household, potentially leading to seasonal hunger, poor nutrition, and increased reliance on purchased food, which may be more expensive or less nutritious. In this scenario, while cash income may see a short-term rise, the household's food security and overall well-being deteriorate, creating a perverse outcome where commercialization exacerbates a core dimension of poverty.

This dual-pathway model is supported by contrasting findings in the literature. Mgomezulu et al. (2024) found poverty lower among commercial farmers in three African countries, suggesting the dominance of former pathway. In contrast, studies in highly vulnerable contexts, such as those on female-headed households in Ethiopia, warn of the risks of later pathway, where market participation does not translate into improved food security or resilience (Kuma et al., 2019).

In addition, gender is a fundamental axis structuring access to and control over the assets necessary for successful commercialization. Feminist political economy critiques highlight how patriarchal norms restrict women's land ownership, limit their access to credit and extension services, and assign them the bulk of reproductive labour (Agarwal, 1994; Doss, 2018). For widows, these constraints are often intensified. The death of a spouse can trigger asset-stripping by relatives, loss of customary land rights, and a collapse of social networks that previously facilitated market access (Peterman, 2012; FAO, 2020). Their commercialization decisions are therefore made from a position of significantly diminished "asset pentagon" (Scoones, 1998), particularly in terms of financial, social, and natural capital.

Furthermore, widows in conflict zones, such as North-East Nigeria, face a triple vulnerability: gender, displacement, and the trauma of conflict. Displacement (IDP status) represents a

severe shock to all livelihood assets, loss of land, destruction of physical capital, and disruption of social and market networks (IOM, 2023). This forces a radical reconfiguration of livelihood strategies, often under conditions of extreme uncertainty and limited state support (Barbelet et al., 2021). In this context, the decision to commercialize cowpea cannot be read simply as an entrepreneurial choice; it may be a critical survival strategy shaped by desperation and a lack of alternatives.

Conceptual framework

Integrating these theoretical insights and empirical cautions, Figure 1 presents the conceptual framework guiding this analysis. It moves beyond a simple linear model to depict a system of relationships where the impact of cowpea commercialization on the poverty status of widowed farmers is mediated by contextual and household-level factors and can manifest in different poverty dimensions.

Core Constructs and Relationships:

i. Contextual Vulnerability (Exogenous Shock): The conflict-induced displacement (IDP vs. Host status) acts as a primary shock, directly constraining access to key productive assets (especially land and capital) and shaping market access conditions. This sets the initial conditions for all subsequent decisions.

ii. Household Commercialization Decision (HCI): The degree to which a widow commercializes her cowpea harvest (HCI) is influenced by:

o Asset Endowment: Farm size, farming experience, human capital (education).

o Institutional Access: Group membership (social capital), access to market information.

o Household Demands: Household size (consumption needs/dependents).

iii. Dual-Pathway Impact on Poverty:

o Pathway 1 (Income Channel): Commercialization → Increased Farm Income → Increased Household Expenditure on non-food items (health, education, assets) → Reduction in Income/Multidimensional Poverty (PPI).

o Pathway 2 (Subsistence Channel): Commercialization → Reduced Quantity of Cowpea Available for Household Food Consumption → Potential Compromise of Food Security & Nutrition. This pathway is likely dominant in cases of distress sales driven by large household needs or a lack of alternative income sources.

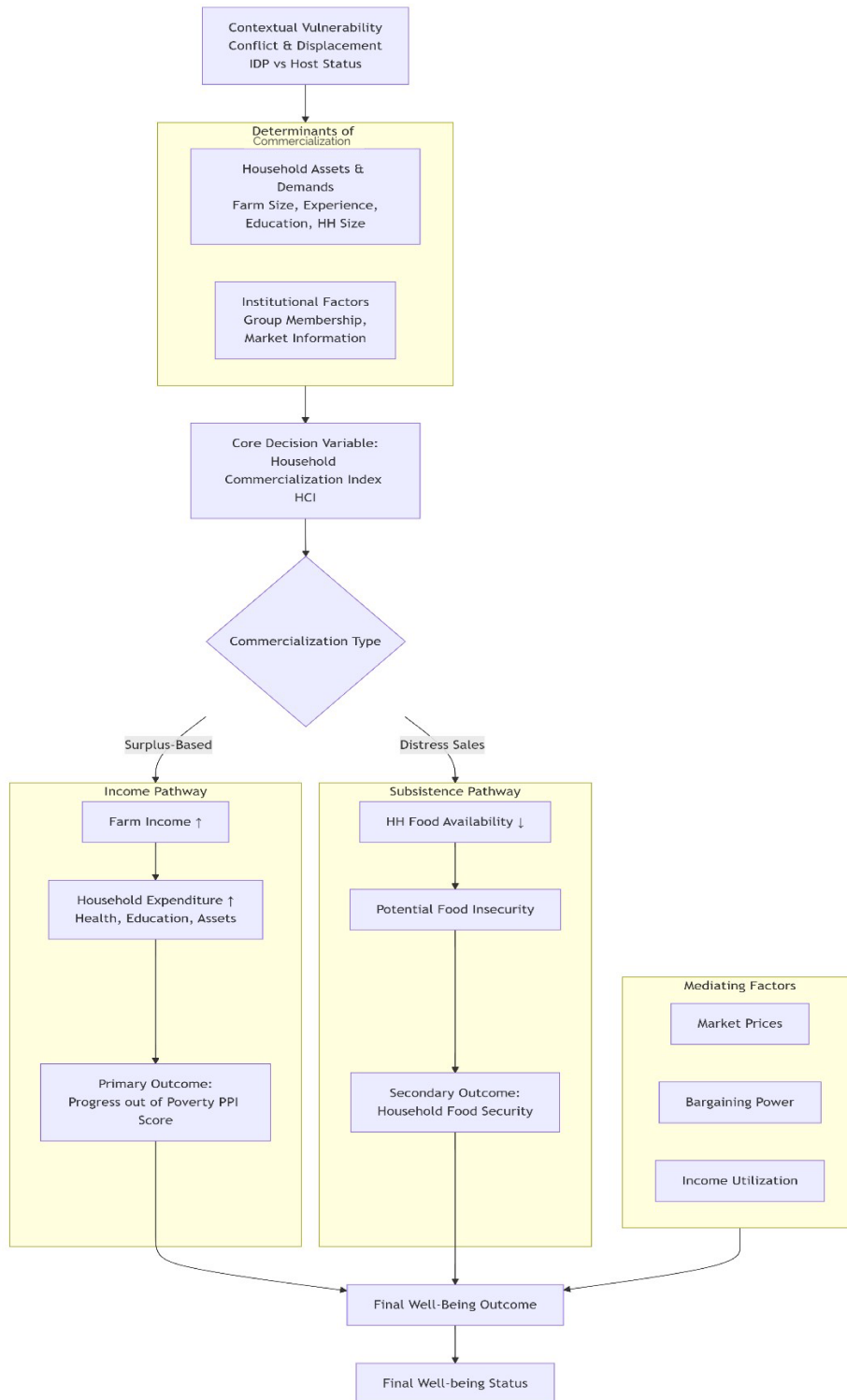
iv. The Mediating Role of Market Conditions & Agency: The ultimate effect on overall well-being (the final poverty outcome) depends on whether the income generated (Pathway 1) is sufficient to offset the food deficit (Pathway 2) by allowing the purchase of adequate and nutritious food in the market. This, in turn, is mediated by local food prices, the widow's bargaining power within the household and market, and her ability to utilize income for welfare-maximizing purposes.

v. Outcome Variable - Progress Out of Poverty Index (PPI): This study uses the PPI as its primary dependent variable. It is crucial to note that the PPI is a proxy for the likelihood of living below a national income poverty line, based on indicators of household assets and living standards. It is thus

a strong measure for Pathway 1 (income poverty) but may be less sensitive to acute, seasonal fluctuations in Pathway 2 (food security). A finding of no change or a negative relationship between HCI and PPI would strongly suggest that com-

mercialization is failing to improve the income-based poverty status, potentially because it is of the distress-sale variety, with benefits being negated by associated costs or because income is not being converted into durable asset.

Figure 1. Conceptual framework showing effects of widowed farmers' household commercialization on poverty



Source: Authors' own editing

MATERIALS AND METHODS

Study area

This study was conducted in North-east Nigeria which consists of six states. The States are Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe. The region lies between Latitude 9° 08' to 14°N and Longitude 8° 68' to 15°E. The area occupies a land mass of 280,419 km² (National Bureau of Statistics [NBS], 2022). According to the source the region has a population of 30, 541,900.

The choice of this area is predicated on its status as Nigeria's primary cowpea production zone (IITA, 2024) and its acute vulnerability context. There is heightened poverty rate as a result of the activities of Boko Haram armed conflict in the agrarian communities which resulted into community displacements that coupled with farmer-herders conflicts, incessant floods and climate change vulnerability. These thwart so many farmers from going to their farms specifically widows (International Organization for Migration [IOM] (2023); UN-HCR, 2017). As a result, widows become vulnerable to food insecurity, harsh weather, poor sanitary materials, poor access to health services, clean water and decent living standard among others (FAO, 2018; Aderemi & Ogbeje, 2024). However, humanitarian actions are available to cushion these vulnerabilities in which the high rate of exclusion of females which the widows were the majority in the humanitarian actions was reported (Barbelet & Wake, 2020; Barbelet et al., 2021). However, legumes production such as groundnut which relatively requires less inputs that also improves the fertility of the soil through atmospheric Nitrogen fixation, the legumes in addition serve as both cash and food crop for hu-

man and animals (Witcombe & Tiemann, 2022). It further has relatively less production duration which allow quicker return on investment (Witcombe & Tiemann, 2022). It is therefore remains an alternative for vulnerable widows in north-eastern Nigeria to engage into its production and commercialisation due to their condition of poor access to resources, market value and nutrition richness it possess.

Sampling Procedure

A multistage sampling procedure was used to select communities and respondents in the four LGAs. The technique reduces the time and cost of collecting samples from a large population to a convenient size, but goes through several stages to ensure fair representation (Rahman et al., 2022; Shehu et al., 2024a). In the first stage, four States were purposively from the six States of the North-Eastern Nigeria engulfed by the Boko Haram Insurgency, the selection was based on the intensity of the conflicts in the States, these States were Adamawa, Borno, Gombe and Yobe. In the second stage, L.G.As with a lower intensity of conflicts were proportionately randomly selected, this is to allow data collection by the enumerators, and the displaced farmers usually found IDPs in the less affected conflict area. Thirdly, list of widow farmers were collected from the extension officer of the Agricultural Development Programme (ADP) and community leaders, a listing of all active female farmers was compiled in the L.G.As selected, and 5% of the widow farmers were randomly selected from the list of the widow farmers as suggested by Krejcie & Morgan (1970) from the population of 10,500 (under 99% confidence level with 5% margin of error), which forms 525 for the study (Table 1).

Table 1. Sampling procedure and sample size

State	L.G.A	Sample frame	Sample size (5%)
Adamawa	Demsa	500	25
	Fufore	480	24
	Gombi	680	34
	Guyuk	540	27
	Hong	740	37
	Song	380	19
	Yola south	400	20
Borno	Bayo	640	32
	Biu	480	24
	Hawul	480	24
	Kwaya kusar	620	31
Gombe	Shani	460	23
	Akko	540	27
	Billiri	580	29
Yobe	Kaltungo	560	28
	Fika	760	38
	Nangere	820	41
	Potiskum	840	42
Total	18	10500	525

Source: Reconnaissance Survey (2022)

Method of Data Collection

Primary data were collected through a cross-sectional survey conducted between September and December 2022. A structured questionnaire was pre-tested and refined, the pretested data was dropped during the analysis. It was administered through face-to-face interviews by a team of trained enumerators fluent in local languages (Hausa, Kanuri, and Fulfulde).

The questionnaire was digitally deployed using Open Data Kit (ODK), an open-source suite of tools for mobile data collection, on Android tablets. This ensured real-time data capture, reduced errors, and facilitated efficient data management. The instrument was designed to collect detailed information on: Socio-economic characteristics (age, education, household composition, displacement status); Farm production (cowpea farm size, farming experience, production quantity, inputs used); Commercialization (quantity and value of cowpea harvested, quantity and value sold, marketing channels used); Institutional factors (membership in farmer groups or cooperatives, access to credit, and sources of market information); and PPI indicators.

Method of Data Analysis

The study used descriptive statistics such as frequency, percentage, mean, standard deviation to summarise the data, inferential statistics (Ordinary Least Squares (OLS) multiple linear regression) were used to determine the drivers of poverty among widowed cowpea farmers and the effect of widowed

cowpea farmers' HCI on their poverty.

The model for drivers of poverty was explicitly expressed as:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_{10} X_{10} + \varepsilon_i \quad \dots 1$$

Y_i = poverty (PPI)

β_0 = intercept

β = regression coefficients

ε_i = error term

X_1 = Age of the farmer (years)

X_2 = Education (year of formal education)

X_3 = Farm size (ha)

X_4 = Legume farming experience (years) X_6 =

X_5 = Household size (Number of persons in the household)

X_6 = Group membership (member=1, otherwise=0)

X_7 = Market information (Accessed market information=1, otherwise=0)

X_8 = Value of harvest (₦)

X_9 = Sales (₦)

While the model for the effect of HCI on poverty was explicitly expressed as:

$$Y_i = \beta_0 + \beta_1 X_1 + \varepsilon_i \quad \dots 2$$

Y_i = poverty (%)

β_0 = intercept

β = regression coefficients

ε_i = error term

X_1 = HCI (%)

Table 2. Description and Measurement of the Variable

Variable	Description and Measurement	Mean	SD
Dependent Variable			
Progress out of Poverty (PPI)	A composite index (0-100) calculated using the official Nigeria PPI scorecard. The scorecard uses 10 simple, verifiable indicators (e.g., household size, children's school attendance, asset ownership, housing materials) to compute a likelihood score of a household living below the national poverty line. A higher score indicates a lower probability of being in poverty.	40.12	12.45
Key Independent Variable			
Household Commercialization Index (HCI)	The ratio of the total value of cowpea sold to the total value of cowpea production, expressed as a percentage. HCI = (Value of Sales / Value of Total Harvest) 100. It measures the degree of market orientation for cowpea.	54.56	16.12
Explanatory/Control Variables			
Age	Age of the respondent in years.	49.21	13.88
Education	Years of formal schooling completed by the respondent.	5.03	5.01
Farm Size	Total land area cultivated to cowpea in the last season, in hectares.	3.02	2.05
Legume Farming Experience	Number of years the respondent has been farming legumes (including cowpea).	22.98	12.45
Household Size	Total number of persons eating from the same pot and living in the same household.	7.01	2.92
Group Membership	Dummy: 1 = Respondent is a member of any farmers' group, cooperative, or association; 0 = Otherwise.	0.41	0.49
Market Information	Dummy: 1 = Respondent accessed formal market information (on price, standards, buyers) via extension agents, radio, or mobile phone in the last season; 0 = Otherwise.	0.41	0.49
Value of Harvest (₦)	Total monetary value (in Naira) of the cowpea harvested in the last season, based on local prevailing prices at harvest.		159,220
Sales (₦)	Total cash income (in Naira) from cowpea sales in the last season.	78,245	114,210
IDP Status	Dummy: 1 = Respondent resides in an IDP camp/settlement; 0 = Respondent resides in a host community.	0.26	0.44

Source: Authors' own editing

RESULTS AND DISCUSSION

Variable description and measurement

Table 2 revealed that providing the mean and standard deviation for each variable offers immediate insight into the sample's characteristics and the distribution of key factors. For example: The mean PPI of 40.12 provides a baseline welfare level. The mean HCI of 54.56% indicates a surprisingly high level of market participation on average, which contextualizes the discussion around distress sales. The mean household size of 7.01 and the IDP status mean of 0.26 (26%) quantify the significant consumption burdens and displacement shock highlighted in the conceptual framework as key vulnerability factors.

The description correctly frames the PPI as a tool for assessing the likelihood of living below an income poverty line. This is not only a strength for clarity but also introduces a limitation noted in the conceptual framework: the PPI is more sensitive to Pathway 1 (Income Assets) than to short-term fluctuations in Pathway 2 (Food Security). A household engaging in distress sales might use the cash for urgent needs without acquiring durable assets, showing little improvement in PPI. The negative HCI coefficient suggests this may be occurring. The study correctly interprets the PPI within its designed limits.

The Distinction Between Value of Harvest and HCI: This is the table's most methodologically important feature. By including both variables, the analysis can isolate the intensive margin of commercialization (HCI) from the extensive margin of production (Value of Harvest). The positive coefficient for Value of Harvest and negative coefficient for HCI in the integrated model would provide powerful evidence for the distress sale hypothesis: producing more is good, but being forced to sell a high proportion of what you produce is detrimental.

The binary measurement of Group Membership and Market Information is pragmatic but captures only access, not quality, intensity, or effectiveness of use. Their non-significance in the model, as discussed, could mean that mere access is insufficient without the resources to act on it—a nuance that future qualitative work could explore.

IDP Status as a Composite Shock, it is dummy variable that efficiently captures the multifaceted "contextual vulnerability"

from the conceptual framework. It is a proxy for a bundle of correlated disadvantages: loss of land, disruption of social networks, trauma, and often poorer living conditions. Its large expected negative coefficient quantifies the overwhelming impact of this compounded shock.

Distribution of socio-economic and institutional factors of cowpea widowed farmers by displacement status

An analysis of the socio-economic and institutional characteristics of widowed cowpea farmers (Table 3) in the IDP and host communities reveals that both groups exhibit a comparable average age (host: 49 years, IDP: 49.6 years) with similar variability. The host community demonstrates marginally higher mean years of formal education (5.18 years) in comparison to IDPs (4.79 years), exhibiting comparable variability between the two groups. The host community has slightly more farming experience (23.49 and 21.94 years respectively) and specific cowpea farming experience (15.83 and 13.53 years respectively), with similar variability between the host and IDP communities. A notable difference was in the average farm size: host community (3.41 units) and IDPs (2.23 units), suggesting that IDPs have more limited access to farmland. This disparity can be attributed to the displacement of IDPs from their original places of residence, resulting in the abandonment of their agricultural assets and other resources. The two groups demonstrate analogous levels of group membership, with both reaching approximately 41-42%. However, IDPs exhibit marginally higher access to market information (45%) compared to the host community (39%). However, the primary implication is that IDPs appear to be more constrained in terms of farm size and farming experience, and maintain larger household sizes, possibly due to displacement dynamics. Despite displacement, IDPs maintain similar levels of social integration (group membership) and slightly better access to market information. Additionally, the relatively low levels of formal education observed in both categories underscore the potential requirement for enhanced agricultural extension services. Furthermore, IDPs' larger household sizes and better access to market information may reflect their adaptive strategies in response to displacement.

Table 3. Distribution of socio-economic and institutional factors of cowpea widowed farmers by displacement status n=525

Variable		Age	Education	Farm size	Farming	Cowpea farming experience	Household size	Group	Market
Host	Mean	48.99	5.18	3.41	23.49	15.83	6.54	0.41	0.39
	Std.	13.77	5.10	2.10	12.38	9.79	2.97	0.49	0.49
		18	0	0.5	2	1	1	0	0
		80	20	14	50	50	17	1	1
IDPs	Mean	49.60	4.79	2.23	21.94	13.53	7.86	0.42	0.45
	Std.	14.04	4.91	1.53	12.61	10.02	2.79	0.50	0.50
		18	0	0.1	2	1	3	0	0
		80	20	7.5	50	50	17	1	1

Source: Authors' own editing

Distribution of marketing channels of cowpea widowed farmers by displacement status

Figure 3 represents the distribution of marketing channels used by widowed cowpea farmers, as categorized by their displacement status (host community or IDPs) and access to the market channel.

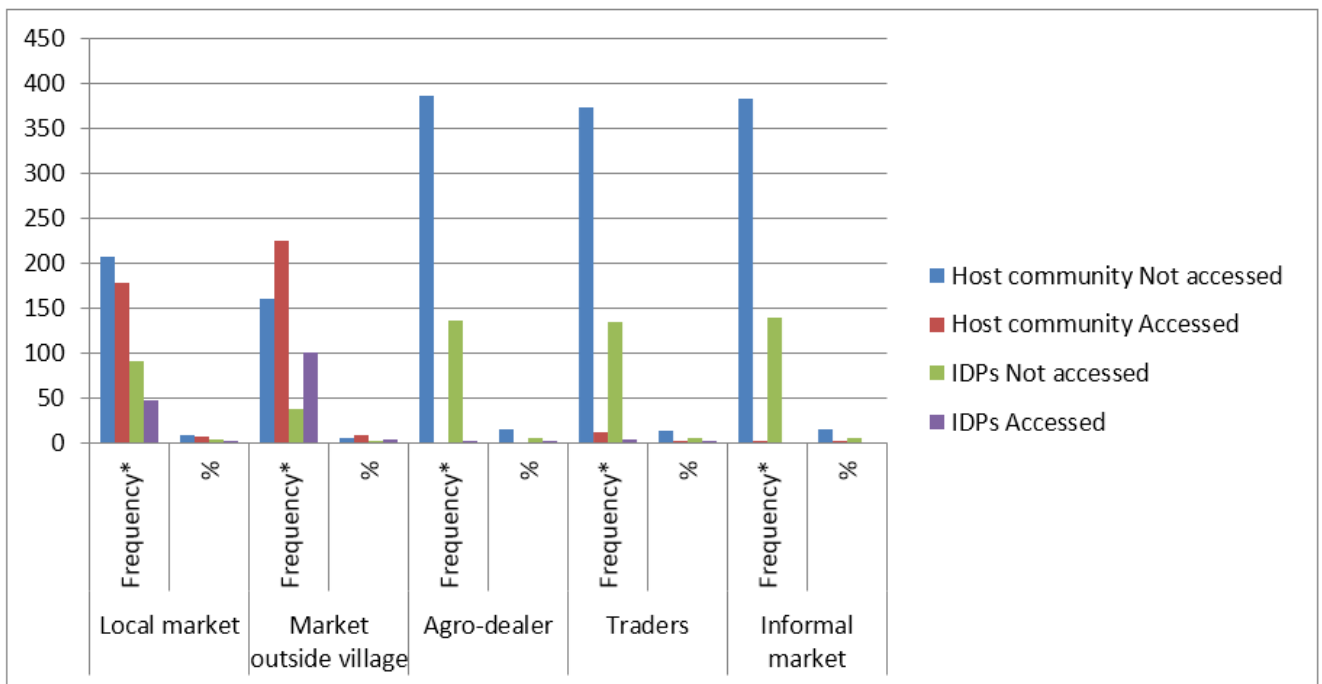
Local markets appear to be the most common marketing channel for both widowed cowpea farmers in the host community (38.6%) and IDP (14.3%), followed by markets outside the village (24.7% for host community and 15.4% for IDPs) and traders (14.25% for host community and 5.14% for IDPs).

The result further revealed that none (0%) of the IDPs surveyed accessed marketing channel from agro-dealers, and only a negligible number (0.11%) accessed from informal markets. This suggests that IDPs may face greater challenges in access-

ing essential agricultural inputs and services compared to widowed farmers in the host communities.

The figure further indicates minimal use of formal channels like agro-dealers by both host community and IDP farmers. This could be due to factors like limited access or lack of awareness about the services offered. The process of displacement can disrupt social networks, market linkages, and access to resources, making it harder for IDPs to re-establish themselves in new locations. IDPs, especially women, may face security concerns or restrictions on movement that impedes their ability to reach distant markets. IDPs often arrive in host communities with limited financial resources, making it difficult to invest in transportation, storage, or processing facilities needed to access certain markets.

Figure 3. Marketing channels of cowpea widowed farmers by displacement status



Source: Authors' own editing

Note: *= multiple responses

Household Commercialization of the widowed cowpea farmers by displacement status

The result in Table 4 showed that the average HCI for the host community was 54.19% with a standard deviation of 16.817. This revealed that there is high market participation of widowed cowpea farmers into commercialization of cowpea with a very low dispersion within the widowed cowpea farmers.

The average mean of HCI for the IDPs was 55.44% with a standard deviation of 14.351. This revealed that there is high participation of by widowed cowpea farmers into commercialization of cowpea with a very low dispersion within them. This corroborates the findings of Shehu et al. (2024a) Shehu et al. (2024b) who found the market commercialization was high in the study area despite Boko haram insurgency, farmers-herders

conflict and incessant floods due to climate change in North-East Nigeria.

Table 4. Market participation of the widowed cowpea farmers by displacement status n= 525

	Variable	N	Mean	Std. Deviation	Minimum	Maximum
Host community	Sales (₦)	386	76,413.81	116462.33	150	1125000
	Value of Harvest (₦)	386	134,497.41	165027.37	1000	1250000
	HCI (%)	386	54.19	16.817	10	90
IDPs	Sales (₦)	139	83,767.55	108919.72	7500	1125000
	Value of Harvest (₦)	139	144,812.95	141557.77	20000	1250000
	HCI (%)	139	55.44	14.351	10	90

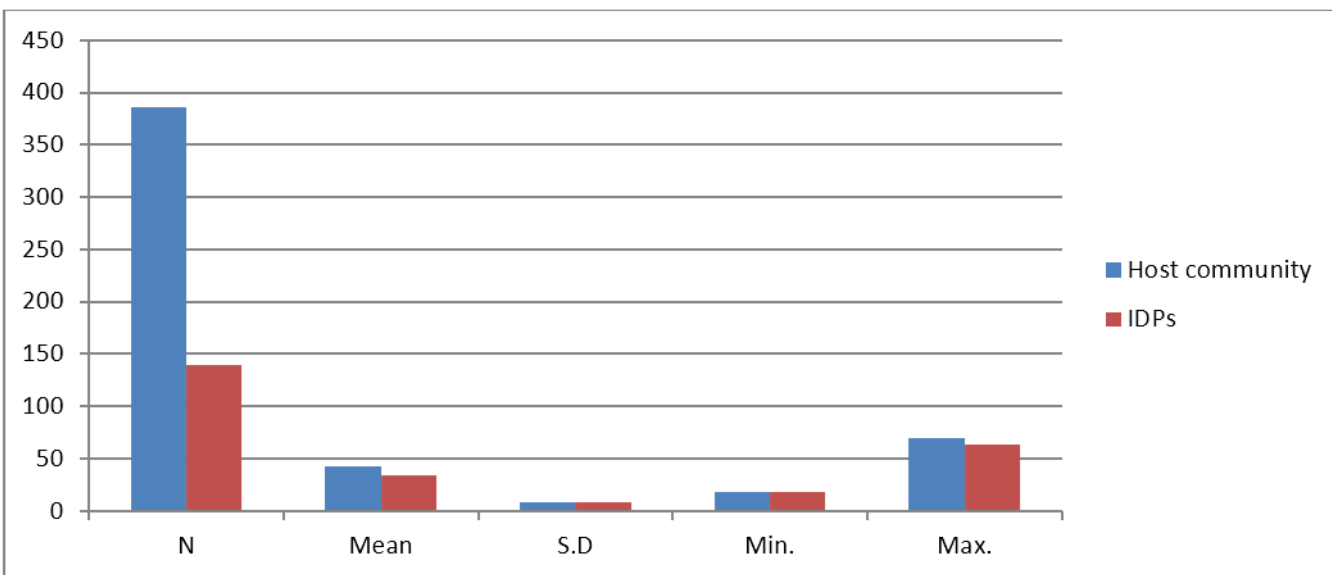
Source: Authors' own editing

Progress out of poverty of widowed cowpea farmers by displacement status

The result in figure 4 presents the progress out of poverty for widowed cowpea farmers, categorized by their displacement status as either host community or IDP. The average progress out of poverty score was lower for IDP farmers (33.55) compared to host community farmers (42.96). This indicates that displacement has a substantial negative effect on the ability of these farmers to escape poverty. The standard deviation for both groups is relatively low, suggesting considerable ho-

mogeneity in poverty levels among the cowpea farmers within each category. This is probably due to the fact that displacement often involves the loss of land, livestock, and other assets, making it difficult for IDPs to rebuild their livelihoods. Also, IDPs may have limited access to credit, agricultural inputs, and markets; impeding their ability to invest in productive activities. The trauma of displacement may affect the mental and physical health of IDPs, by impacting on their ability to engage in productive activities as a result of possible discrimination and social exclusion, limiting their access to opportunities and support networks.

Figure 4. Progress out of poverty of widowed cowpea farmers by displacement status



Source: Authors' own editing

Factors influencing PPI of widowed cowpea farmers in North-east Nigeria

The OLS regression results for the determinants of poverty, as measured by the Progress out of Poverty Index (PPI), are presented in Table 5. The model is statistically robust, with an F-statistic of 30.42 ($p \leq 0.01$), indicating that the joint effect of the explanatory variables is significant. The model ex-

plains 35.3% ($R^2 = 0.353$) of the variation in PPI scores among widowed cowpea farmers. This moderate explanatory power aligns with the conceptual framework's emphasis on the complex, multi-faceted nature of poverty, which is influenced by a broader set of socio-economic, political, and institutional factors beyond those captured here (Scoones, 1998). The analysis reveals significant relationships for several

key variables, offering insights into the pathways shaping poverty outcomes for this vulnerable group.

Consistent with the livelihood assets component of the conceptual framework, human capital in the form of legume farming experience emerged as a positive and significant ($p \leq 0.01$) determinant of PPI. For each additional year of experience, a widow's PPI score increases by 0.108 points. This finding supports the literature positing that accumulated experiential knowledge enhances farmers' technical efficiency, risk management capabilities, and ability to optimize production in marginal environments typical of the North-East (Abdulsalam et al., 2024). This human capital directly strengthens a household's livelihood portfolio, facilitating progress out of income poverty.

Similarly, the total value of cowpea harvest (a proxy for the scale of production and natural capital yield) is positively associated ($p \leq 0.10$) with higher PPI scores. This underscores the fundamental role of production sufficiency. A larger harvest provides a critical buffer, enhancing both food availability (subsistence pathway) and potential surplus for sale (income pathway), thereby directly contributing to improved household welfare, as found in similar contexts by Fischer and Hadju (2015). This variable's significance revealed that the absolute volume of resources, not just the proportion commercialized, is vital for poverty alleviation.

Conversely, household size exerts a strong, negative influence ($p \leq 0.01$) on PPI. Each additional household member is associated with a 1.108-point decrease in the PPI score. This finding powerfully illustrates the "demands" side of the conceptual framework. A larger household size increases consumption needs and dependency burdens, stretching finite re-

sources, particularly critical for a widow managing a household alone, and limiting the capacity for savings or investment, thereby diminishing the poverty-reducing potential of any income generated (Ogwumike et al., 2013).

Most strikingly, IDP status is the strongest negative predictor in the model ($p \leq 0.01$). Residing in an IDP settlement is associated with a substantial 7.760-point reduction in PPI compared to widows in host communities. This result provides robust quantitative validation for the framework's foundational element: contextual vulnerability. Displacement represents a catastrophic shock that strips households of key assets, land, livestock, permanent housing, and established social networks (IOM, 2023). The coefficient magnitude confirms that this loss of physical, natural, and social capital is so profound that it severely constrains a widow's livelihood options and significantly deepens poverty, as documented by IDMC (2021). It serves as a critical control variable, establishing the profoundly disadvantaged starting point from which IDP widows engage in commercialization.

It is instructive to note that variables such as formal education, farm size, group membership, and access to market information were not statistically significant in this model. This suggests that for widowed cowpea farmers in this crisis-affected setting, the advantages conferred by these factors may be neutralized by overarching structural constraints. For instance, the benefits of group membership (social capital) may be offset by a lack of resources to leverage collective action, or the utility of market information may be nullified by an inability to act on it due to mobility restrictions or lack of capital. This aligns with the framework's premise that in high-vulnerability contexts, the returns to certain assets are attenuated.

Table 5. Factors influencing PPI of widowed cowpea farmers

Variable	Coefficient	T-value
Age	-0.002 (0.027)	-0.06
Education	-0.001 (0.073)	-0.02
Farm size	-0.091 (0.186)	-0.49
Legume farming experience	0.108 (0.039)	2.77***
Household size	-1.108 (0.143)	-7.75***
Group membership	0.125 (0.671)	0.19
Market information	0.173 (0.747)	0.23
IDP status	-7.760 (0.824)	-9.42***
Value of Harvest	.0000116 (6.35e-06)	1.83*
Sales	-.0000242 (7.68e-06)	-3.15***
Constant	49.060 (2.049)	23.94
F(10, 514)	30.420***	
R-squared	35.30%	

Note: Values in parenthesis = robust standard error

Source: Authors' own editing

Effects of Household commercialization on PPI

Table 6 revealed the central hypothesis of this study, derived from the dual-pathway conceptual framework, tested using the integrated OLS regression model where the House-

hold Commercialization Index (HCI) is analyzed alongside key control variables. The results of this primary analysis are presented in Table 5. The model is statistically significant ($F(11, 513) = 22.15, p \leq 0.01$) and explains approximately 4.7%

of the variation in PPI scores. The coefficient for Household Commercialization Index (HCI) is -0.119 and statistically significant at the 1% level ($p \leq 0.01$). Crucially, this effect is estimated while controlling for the total value of harvest, IDP status, household size, farming experience, and other covariates. This finding provides robust, nuanced evidence supporting a core pathway in the conceptual model: for widowed cowpea farmers in North-East Nigeria, a greater degree of market orientation in cowpea production is, on average, associated with a lower Progress out of Poverty Index score. Specifically, holding all other factors constant, a one-percentage-point increase in HCI predicts a 0.119-point decrease in a widow's PPI.

This result may suggest the dominance of Pathway 2 (Subsistence/Distress Channel) over Pathway 1 (Income Channel) for this specific widowed sample. The negative sign indicates that increased commercialization is correlated with worse poverty outcomes. This aligns with the framework's contingency, wherein commercialization driven by vulnerability rather than surplus can undermine well-being. For widows managing households under the strain of displacement (IDP status) and large family sizes (both significant negative predictors in this model), selling a higher proportion of their cowpea harvest likely reflects a distress sale strategy. This is undertaken to meet immediate, pressing cash needs (e.g., healthcare, debt burden, school fees), this fact may point to a distress selling mechanism at the expense of household food reserves. The resulting reduction in food availability may lead to increased expenditure on market foods later or poorer nutrition, negating any short-term cash income gains and failing to translate into the durable asset accumulation captured by the PPI. This finding empirically validates the hypothesis of Birhanu et al. (2021) regarding the poverty risks of staple crop commercialization when it compromises subsistence.

This result appears to contradict studies like Wang et al. (2024) in China and Mgomezulu et al. (2024) in more stable African contexts, which found commercialization reduced poverty. This divergence may not be a methodological discrepancy but a powerful confirmation of the conceptual framework's emphasis on contextual vulnerability. The studies finding positive effects typically analyse contexts with lower baseline vulnerability, better market infrastructure, and farmers with greater asset buffers. In contrast, our study focuses on widows in a conflict zone, a group characterized by severely diminished asset pentagons (loss of spousal support, land, and social networks). For them, the precondition for successful, surplus-based commercialization (Pathway 1) is often absent. Therefore, the observed commercialization is of a different nature—a coping mechanism rather than an entrepreneurial strategy. This perfectly illustrates De Janvry and Sadoulet's (2009) point about heterogeneity: the average effect of commercialization masks sharply different outcomes for different subgroups. Our finding clarifies that for widows in crisis settings, the common policy prescription of commercialization may be ineffective or even harmful if not preceded by interventions that address their acute vulnerability and asset deficits.

The integrated model accentuates the importance of controlling for confounding factors. The strong, persistent negative effect of IDP status and household size in this model confirms that these vulnerability factors create the conditions under which commercialization becomes detrimental. The positive effect of value of harvest remains significant, this depicts that overall production scale is beneficial, but the proportion sold (HCI) is harmful. This key distinction between selling more because you have surplus versus selling more of what you have (distress) is only visible in a model that includes both variables.

Table 6. Effects of Household commercialization on PPI n= 525

Variable	Coefficient	T-value
Household commercialization	-0.126*** (0.029)	-4.35
Constant	47.340 (1.660)	28.51
F(1, 523)	18.95***	
R-squared	4.70%	

Note: Values in parenthesis= robust standard error

Source: Authors' own editing

CONCLUSION

This study set out to interrogate the effect of household cowpea commercialization on poverty among widowed farmers in North-East Nigeria, a group situated at the critical intersection of gender, conflict, and displacement. Grounded in a revised conceptual framework that distinguishes between surplus-based and distress-driven commercialization, the analysis yields conclusions that are both nuanced and sobering.

The findings robustly demonstrate that, for this vulnerable population, a higher degree of cowpea commercialization is associated with a lower Progress out of Poverty Index (PPI) score, even after controlling for key determinants like production scale, displacement status, and household demographics.

This central result validates the dominance of Pathway 2 (the Distress Sale/Subsistence Channel) within our conceptual model. It indicates that for widows, particularly those in IDP settings or with large households' commercialization often acts as a coping mechanism rather than a growth strategy. The sale of a greater proportion of the harvest appears to be driven by immediate liquidity needs, likely at the expense of household food security, thereby failing to generate the sustainable income or asset accumulation necessary to improve their PPI-based poverty status.

The analysis further clarifies the conditions that shape this outcome. The powerful negative effects of IDP status and household size confirm that contextual vulnerability and high dependency burdens create the preconditions for detrimental

commercialization. Conversely, legume farming experience and the total value of harvest were positive factors, underscoring that human capital and production sufficiency remain foundational for welfare. The non-significance of factors like formal group membership suggests that in such high-volatile environments, the potential benefits of certain forms of social capital are neutralized without complementary resources.

Ultimately, this study concludes that the relationship between agricultural commercialization and poverty is not universal but is fundamentally mediated by initial asset endowment and vulnerability context. In the crisis-affected landscape of North-East Nigeria, promoting market participation for widowed cowpea farmers without first addressing their glaring deficits in land, security, and social protection risks exacerbating the very poverty it intends to alleviate.

Policy Implications

Derived directly from the empirical findings and the conceptual framework, the following policy implications are proposed to guide interventions that are both effective and sensitive to the unique vulnerabilities of widowed farmers.

The strong link between IDP status and poverty necessitates policies that move beyond immediate humanitarian relief to restore productive assets. Actors rendering the humanitarian services such as government, NGOs and local community driven initiatives should facilitate formal or customary land-use agreements for widows in both host and IDP communities to rebuild natural capital. Also, they should provide direct support in the form of drought-tolerant seeds, small livestock, or simple processing equipment to help rebuild the productive asset base, creating a surplus for genuine market engagement (Pathway 1), and support widows in securing land titles, death certificates, and other legal documents to prevent asset stripping and establish economic identity.

In order to prevent commercialization from undermining subsistence, direct cash or food transfers are needed to meet urgent consumption needs. Federal government should strengthen the cash transfer program by implementing regular, predictable cash transfer programs for widowed households, particularly those with large numbers of dependents. This can reduce the pressure to sell staple food crops for emergency cash and link food assistance to activities that build community or individual assets (e.g., soil conservation, irrigation), simultaneously addressing food gaps and enhancing future productivity.

Furthermore, all the development agents present in the North-East Nigeria should consider commercialization only after subsistence is secured and should focus on creating value from genuine surplus. This could be achieved through supporting cooperatives not just for marketing, but for collective bulking, storage, and processing. This enables members to wait for favourable post-harvest prices and engage in value addition (e.g., producing cowpea flour, snacks like akara), thereby increasing income from a smaller, truly surplus quantity. Also, Connection of women's cooperatives directly to institutional buyers (schools, NGOs) for processed cowpea products, creating a more stable and remunerative market than the volatile raw grain trade could serve the purpose of subsist-

ence before commercialization.

The trauma of conflict and widowhood itself is a barrier to effective economic agency. Therefore, Psychosocial Support (PSS) and counselling should be embedded within agricultural extension and livelihood programs to help widows cope with loss and build the resilience needed for long-term planning and Train extension agents to address the specific technical, social, and mobility constraints faced by widows, offering advice tailored to their resource-limited contexts by the Social welfare department in L.G.As.

A one-size-fits-all approach will fail. The sharp disparity in poverty outcomes necessitates differentiated strategies. Therefore, widows in IDP camps and host communities should be engaged separately to design context-specific interventions by all the development actors. Federal Government and donor agencies should fund programs that foster economic integration of widows into host communities through shared resource access (e.g., communal farming plots) and conflict-resolution mechanisms to ease tensions.

Limitation of the Study

The study had a limitation of relying on cross-sectional data. While the study tried to control for heteroskedasticity through using robust standard error, further study involving experimental or panel data designs would be needed to properly account for potential bias from unobserved heterogeneity and to test this Hypothesis. Furthermore, while the PPI is a recognized tool, it does not necessarily reflect short-term food security problems, seasonal deprivation, or nutritional losses resulting from forced sales.

Direction for Future Studies

The study finds an association between cowpea widowed farmers' commercialization of their output and PPI, but there is need for further studies to incorporate indicators of food consumption, dietary diversity, coping strategies, debt burdens, or asset depletion, which would significantly strengthen the argument regarding forced sales.

DECLARATIONS

Declaration of interest statement

All the authors declare no conflict of interest.

Declaration of Data availability

The data is with the author and would be released on reasonable request.

Declaration of Generative AI Use

DeepAI was used to improve the grammar of the paper under the author critical thinking and evaluation, therefore the authors declare the responsibility of all the content in the paper.

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