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ASSESSING RURAL WOMEN AGRO-ENTREPRENEURS' ACCESS TO KATSINA STATE SUPPORT INTERVENTIONS FOR AGRO-ENTERPRISE DEVELOPMENT IN KATSINA STATE, NIGERIA

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ABSTRACT: *The study examined the awareness, access, and effectiveness of support interventions among rural women agro-entrepreneurs in Katsina State. Using a descriptive survey design, data were collected from women agro-entrepreneurs across three districts: Katsina Central (KC), Katsina North (KN), and Katsina South (KS). Descriptive statistics, ANOVA, and multiple regression were used to data on socioeconomic characteristics, awareness, access and support interventions. Results revealed that 72.7% of the respondents were married with an average age of 35 years and 12.6 years of experience. Religious homogeneity in Islam (100%) and dominance of Quranic education (82.9%) prevailed. Average monthly income was ₦14,979, with district variations ranging from ₦13,256 in KN to ₦17,431 in KS. Enterprise involvement patterns showed concentration in poultry farming (63%) and small ruminant rearing (61%) always, while value-addition activities remained severely underutilized. Fish farming (99.5%) were not involved, while dairy processing (96.8%), and meat processing (98.1%) also showed minimal participation. While 69% demonstrated high awareness of available support interventions, 76.4% had low access to these programmes. Microfinance and credit interventions showed highest awareness (89.4%) but 89.4% never accessed. District level results revealed disparities, with KN and KS showing very high awareness rates (95.8% and 98.6% respectively) with only 16.7% high access each, while KC demonstrated better access (37.5%) despite lower awareness. Effectiveness assessment revealed 78.7% had low programme effectiveness. Technology adoption (87%) was never effective) while business practice changes (87%), and market access improvements (83.8%) showed poor performance. KC outperformed other districts with 44.4% reporting high effectiveness compared to 13.9% in KN and 5.6% in KS. Policy implementation gaps (94.4%) and political factors (94.4%) were most serious constraints, followed by bureaucratic barriers (93.1%) and information gaps (81%). Multiple regression analysis revealed that awareness had a negative effect on access (-0.503, $p<0.001$), while information sources positively influenced access (0.44, $p<0.05$). Educational levels showed negative relationships with access, suggesting that structural barriers outweigh individual capacity factors. Significant differences between districts in awareness ($F = 276.027$, $p < 0.001$), effectiveness ($F = 26.890$, $p < 0.001$), and challenges ($F = 30.095$, $p < 0.001$) occurred. The study concludes that while Katsina State has established various support interventions for rural women agro-entrepreneurs, critical implementation gaps, bureaucratic barriers, and political factors severely limited actual access and effectiveness. The research recommends institutional strengthening, simplified access procedures, and targeted district-specific approaches to bridge the awareness-access gap and improve programme outcomes for rural women agro-entrepreneurs.*

KEYWORDS: agro-entrepreneurs, awareness, access, interventions, information, effectiveness.

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INTRODUCTION

Agriculture remains the backbone of Nigeria's economy. It contributes about 22.35% to the nation's Gross Domestic Product and employs over 70% of the population, primarily at subsistence level (Food and Agriculture Organization, 2021). Within this landscape, rural women constitute a significant yet underutilized demographic, playing crucial roles in food production, processing, and marketing activities that are essential for household food security and economic sustainability. Also, despite such substantial contributions to agricultural development, rural women agro-entrepreneurs have continued to face numerous challenges that limit their access to resources, support services, and opportunities for enterprise growth and development.

Katsina State, like other northern states possesses unique socio-cultural, economic, and environmental characteristics including favorable agro-climatic conditions; fertile clay loam to sandy loam soils, gentle topographic features and rainy seasons that support diverse agricultural activities including crop production and livestock rearing. This has necessitated government's commitment to empowering rural women through targeted agricultural interventions. For instance, the state government recently approved five hundred million naira empowerment programme targeting about 7,220 rural women and youths, indicating a substantial investment in rural entrepreneurship development (ThisDay Live, 2025). The importance of such support extends beyond individual economic benefits to encompass broader development outcomes such as poverty reduction, food security enhancement, and rural economic development.

Investigation on Nigerian agribusiness entrepreneurship has also identified systemic challenges that affect the sector's development, including inadequate technology adoption, poor infrastructure, educational gaps, and limited access to financial services (Alabi et al., 2024). These challenges seem to more pronounced for rural women entrepreneurs who face additional barriers related to cultural norms, land tenure systems, and gender-specific constraints.

Rural women's access to support interventions is however, drawn from multiple perspectives, including gender and development theories, agricultural innovation systems, and entrepreneurship development models. These frameworks emphasize the importance of inclusive approaches that address both structural barriers and individual capacity constraints affecting women's agricultural entrepreneurship. The concept of "access" in this case extends beyond mere availability of services to include affordability, appropriateness, and cultural acceptability of interventions designed to support rural women agro-entrepreneurs in the state

State-level interventions in agricultural development have evolved in recent years, moving from generic support programmes to more targeted approaches that recognize the specific needs and constraints of different demographic groups. In Katsina State, the Agricultural and Rural Development Authority, along with other institutional actors, have implemented various programmes aimed at enhancing agricultural productivity and rural livelihoods. However, the extent to which these interventions effectively reach and benefit rural women agro-entrepreneurs requires assessment. This study therefore was aimed at filling such knowledge gap regarding the specific experiences of rural women agro-entrepreneurs in accessing state support interventions.

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Statement of the research problem

Despite the critical role of women in Nigeria's agricultural sector, where they constitute approximately 60-79% of the rural farming population (Food and Agriculture Organization, 2021), rural women agro-entrepreneurs in Katsina State face significant barriers in accessing government support interventions designed to promote agro-enterprise development. While Katsina State has implemented various agricultural development programmes and support schemes aimed at enhancing agricultural productivity and entrepreneurship, the extent to which these interventions effectively reach and benefit rural women agro-entrepreneurs remains unclear.

Rural women agro-entrepreneurs encounter numerous challenges including limited access to credit facilities, inadequate extension services, poor market linkages, insufficient technical training, and weak institutional support systems (Alabi et al., 2024). These challenges are compounded by socio-cultural barriers, gender discrimination in resource allocation, and limited awareness of available government support programmes. Consequently, despite their significant contribution to agricultural production and food security, rural women continue to operate small-scale, subsistence-level enterprises with minimal growth potential.

The gap between policy intentions and actual implementation outcomes raises critical questions about the accessibility, appropriateness, and effectiveness of Katsina State's support interventions for rural women agro-entrepreneurs. Without an adequate understanding of how these women access and utilize available support interventions, policymakers cannot adequately address the structural barriers that limit women's participation in commercial agriculture and agro-enterprise development.

Therefore, there is a pressing need to assess rural women agro-entrepreneurs' access to Katsina State support interventions, identify the barriers they face, and the effectiveness of existing programmes in meeting their specific needs. This assessment will provide insights for informed policy design and implementation to better serve this important demographic in Katsina State agro-entrepreneurship development agenda.

Objectives of the study

The study generally aimed at assessing rural women agro-entrepreneurs' access to support interventions for agro-enterprise development in Katsina State. The specific objectives included to:

1. identify rural women's level of involvement in agro-enterprises
2. assess rural women agro-entrepreneurs' level of awareness of support interventions
3. assess level of women agro-entrepreneurs'access to support interventions
4. assess the effectiveness of support interventions in promoting agro-enterprise development
5. identify challenges to rural women agro-entrepreneurs' access to support interventions

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LITERATURE REVIEW

Nigeria's agricultural sector employs over 70% of the population, with women constituting a significant portion of this workforce. According to the Ogunlela & Mukhtar (2009), rural women, more than their male counterparts, take the lead in agricultural activities, making up to 60-80 percent of labour force, though their contributions to agriculture and rural development are rarely noticed. The study further notes that rural women are major players in this highest GDP contributing sector in Nigeria although they remain poor, with disincentives having entrenched subsistence agriculture chiefly among rural women. However, the persistence of traditional gender roles and cultural practices have continued to influence women's access to productive resources, technology, and markets (East-West Seed Knowledge Transfer, 2025). These challenges are particularly pronounced in northern Nigeria.

The concept of agro-entrepreneurship has evolved in Nigeria's development agenda, following government's recognition of agriculture as a major pathway to economic diversification. Ikuemonisan's (2024)'s study which examined the challenges and opportunities in Nigeria's agribusiness sector has also revealed agro-entrepreneurship strengths like abundant land, a young population, and government support, alongside weaknesses such as low technology use, poor infrastructure, inadequate finance, limited market and educational gaps.

However, gender analysis overtime has continued to reveal disparities in access to agricultural resources and support services. Uduji et. al (2020)'s study emphasizes that land tenure systems with bias against women, inadequate access to credit and agricultural inputs, and sociocultural constraints are detrimental to their productivity and economic empowerment. Notable also is the fact that addressing such gender gaps in agriculture could increase productivity and food security. The World Bank (2024) reports that forgone earnings from gender gaps in productivity are estimated to amount to at least $2.3 billion annually and more when accounting for spillovers to other sectors in Nigeria's agriculture sector alone. This evidence underscores the importance of gender-sensitive approaches to agricultural development and the need for targeted interventions that address women's specific needs and constraints.

It is therefore not in doubt that Government support pronouncements for agricultural development have been very robust overtime, with increasing recognition of the need for targeted interventions. In corroboration, the World Bank (2024) reports that the Federal Government of Nigeria, with financing from the World Bank, launched the Transforming Irrigation Management in Nigeria (TRIMING) Programme, which aims to achieve its transforming impact through the modernization of irrigation systems, improved water resources management. This initiative specifically recognizes the importance of including women farmers in irrigation development. Another government supportive effort is the Nigeria For Women Project (2025), described as a strategic engagement between the World Bank and the Nigerian Government to improve the livelihood of 324,000 women. The programme specifically targets rural women and aims to enhance their access to productive resources and markets. Extension services remain a critical component of government support, with programmes focused on building capacity among extension agents and improving service delivery to farmers.

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However, research indicates that women often face greater challenges in accessing formal financial services due to collateral requirements, documentation challenges, and cultural barriers. Despite these support interventions, rural women agro-entrepreneurs have continue to face barriers in accessing government programmes and services. Ikuemonisan, (2024) reveal that glaring gender disparity in funding opportunities, education, limited access to land ownership, agricultural technologies, and leadership opportunities are the foremost challenges facing women in Nigerian agriculture.

The World Bank (2024) has also noted that farmers have no title to 95 per cent of agricultural land. This impedes them from obtaining finance or investing in improvements. Added to this is poor rural roads which undermine farm profitability, increase waste, and impede access to markets, inputs, equipment and new technology (World Bank 2024). These structural constraints operate at multiple levels including individual, household, community, and institutional levels. At the individual level, limited education and technical skills constrain women's ability to engage with formal support programmes. Many rural women lack the literacy and numeracy skills required to complete application processes or participate effectively in training programmes. Digital literacy has become increasingly important as more services move online, yet many rural women lack access to digital technologies and skills (Rutashobya 2021).

Respondents' socioeconomic characteristics

Table 1 presents results on the socioeconomic characteristics of rural women agro-entrepreneurs in Katsina State. The results show that majority (72.7%) were married, with variations across districts. KS (79.2%) showed the highest percentage of married women while KN had highest single women (18.1%). Widow status was highest in KS (19.4%) and divorce rates were low across the districts, with KC (5.6%) having highest. All respondents (100%) practiced Islam, indicating religious homogeneity. Quranic education dominated overall (82.9%), with KS (94.4%) showing highest prevalence. Primary education was most common in KC (23.6%) compared to KS and KN. Secondary education was limited overall (4.2%), with KN (8.3%) showing highest rate. The average age overall was approximately 35 years (34.814 ± 13.872). KN had youngest population (30.569 ± 13.087) while KS had oldest (38.764 ± 15.482) years. Years of experience overall was (mean = 12.644 ± 1700.195) years. KC, KN and KS had 11.903 ± 9.353, 9.306 ± 8.685 and 11.903 ± 9.353 years respectively. Average monthly income overall was ₦14,979.884 ± ₦18,812.254. KS (₦17,431.528) had highest mean income while KN (₦13,256.944) had the lowest.

Table 1: Respondents' socioeconomic characteristics

Variable	Overall	KC	KN	KS
Marital status:				
Divorced	3.2%	5.6%	2.8%	1.4%
Married	72.7%	73.6%	65.3%	79.2%
Single	8.8%	8.3%	18.1%	0.0%
Widow	15.3%	11.1%	13.9%	19.4%
Religion:				
Islam	100%	100%	100%	100%

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Level of education:				
Primary	13%	23.6%	11.1%	4.2%
Quranic	82.9%	73.6%	80.6%	94.4%
Secondary	4.2%	2.8%	8.3%	1.4%
Age	Mean ± SD34.814 ± 13.872	35.113 ± 11.694	30.569 ± 13.087	38.764 ± 15.482
Years of experience (Mean ± SD)	128.644 ± 1700.195	11.903 ± 9.353	9.306 ± 8.685	364.722 ± 2944.227
Income per month (Mean ± SD)	14979.884 ± 18812.254	14251.181 ± 14371.46	13256.944 ± 12645.768	17431.528 ± 26373.727

Involvement in agro-enterprise

Table 2 presents results on the involvement of rural women agro-entrepreneurs in various agricultural and agribusiness activities. The results revealed that overall (63%) participated always in poultry farming and 18.1% were not involved, with a mean score of 2.264. Small ruminant rearing followed with 61% always involved and 20.8% not involved (mean = 2.190). Staple crop farming (maize, sorghum, millet, rice) had 39% always involved and 46.3% not involved (mean = 1.463). Cash crop production showed 33% always involved with 52.3% not involved (mean = 1.282). Oil extraction had 34% always involved with 55.1% not involved (mean = 1.236). Fish farming (99.5%) showed no involvement (mean = 0.009), while 95.8% did not involve in dairy production (0.088). Dairy processing (96.8%) were not involved, with a mean of 0.065). Meat/fish processing (98.1%, mean = 0.037) and feed production (95.8%, mean = 0.102) were not involved. At districts level, results showed that KC showed the highest involvement in small ruminant rearing (2.569) and poultry farming (2.472). Cash crop production (1.472) and fruit juice production (1.014) also recorded strong involvement. In KN, involvement was moderate in oil extraction (1.319) and snack food manufacturing (1.056) while lowest in livestock participation. Poultry farming (2.681) and staple crop farming (1.861) and cash crop production (1.597) were strong in KS. Table 2b is a summary of the level of involvement in an agro-enterprise. The result revealed a balanced involvement of high (50%) and low (50%) low levels. In KC, 51.4% of the women had high involvement rate while 51.4% had low level of involvement in KN. KS had a balanced involvement of 50% high and 50% low.

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Table 2a: Involvement in agro-enterprise

Items	Never	Occasionally	Always	Overall	KC	KN	KS
Cash crop production (cotton, groundnuts, sesame, soybeans)	52.3	14.8	33	1.282	1.472	0.778	1.597
Vegetative cultivation (tomatoes, peppers, onions, okra)	71.3	20.4	8.3	0.657	0.653	0.875	0.444
Fruit farming (mango, guava, citrus fruits)	84.7	14.4	0.9	0.315	0.500	0.444	0.000
Leafy greens production (spinach, moringa, amaranth)	82.9	12	5.1	0.394	0.708	0.222	0.250
Stable crop farming (maize, sorghum, millet, rice)	46.3	14.8	39	1.463	1.375	1.153	1.861
Tuber crop cultivation (cassava, sweet potatoes, yams)	82.9	10.6	6.5	0.407	0.486	0.403	0.333
Legume farming (cowpea, bambara nuts)	87	11.6	1.4	0.273	0.111	0.708	0.000
Spice cultivation (ginger, turmeric, garlic)	91.2	7.9	0.9	0.185	0.000	0.528	0.028
Small ruminant rearing (goats, sheep)	20.8	18.5	61	2.190	2.569	1.681	2.319
Diary production	95.8	3.7	0.5	0.088	0.181	0.056	0.028
Poultry farming (chickens. guinea fowl, turkeys)	18.1	19.4	63	2.264	2.472	1.639	2.681
Fish farming (aquaculture)	99.5	0.5	0	0.009	0.028	0.000	0.000
Grain milling (flour production)	89.8	6.5	3.7	0.241	0.208	0.264	0.250
Traditional fermented food production (locust bean condiments)	72.7	22.2	5.1	0.597	0.778	0.847	0.167
Feed production	95.8	2.3	1.9	0.102	0.194	0.069	0.042
Spice processing and packaging	83.3	11.6	5.1	0.384	0.306	0.667	0.181
Snack food manufacturing (groundnut cake, plantain chips)	66.7	14.4	19	0.856	0.597	1.056	0.917
Fruit juice / jam production (kunu, zobo, aiya drinks)	71.3	17.1	12	0.690	1.014	0.444	0.611
Meat / fish processing (dried fish / meat, sausages)	98.1	1.9	0	0.037	0.056	0.056	0.000
Diary processing (yogurt, cheese, butter)	96.8	3.2	0	0.065	0.111	0.056	0.028
Food processing (tomato paste, dried vegetables)	77.8	15.3	6.9	0.514	0.375	1.014	0.153
Oil extraction (groundnut, sesame)	55.1	11.1	34	1.236	1.153	1.319	1.236
Grain trading	70.8	19	10	0.685	0.639	0.861	0.556
Fresh produce retail	88	9.7	2.3	0.264	0.167	0.569	0.056

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Wholesale agricultural commodities	88.9	9.3	1.9	0.241	0.583	0.069	0.069
Mobile food vending	84.7	12	3.2	0.338	0.875	0.042	0.097
Rural food distribution	93.1	6.9	0	0.139	0.333	0.000	0.083
Market stall operations	93.1	6.5	0.5	0.144	0.153	0.111	0.167
Contract farming arrangements	87.5	11.1	1.4	0.264	0.167	0.597	0.028

Table 2b: level of involvement in agro-enterprise

Variable (mean(SD))	**Level**	**Overall**		**KC**		**KN**		**KS**		**Mean**	**SD**
		F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	9.79	5.48
Involvement:	Low	108	50.0	35	48.6	37	51.4	36	50.0		
	High	108	50.0	37	51.4	35	48.6	36	50.0		

Awareness of intervention support types

Table 3 presents the awareness rural women agro-entrepreneurs regarding types of support interventions available for agro-enterprise development. The results revealed that respondents were aware (89.4%) of microfinance and credit programmes with only 10.6% unaware. Also (84.3%, 75.9%, 73.6%, 73.1%, 72.7% were aware of credit facilities, grants, agricultural extension services, cooperative formation support and agro-input subsidy schemes. In the same vein, most respondents were aware of irrigation development projects (69.9%), business skills development training/workshops (68.5%), agricultural insurance programmes (60.6%) , and market linkage programmes (59.3%). Table 3b is a summary of levels of awareness support interventions. The result revealed an existence of critical gaps as overall (69.0%) had high awareness level than 31.0% that recorded low awareness. At districts levels, 87.5% in KC had low awareness while 95.8%, and 98.6% had high rates of awareness in KN and KS respectively.

Table 3a: Awareness of intervention support types

Items	**Unaware**	**Aware**
Microfinance and credit programmes	10.6	89.4
Agricultural Extension Services	26.4	73.6
Market linkage programmes	40.7	59.3
Agro-input subsidy schemes	27.3	72.7
Cooperative formation support	26.9	73.1
Agricultural insurance programmes	39.4	60.6
Credit facilities	15.7	84.3
Business skills development Training/ workshops	31.5	68.5
Irrigation development projects	0.0	69.9
Grants	0.0	75.9

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Table 3b: Level of awareness

Variable	Level	Overall		KC		KN		KS		Mean	SD
		F	%	F	%	F	%	F	%	9.79	5.48
Awareness	Low	67	31.0	63	87.5	3	4.2	1	1.4	7.27	3.63
	High	149	69.0	9	12.5	69	95.8	71	98.6		

Source of awareness

The results on Table 4 show that the overall, respondents always sourced information from radio (78.7%), friends (65.3%), and family members/relatives (58.3%). Internet (100%), extension agents (91.7%), television (87.0%), print media (99.1%) were never used. Result across the districts further revealed that KS had higher radio usage (mean = 2.944) than KN with highest friend network utilization (mean = 2.833). KC showed more balanced usage across sources. Table 4b presents summary of information sources levels. The result revealed that overall (76.4%) had low rate of information access. KN (84.7%) had good information access than KN (61.1%), and KS (65.3%) that had poor information access level.

Table 4a: Source of awareness

Items	Never	Occasionally	Always	Overall	KC	KN	KS
Radio	8.3	13.0	78.7	2.620	2.653	2.944	2.264
Television	87.0	13.0	0.0	0.259	0.194	0.194	0.389
Extension agents	91.7	6.9	1.4	0.181	0.111	0.222	0.208
Ministry of trade and industry	97.2	2.8	0.0	0.056	0.083	0.056	0.028
Friends	6.0	28.7	65.3	2.532	2.542	2.833	2.222
Printed media	99.1	0.9	0.0	0.019	0.000	0.056	0.000
Church	99.5	0.0	0.5	0.014	0.042	0.000	0.000
Mosque	89.4	10.2	0.5	0.218	0.083	0.042	0.528
Association	97.7	1.9	0.5	0.051	0.056	0.069	0.028
Internet	100	0.0	0.0	0.000	0.000	0.000	0.000
Family members / relatives	8.3	33.3	58.3	2.417	2.042	2.903	2.306

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Table 4b: level of awareness sources

Variable	Level	Overall		KC		KN		KS		Mean	SD
		F	%	F	%	F	%	F	%	9.79	5.48
Information	High	51	23.6	27	37.5	12	84.7	12	16.7		
	Low	102	76.4	44	61.1	11	15.3	47	65.3	5.21	1.66

Access to intervention support

Table 5b presents results on agro-women entrepreneurs' access to various agricultural interventions in the state. The results revealed that overall, majority never accessed irrigation development projects (98.6%), business skills development training (98.1%), agricultural insurance programmes (97.7%), market linkage programmes (96.8%), cooperative formation support (96.8%), agro-input subsidy schemes (96.3%), agricultural extension service (94.9%), grants (91.7%), microfinance and credit programmes (89.4%), and credit facilities (89.4%). However, access at districts levels showed that KN had high access to credit facilities (76.4%) compared with its counterparts. Also, KS had better access for microfinance (37.5%) and grants (11.1%) while KC generally showed moderate access across most interventions. Table 4b is a summary of levels of access to state support interventions. The result revealed a concerning trend as overall (76.4%) had low access to support programmes. KC revealed relatively better access with 37.5% having high access despite low awareness. KN and KS have low access as each recorded only 16.7% high access despite their high awareness status

Table 5a: access to intervention support

Items	Never	Occasionally	Always	Overall	KC	KN	KS
Microfinance and credit programmes.	89.4	4.6	6.0	0.273	0.208	0.236	0.375
Agricultural Extension Service	94.9	2.8	2.3	0.125	0.097	0.139	0.139
Market linkage programmes..	96.8	0.9	2.3	0.088	0.097	0.083	0.083
Agro-input subsidy schemes..	96.3	2.8	0.9	0.083	0.097	0.056	0.097
Cooperative formation support.	96.8	2.8	0.5	0.069	0.139	0.042	0.028
Agricultural insurance programmes.	97.7	1.4	0.9	0.056	0.139	0.000	0.028
Credit facilities	89.4	4.6	6.0	0.273	0.764	0.028	0.028
Business skills development training workshops	98.1	0.9	0.9	0.046	0.111	0.000	0.028
Irrigation development projects	98.6	1.4	0.0	0.028	0.056	0.000	0.028
Grants	91.7	5.6	2.8	0.194	0.208	0.264	0.111

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Table 5b: level of access to support intervention

Variable	Level	Overall		KC		KN		KS		Mean	SD
		F	%	F	%	F	%	F	%	9.79	5.48
Access:	Low	165	76.4	45	62.5	60	83.3	60	83.3	0.73	1.81
	High	51	23.6	27	37.5	12	16.7	12	16.7		

Effectiveness of intervention support

The results on Table 6a reveal that overall, enterprise expansion (12.0%), job creation within supported enterprises1(1.6%), income changes after accessing interventions (10.6%), quality improvements in products or services (9.7%) and market access improvements (9.3%) were highly effective. Business sustainability improvements (10.6%), quality improvements (8.3%), job creation (7.4%) were moderate. Unfortunately, technology adoption (87.0%), changes in business practices (87.0%), changes in business formalization (86.1%) market access improvements (83.8%), enterprise expansion (82.4%) and increase in production volume, sales, profit margins (82.9%) were never effective. In KN, effectiveness was moderate. KS recorded low effectiveness in enterprise expansion and Income changes both at (mean = 0.097) compared to KC district that outperformed other districts. Table 6b presents rates of effectiveness of support interventions. The result revealed that overall (78.7%) recorded low level of effectiveness while 21.3% had low rate. KC (44.4%), KN (13.9%), and KS (5.6%) reported high rates.

Table 6a: effectiveness of interventions in promoting agro-enterprise development

Items	Never	Moderate	High	Over-all	KC	KN	KS
Increase in production volume, sales, profit margins	82.9	0.0	8.3	0.255	0.542	0.139	0.083
Changes in business formalization (registration, compliance with regulations)	86.1	0.0	8.3	0.222	0.611	0.014	0.042
Quality improvements in products or services	81.9	8.3	9.7	0.278	0.611	0.111	0.111
Business sustainability improvements (reduced vulnerability to shocks)	81.9	10.6	7.4	0.255	0.514	0.153	0.097
Income changes after accessing interventions	81.0	0.0	10.6	0.296	0.625	0.167	0.097
Job creation within supported enterprises	81.0	7.4	11.6	0.306	0.75	0.111	0.056
Technology adoption resulting from interventions	87.0	6.5	6.5	0.194	0.528	0.042	0.014
Enterprise expansion (new products, additional business activities)	82.4	5.6	12.0	0.296	0.681	0.111	0.097
Changes in business practices (record keeping, planning, marketing strategies)	87.0	4.2	8.8	0.218	0.542	0.028	0.083
Market access improvements (new markets, better prices, reduced intermediaries	83.8	6.9	9.3	0.255	0.597	0.083	0.083

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Table 6b Level of effectiveness

Variable	Level	Overall		KC		KN		KS		Mean	SD
		F	%	F	%	F	%	F	%	9.79	5.48
Effectiveness:	Low	170	78.7	40	55.6	62	86.1	68	94.4	2.57	5.41
	High	46	21.3	32	44.4	10	13.9	4	5.6		

Challenges to rural women agro-entrepreneurs in accessing support interventions

The results of the challenges faced by rural women agro-entrepreneurs in accessing support interventions in Katsina State are presented in Table 7a. the results show that overall, policy implementation gaps (94.4%, mean = 1.907), political factors (94.4%, mean = 1.907) and bureaucratic barriers (93.1%, mean = 1.894), information gaps (81.0%, mean = 1.727), educational limitations (73.6%, mean = 1.583), financial barriers (68.5% mean = 1.481), technical capacity limitations (68.5%, mean =1.417) and social/cultural constraints (61.6% , mean = 1.417) were serious challenges. Moderate challenges included geographical constraints (50.9%, mean = 1.171) and time constraints (40.7%, mean = 1.097). Results at districts levels revealed that educational limitations (mean = 1.931), information gaps (mean = 1.931), and technical capacity (mean = 1.708) were serious constraints in KN while bureaucratic and political challenges (mean = 1.986) constituted serious challenge in KC. KS generally recorded low challenges. However, the highest area of challenge was geographical constraints (mean = 1.347). Table 7b is a summary of rates of challenges faced. The result revealed that overall (54.2%) had high level of challenge while 45.8% had low challenge level. KC faced the most challenges with 90.3% having high rate while KN (18.1%) and KS (54.2%) had high and moderate levels of challenges respectively.

Table 7a: Challenges to support interventions access

Items	Never	Mild	Serious	Overall	KC	KN	KS
Technical capacity limitations (inability to meet technical requirements)	26.9	4.6	68.5	1.417	1.708	1.597	0.944
Financial barriers (application fees, collateral requirements, counterpart funding)	20.4	11.1	68.5	1.481	1.764	1.597	1.083
Time constraints (competing domestic responsibilities)	31.0	28.2	40.7	1.097	1.625	0.847	0.819
Geographical constraints (distance to service centers, transportation challenges)	33.8	15.3	50.9	1.171	1.792	0.375	1.347
Educational limitations (literacy levels, language barriers)	15.3	11.1	73.6	1.583	1.931	1.139	1.681
Social and cultural constraints (gender norms, mobility restriction)	19.9	18.5	61.6	1.417	1.819	0.75	1.681
Information gaps (lack of awareness, unclear guidelines)	8.3	10.6	81.0	1.727	1.847	1.931	1.403

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Bureaucratic barriers (complex application procedures, excessive documentation	3.7	3.2	93.1	1.894	1.986	1.986	1.708
Political factors (favoritism, patronage networks influencing access)	3.7	1.9	94.4	1.907	1.958	2.00	1.764
Policy implementation gaps (disconnect between policy design and implementation)	3.7	1.9	94.4	1.907	1.944	2.00	1.778

Table 7b: level of challenge

Variable	Level	Overall		KC		KN		KS		Mean	SD
		F	%	F	%	F	%	F	%	9.79	5.48
Challenge:	Low	99	45.8	7	9.7	59	81.9	33	45.8	15.6	4.19
	High	117	54.2	65	90.3	13	18.1	39	54.2		

Test of difference

Table 8a is the ANOVA tests on differences between groups across six key outcome variables. The results revealed no existence of statistical significant difference between groups in involvement ($F = 1.683$, $p = 0.188$). Awareness ($F = 276.027$, $p < 0.001$) showed significant difference between groups. However, marginal non-significant difference existed in access ($F = 2.868$, $p = 0.059$). Information source ($F = 16.277$, $p < 0.001$), effectiveness ($F = 26.890$, $p < 0.001$), and challenges ($F = 30.095$, $p < 0.001$) showed high significant differences. The post-hoc analysis as shown in Table 8b revealed districts disparities. Both KN and KS showed significant lower involvement compared to KC (mean = -11.20 and -10.94, $p < 0.001$). No significant difference existed between KN and KS ($p = 0.909$). Result on credit access revealed that KN had significant lower credit access compared to KC (mean -1.10, $p < 0.001$) while KS better credit access than KN (mean = 1.24, $p < 0.001$). However, no significant difference occurred between KS and KC ($p = 0.600$).

KC had significant lower awareness than KN (+14.89) and KS (+14.11). KN and KS showed no significant difference from each other ($p = 0.521$). Information results revealed that KN had better information access KC (+1.24). KS and KC showed no significant difference. Although, KN (+1.32) had significant better sources than KS. Result on effectiveness revealed that KC (+5.04) showed significant higher effectiveness than KN. Also significant difference existed between KC and KS with KC having higher effectiveness (+5.24). No significant difference existed between KN and KS. For constraints, KC faced significantly fewer challenges (4.15). Also between KC and KS; KC faced significantly fewer challenges (4.17). No significant difference occurred in challenges between KN and KS.

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Table 8a: ANOVA results on involvement, awareness, access, information source, effectiveness and challenges

Outcome variable	term	df	sumsq	meansq	statistic	p.value
Involvement score	group_var	2.000	99.528	49.764	1.683	0.188
	Residuals	213.000	6296.972	29.563		
Awareness score	group_var	2.000	10113.778	5056.889	276.027	0.000
	Residuals	213.000	3902.222	18.320		
Access score	group_var	2.000	18.676	9.338	2.868	0.059
	Residuals	213.000	693.528	3.256		
Info source score	group_var	2.000	78.620	39.310	16.277	0.000
	Residuals	213.000	514.417	2.415		
Effectiveness score	group_var	2.000	1268.954	634.477	26.890	0.000
	Residuals	213.000	5025.861	23.596		
challenges_score	group_var	2.000	830.565	415.282	30.095	0.000
	Residuals	213.000	2939.194	13.799		

Table 8b: Post-hoc Analysis

Outcome Variable	Comparison	diff	lwr	upr	p adj
Involvement_score	KN-KC	-11.2014	-12.6015	-9.8013	0.0000
	KS-KC	-10.9375	-12.3376	-9.5374	0.0000
	KS-KN	0.2639	-1.2329	1.7607	0.9091
Access_score	KN-KC	-11.2014	-12.6015	-9.8013	0.0000
	KS-KC	-10.9375	-12.3376	-9.5374	0.0000
	KS-KN	0.2639	-1.2329	1.7607	0.9091
Awareness_score	KN-KC	14.889	13.205	16.573	0.000
	KS-KC	14.111	12.427	15.795	0.000
	KS-KN	-0.778	-2.461	0.906	0.521
Information_source_score	KN-KC	1.236	0.625	1.847	0.000
	KS-KC	-0.083	-0.695	0.528	0.945
	KS-KN	-1.319	-1.931	-0.708	0.000
Effectiveness_score	KN-KC	-5.042	-6.952	-3.131	0.000
	KS-KC	-5.236	-7.147	-3.325	0.000
	KS-KN	-0.194	-2.105	1.716	0.969
Challenges_score	KN-KC	-4.153	-5.614	-2.692	0.000
	KS-KC	-4.167	-5.628	-2.705	0.000
	KS-KN	-0.014	-1.475	1.447	1.000

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Multiple regression analysis

The Multiple regression results as contained in Table 9 reveal that overall, awareness (-0.503, p<0.001) and education level both Quranic (-2.095, p<0.05) and secondary (-4.164, p<0.05) had negative effect on the level of access to intervention while information source (0.44, p<0.05) had significant effect. At districts level, years of experience had a negative effect (-0.383, p<0.01) while information source positively determined the level of access to support interventions (1.742, p<0.01) in KC. In KN, information source (-0.631, p<0.05) was not a predictor but challenges (0.318, p<0.05) were positive determinants. Marital status (married) (-13.537, p<0.001) and (widow) (-12.316, p<0.001) were not predictors in KS while information source 0.428(0.195) was a determinant.

Table 9: Determinants of access to intervention support

Variables	Overall	KC	KN	KS
(Intercept)	4.212(2.841)	0.739(10.638)	-5.614(4.332)	5.704(4.544)
Age	0.036(0.03)	0.118(0.1)	0.069(0.045)	0.028(0.026)
Years of experience	0.000(0.000)	-0.383(0.131)**	-0.079(0.056)	0.000(0.000)
Income per month in naira	0.000(0.000)	0.000(0.000)	0.000(0.000)	0.000(0.000)
Marital status (Married)	-0.895(1.763)	-0.905(3.383)	1.297(1.618)	-13.537(2.883)***
Marital status`(Single)	0.342(2.111)	3.481(4.663)	1.306(1.75)	-
Marital status`Widow	-1.14(1.94)	2.727(3.945)	0.783(1.884)	-12.316(2.795)***
Level of education (Quranic)	-2.095(0.975)*	-1.677(2.164)	1.149(0.917)	0.053(1.598)
Level of education (Secondary)	-4.164(1.796)*	-7.819(4.959)	0.752(1.347)	-0.601(3.104)
Involvement	0.002(0.061)	0.125(0.148)	0.016(0.053)	-0.058(0.077)
Awareness	-0.503(0.103)***	-0.612(0.316)	0.157(0.257)	0.645(0.341)
Information	0.44(0.216)*	1.742(0.612)**	-0.631(0.302)*	0.428(0.195)*
Challenges	0.017(0.085)	-0.2(0.474)	0.318(0.157)*	-0.048(0.056)
R-squared	0.3591	0.435	0.4343	0.4597
Adj R-squared	0.3176	0.3062	0.3075	0.3498
F-stat	8.66	3.38	3.43	4.18
F p-value	6.4381e-14	0.00071565	0.00060001	9.8038e-05

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DISCUSSION OF FINDINGS

The predominance of married women reflects the traditional family structure in the state, where marriage provides both social stability and economic support networks. The finding is supported by Ogunlela & Mukhtar (2009), who discussed gender roles in Nigerian agriculture and how traditional structures influence women's participation in farming activities. However, the district variations in KS and KN suggest different socioeconomic dynamics across the districts. The higher proportion of widows in KS may indicate either demographic trends or the resilience of widowed women who turn to agro-entrepreneurship as a survival strategy. The religious homogeneity (Islam) and educational profile dominated by Quranic education are indications of the cultural context of the state. The limited formal education (secondary education) represents a significant constraint to accessing modern agricultural technologies and business development opportunities. The Ikuemonisan (2024) study on Nigerian agribusiness entrepreneurship had similarly revealed how educational limitations create barriers to sustainable agricultural development. The age distribution, showing an average of 35 years, indicates that agro-entrepreneurship attracts women in their productive years, while the experience levels averaging 12.6 years suggest established involvement in agricultural activities. The income disparities across districts with KS earning highest and KN lowest, reveal geographic inequalities that may be linked to resource availability, market access, or policy implementation differences. The World Bank (2024) report on women in irrigated farming also provides insights into how geographic factors affect women's agricultural participation and income generation.

The concentration in poultry farming and small ruminant rearing demonstrates a logical preference for livestock enterprises that require lower capital investment, are culturally acceptable for women, and which can be managed alongside household responsibilities. The limited involvement in dairy processing, fish farming (99.5%), and meat processing reveals missed opportunities in value-added activities that could increase income. This pattern suggests either lack of technical knowledge, inadequate infrastructure, cultural barriers, or insufficient market linkages. The district-level variations with KC excelling in small ruminants and KS in poultry indicate geographic comparative advantages that could be leveraged for targeted interventions. This is in tandem with Adebayo et al. (2021), who documented women's contributions to agricultural production in rural Nigeria, including their predominant roles in livestock management activities that can be integrated with household responsibilities.

A critical finding is the stark disconnect between high awareness levels and extremely low access rates. This paradox suggests that awareness campaigns have been successful, but fundamental barriers prevent actual participation in support programs. The district variations are telling too with KN and KS showing very high awareness rates while their access remains severely limited. This indicates that awareness without addressing structural barriers is insufficient. The relatively better access in KC despite lower awareness suggests that local implementation mechanisms or administrative efficiency may be more crucial than information dissemination. This finding is reinforced by the Nigeria For Women Project (2025) documentation of strategic engagement challenges between the World Bank and Nigerian Government.

The low effectiveness ratings across most indicators reveal systemic failures in programme design and implementation. The fact that majority reported that interventions were "never effective" in technology adoption and business practice changes indicates that programmes

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may have been poorly designed for the targeted population's needs. The better performance of KC in effectiveness compared to KN and KS suggests that local factors including administrative capacity, political commitment, or geographic accessibility may have played crucial roles in programme success. The Food and Agriculture Organization (2021) Nigeria overview also provides similar context for understanding the broader agricultural policy landscape that influences programme effectiveness.

The identification of policy implementation gaps and political factors as most serious challenges suggests that problems lie in the policy-to-practice translation process rather than in women's capabilities or willingness to participate. The prominence of bureaucratic barriers indicates that administrative procedures may be too complex, time-consuming, or culturally insensitive for rural women to navigate successfully. Information gaps despite high awareness levels suggest that while women know about programmes, they lack detailed procedural knowledge necessary for access. Educational limitations as a serious challenge reinforces the earlier finding about limited formal education, creating a cycle where those who most need support are least equipped to access it due to literacy and procedural knowledge barriers. The is in line with that of Uduji et al. (2020), who examined corporate social responsibility initiatives and highlighted persistent challenges in reaching rural women effectively.

The significant statistical differences between districts in awareness, information access, effectiveness, and challenges reveal that location is a determinant of programme success. KC's consistently better performance across multiple indicators, despite having lower initial awareness, suggests that local implementation capacity, infrastructure, or political commitment may be superior. On the other hand, the fact that KN and KS had similar patterns of high awareness but low access and effectiveness indicates that these areas face similar structural constraints that may require different intervention approaches than those used in KC.

The regression result that reveals negative relationship between awareness and access suggests that increased awareness without addressing prevailing barriers may cause inaccessibility of programmes. The negative effects of Quranic and secondary education on access are particularly puzzling and indicate that education raises expectations or awareness of bureaucratic requirements without providing the specific skills needed to navigate programme procedures. The positive effect of information sources suggests that the quality and specificity of information, rather than general awareness, is crucial for successful access.

CONCLUSION

This study on rural women agro-entrepreneurs' access to Katsina State support interventions for agro-enterprise development has revealed a complex landscape of opportunities and challenges that demand urgent policy and strategic intervention redesign. The research established that rural women agro-entrepreneurs in the state represent a significant demographic of married women averaging 35 years of age with substantial agricultural experience, predominantly engaged in culturally appropriate and low-capital livestock enterprises such as poultry farming and small ruminant rearing. Their concentration in these areas reflects both practical constraints and cultural considerations, while indicating missed opportunities in higher-value activities like dairy processing and meat processing that could increase income generation.

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Perhaps the most critical finding of the study was the identification of a stark awareness-access paradox that fundamentally challenges current intervention approaches. Despite exceptionally high awareness levels of available support programmes, access rates remain severely limited across the districts. This paradox indicates that while information dissemination campaigns have succeeded in creating programme awareness, they have failed to address the structural, bureaucratic, and procedural barriers that prevent actual programme participation. The finding that awareness and access negatively correlated suggests that increased awareness without addressing underlying barriers may actually exacerbate frustration and systemic inadequacies.

The significant districts' variations in programme effectiveness, with KC outperforming KN and KS across multiple indicators despite having lower initial awareness levels, indicates that effective programme delivery is possible within the existing framework when proper implementation mechanisms are in place. The low effectiveness ratings across technology adoption and business practice changes indicate that interventions were not appropriately tailored to the specific needs, constraints, and capabilities of rural women entrepreneurs.

RECOMMENDATIONS

The findings suggest several strategic directions for improving support to rural women agro-entrepreneurs:

1. The prominence of implementation gaps and bureaucratic barriers calls for fundamental reforms in programme administration, including simplification of procedures, decentralization of decision-making, and capacity building for local implementing agencies.

2. The district-level variations suggest that uniform approaches may be less effective than tailored strategies that address specific local constraints and leverage existing strengths.

3. The awareness-access disconnect indicates a need to shift from information dissemination to active facilitation of programme access, including procedural support, documentation assistance, and follow-up services.

4. The concentration in primary production activities suggests opportunities for developing processing and marketing linkages that could significantly increase incomes while remaining culturally appropriate.

5. The complex relationship between education and access suggests a need for adult literacy programmes to support agro-entrepreneurship, focusing on practical skills rather than general education.

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