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# EFFECT OF CREDIT ACCESS, UTILIZATION, AND REPAYMENT PATTERNS ON RURAL WOMEN AGRO-ENTREPRENEURSHIP PERFORMANCE IN KATSINA STATE, NIGERIA

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**ABSTRACT:** *This study examined credit access, utilization, repayment and their effect on rural women agro-entrepreneurship performance in Katsina State. A descriptive survey design was employed using multistage sampling procedure to select 240 rural women agro-entrepreneurs across three senatorial districts: Katsina Central (KC), Katsina North (KN), and Katsina South (KS). Data on respondents' demographic characteristics, involvement, credit access, utilization, repayment, performance and challenges were collected using a structured questionnaire and interview schedule. Results revealed that KS had older population (mean age = 45.08) compared to KC (36.57) and KN (36.99) years. Religious homogeneity (Islam) prevailed, while Quranic education (69.6%) dominated. Mean experience was 11 years, with KN (13.08) having the highest mean age. Household sizes were large, averaging overall (7.32) people, with KN (9.64) recording the largest. Involvement showed that small ruminant rearing emerged as primary activity (weighted mean 1.363), followed by poultry (1.313) and staple crop production (1.013). KC showed the highest involvement across most activities, while KN and KS lagged. Cash crops production varied, with KC having higher engagement (1.500) compared to KN (0.250) and KS (0.139). Traditional processing like oil extraction and fruit juice showed moderate participation across districts. Majority never accessed credit from commercial banks (97.5%) and microfinance institution (98.8%). Family (31.7%) and friends (31.2%) occasionally dominated credit sources. District-level results showed KC with the most balanced access, while KN and KS demonstrated family-based access. Credit utilization exposed diversion into non-business purposes (75%). Fertilizers and seeds (79.6%), intended agro-enterprise purposes (88.8%), and land expansion (90.8%) were poorly utilized. Overall (68.8%) had low credit utilization. Primary challenges included poor market conditions (weighted mean = 1.867), lack of business registration/formalization (1.863), limited investment information (1.842), and inadequate business management skills (1.842). Gender and cultural barriers varied, with KC facing more severe religious/cultural restrictions. Repayment behaviour revealed 53.3% having poor repayment. Moral obligation (3.925) towards loan repayment scored highest. KC (60.4%) recorded the best repayment, while KS (29.2%) lagged. ANOVA confirmed significant differences across districts in all key variables ($p < 0.001$). Multiple regression identified credit access ($\beta = 2.25$, $p < 0.001$) followed by credit utilization ($\beta = 1.16$, $p < 0.001$) and repayment behaviour ($\beta = 0.48$, $p < 0.001$) as performance predictors. Challenges posed negative effects on performance ($\beta = -0.19$, $p < 0.001$). The study concludes that while women agro-entrepreneurship potential existed across the districts, credit access, utilization, repayment and performance disparities required targeted interventions.*

**KEYWORDS:** Credit access, utilization, repayment, rural women agro entrepreneurship.



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## INTRODUCTION

In recent years, the role of women agro-entrepreneurs in driving economic growth and food security has gained increasing recognition at both national and global levels. Nevertheless, these women entrepreneurs have reportedly faced avoidable challenges in accessing, utilizing and repaying financial resources, which potentially limit the growth performance of their enterprises (Osabohien, Mordi & Ogundipe, 2020). This study focuses on Katsina State, a predominantly agricultural region in northern Nigeria, to examine the complex relationships between credit access, utilization, and repayment patterns, and their impact on rural women agro-entrepreneurship performance.

Despite various initiatives aimed at improving financial inclusion, women in agriculture have continued to face disproportionate challenges in accessing credit (Adegbite & Machethe, 2020). These challenges are compounded by socio-cultural factors, limited collateral, and lower levels of financial literacy. Moreover, even when credit is accessible, effective utilization and timely repayment pose constraints that significantly influence business outcomes (Oluwatoyin et al., 2020).

The agricultural sector in Katsina State, like other states in Nigeria, is characterized by a high proportion of smallholder farmers, with women playing crucial roles both in the production, processing, and marketing enterprises (Nmadu, Eze & Jirgi, 2012). However, the specific dynamics of credit access and the impact on women agro-entrepreneurs in the state have remained less investigated. The study therefore is an effort aimed at filling the gap by providing an analysis of how credit-related factors influence the business performance of women in agriculture in the state. By examining these relationships, the study also seeks to contribute to the growing body of literature on gender and agricultural finance in Katsina State and Nigeria at large, while making policy recommendations to enhance financial inclusion and economic empowerment of rural women agro-entrepreneurs in the state.

### Statement of the Problem

The agricultural sector in Nigeria has consistently witnessed an array of challenges in terms of productivity and sustainability, with women agro-entrepreneurs mostly bearing the brunt of these difficulties. Despite their crucial roles in food production and rural economic development, women in agriculture have continued to face disproportionate barriers in accessing and effectively utilizing financial resources (Aderigbe, 2014).

While various studies have explored financial inclusion in Nigerian agriculture, there is a notable gap in understanding the specific dynamics of credit access, utilization, and even repayment among women agro-entrepreneurs in Katsina State. Despite the interplay between these credit-related factors and business performance, studies on them have remained abysmally at the lower ebb, particularly in the context of the unique socioeconomic and cultural landscape of northern Nigeria (Adegbite & Machethe, 2020).

Also, existing studies have robustly focused on credit access alone, to the neglect of examining the patterns of credit utilization and repayment, which are crucial determinants of entrepreneurship success (Musa & Abubakar, 2017). This scenario hampers the development of targeted interventions and policies to support women agro-entrepreneurs effectively. This research therefore aims to address these knowledge gaps by providing a comprehensive


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investigation into the relationships between credit access, utilization, and repayment patterns, and their collective effect on the business performance of rural women agro-entrepreneurs in Katsina State.

**Objectives of the Study**

The study generally assessed the effect of credit access, utilization, and repayment patterns on rural women entrepreneurship performance in Katsina State. The specific objectives included to:

1. find out rural women's level of involvement in agro-enterprise
2. assess level of credit access among rural women agro-entrepreneurs
3. find level of credit utilization among rural women agro-entrepreneurs
4. examine the repayment pattern of rural women agro-entrepreneurs
5. examine rural women agro-entrepreneurs' enterprise performance due to credit access, utilization and repayment
6. identify rural women agro-entrepreneurs' challenges to credit access, utilization and repayment.

## LITERATURE REVIEW

Access to credit remains a significant challenge for women agro-entrepreneurs in developing countries, including Nigeria. Nmadu et al. (2020) found that women in Nigerian agriculture face disproportionate barriers to accessing formal financial services, often due to lack of collateral, lower levels of financial literacy, and sociocultural norms. This is particularly pronounced in northern states where traditional gender roles can limit women's economic opportunities (Nmadu et al., 2020).

Adegbite and Machethe (2020) argue that bridging the gender gap in financial inclusion for smallholder agriculture could significantly contribute to sustainable development. Their study therefore emphasized the need for appropriate interventions that can address the specific constraints women often face in accessing credit. The outcome of Ndzaruwa et al. (2022)'s study also added that improved access to agricultural credit is positively associated with increased technical efficiency among women farmers in Southwest Nigeria. This suggests that enhancing credit access could have tangible benefits for women agro-entrepreneurs' business performance if effectively utilized.

Ahmad Shehu and Abubakar (2022), who examined the relationship between capital structure and profitability in Nigerian agro-allied firms, revealed that the way and manner credit is utilized is a significant determinant of business outcomes. However, their study focused on larger firms, leaving a gap in understanding credit utilization patterns among smaller women-led agribusinesses.


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Also, Taiwo, Alege, and Olokoyo (2020) explored livelihood diversification strategies among rural farming households in Ogun State. Their findings suggest that access to credit facilitates diversification and enhances food security. This underscores the importance of effective credit utilization in entrepreneurship.

Repayment behavior is a critical aspect of credit dynamics, influencing both the sustainability of credit programmes and the future credit worthiness of borrowers. Abdullahi, Abubakar, Yusuf and Suleiman (2023) investigated factors influencing loan repayment performance among smallholder rice farmers under the anchor, Borrower Smallholder Rice Farmers' Programme in Sokoto State, Nigeria. The study revealed that financial literacy, loan size, and farming experience significantly influenced repayment performance. Oladeebo and Oladeebo (2008) earlier examined the determinants of loan repayment among smallholder farmers in Ogbomoso Agricultural Zone of Oyo State, Nigeria. The study also revealed that household size, farm size, and off-farm income played crucial roles in determining the repayment capacity of the farmers.

The relationship between credit and business performance is complex and context-dependent. Osabohien, Osuagwu, Osabuohien, Ekhator-Mobayode, Matthew and Gershon (2020) found that access to credit positively influenced agricultural production in Nigeria, but the magnitude of this effect varies across regions and farmer categories. Adewale, Lawal, Aberu and Toriola (2022)'s study revealed that access to credit significantly enhances business performance metrics, such as profitability and growth. However, the work did not focus on women-led enterprises or the northern Nigerian context.

## METHODOLOGY

The study was conducted in Katsina State. Women agro-entrepreneurs in Katsina State involved in various agricultural activities, including crop farming, livestock rearing, and agro-processing, constituted the population. A descriptive survey approach was adopted while multistage sampling technique was employed to select the respondents. In the first stage, 30% (10) of the 34 LGAs was drawn using the stratified random sampling technique. These included Batagarawa, Jibia, Batsari and Dan Musa, Kaita, Mashi, Baure, Dandume, Malumfashi and Bakori. The second stage involved using the simple random sampling technique to select 2 communities from each selected LGA to give 20 communities. In the third stage, snowball technique was used to identify women agro-entrepreneurs within the selected communities. Using systematic sampling procedure, 12 women agro-entrepreneurs were selected from each community to give a sample size of 240 women agro-entrepreneurs that were used in the study.

Both structured questionnaires (for literate respondents) and interview schedule (for non-literate respondents) were used to collect data on respondents' socioeconomic characteristics, involvement in agro-enterprise, credit access, utilization, repayment pattern, enterprise performance and challenges. In order to ensure the appropriateness of the data collection instrument, the instrument was subjected to face and content validity with the assistance of experts in social science. To also ensure quality data was obtained, a split-half reliability test was adopted and a reliability co-efficient (r-value) of 0.85 was obtained and considered good enough for the study.


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In measuring the variables, level of involvement in agro-enterprise was measured on a 3-points scale of Not at all = 0, Occasionally = 1, and Always = 2. The mean score and standard deviation were generated and used to categorize women agro-entrepreneurs into low (< mean ± 1SD) and high (≥ mean ± 1SD) levels of involvement.

Access to credit was measured on a 4-point Likert scale of Always (3), Occasionally (2), Rarely (1), and Never (0). The mean score was determined and used to categorize respondents into High access (scores of mean and above mean) and Low (for scores below mean).

Level of utilization was measured also on a 4-point scale of Effectively Utilized (3), Utilized (2), Fairly Utilized (1), and Not Utilized (0). The mean score was determined and used to categorize respondents into High (scores of mean and above mean) and Low (for scores below mean) in terms of utilization of credit. Loan repayment was measured on a 4-point scale of Strongly on Schedule (3), On Schedule (2), Rarely on Schedule (1), and Not on Schedule (0). The mean scores were determined and used to categorize respondents into High (scores of mean and above mean) and Low (for scores below mean) in terms of credit repayment pattern. Enterprise performance was measured on a 4-point Likert scale of Seriously Improved (4), Fairly Improved (3), Improved (2) and Not Improved (0). The mean score was obtained and used to categorize respondents into High (scores of mean and above mean) and Low (for scores below mean) enterprise performance. Challenges to credit access, utilization and repayment were measured on a 3-point Likert scale of Serious (1), Mild (2), and Not a Constraint (0). The mean score was obtained and used to categorize respondents into High (scores of mean and above mean) and Low (for scores below mean) levels of constraints. The analytical tools used included descriptive (frequency counts, percentages, and mean) and inferential statistics (ANOVA and multiple regression).

## RESULTS

### Respondents' Socioeconomic Characteristics

Table 1 provides demographic characteristics results of the respondents in Katsina State. The results on age distribution revealed notable age differences across districts. KS had an older population (mean = 45.08) years compared to the more similar KC (36.57) and KN (36.99). The majority overall (73.3%) were married but this varied by district. KC and KN showed higher marriage rates (78.1% and 76.4% ) respectively compared to KS (63.9%). KS had higher rates of divorce (9.7%) and widowhood (22.2%), while KC had no respondent. All respondents were Muslims, indicating religious homogeneity, while overall Quranic education (69.6%) dominated the landscape, with primary education (23.8%) being the second most common. Formal secondary and tertiary education levels were low (6.2% and 0.4% respectively). KS showed slightly higher secondary education rates (12.5%). Years of experience averaged 11.22 years, with KN (13.08) showing the highest years of experience. Loan received showed significant disparities: KS received the highest average loans (₦7,833.33) despite having the same maximum as overall (₦100,000). The high standard deviations across all districts suggest unequal access to credit. Household sizes were relatively large on average, with overall (7.32) and KN (9.64) members.


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**Table 1: Respondents' Socioeconomic Characteristics**

| Variable | Overall | KC | KN | KS |
|---|---|---|---|---|
| **Age (mean)** | 39.25 | 36.57 | 36.99 | 45.08 |
| **Marital Status:** | | | | |
| Divorced | 14 (5.8%) | 3 (3.1%) | 4 (5.6%) | 7 (9.7%) |
| Married | 176 (73.3%) | 75 (78.1%) | 55 (76.4%) | 46 (63.9%) |
| Single | 9 (3.8%) | - | 6 (8.3%) | 3 (4.2%) |
| Widow | 41 (17.1%) | 18 (18.8%) | 7 (9.7%) | 16 (22.2%) |
| **Religion:** | | | | |
| Islam | 240 (100%) | 96 (100%) | 72 (100%) | 72 (100%) |
| **Education:** | | | | |
| Primary | 57 (23.8%) | 27 (28.1%) | 13 (18.1%) | 17 (23.6%) |
| Quaranic | 167 (69.6%) | 68 (70.8%) | 53 (73.6%) | 46 (63.9%) |
| Secondary | 15 (6.2%) | 1 (1.0%) | 5 (6.9%) | 9 (12.5%) |
| Tertiary | 1 (0.4%) | - | 1 (1.4%) | - |
| **Experience (mean)** | 11.22 | 10.61 | 13.08 | 10.17 |
| **Loan received** | 6037.2 | 5569.87 | 4887.54 | 7833.33 |
| **Family Size (mean)** | 7.32 | 5.86 | 9.64 | 6.96 |

**Involvement in Agro-entrepreneurship**

Table 2 presents respondents' involvement in different agricultural activities. Results reveal that small ruminant rearing (goats, sheep) showed highest overall involvement with a weighted mean of 1.363. Most (55.0%) were "always" engaged, while only 18.8% were not involved. District variations were also significant as KC (1.906) topped the chart, followed by KS (1.306), while KN (0.694) showed lower engagement. Poultry farming ranked second with an overall weighted mean of 1.313. Over half of the respondents (52.5%) were consistently engaged, with only 21.2% not involved. KC (1.938) again showed the highest involvement, followed by KS (1.139) and KN (0.653). Staple crop farming (maize, sorghum, millet, rice) demonstrated substantial involvement as overall (42.5%, weighted mean =1.013) always participated. District disparities were pronounced as KC (1.802) showed very high engagement, while KN (0.375) and KS (0.597) lagged behind considerably. Cash crop production (cotton, groundnuts, sesame, soybeans) showed moderate overall engagement (weighted mean 0.717), with extreme district variations. While 56.2% of respondents were not involved at all, KC (1.500) demonstrated high involvement compared to involvement in KN (0.250) and KS (0.139). Oil extraction activities showed balanced involvement across districts with an overall weighted mean = 0.588. Nearly half of the respondents (44.2%) showed some level of engagement, with fairly consistent weighted means across the three districts (0.615, 0.639, and 0.500). Engagement in grain trading was moderate (37.5%, weighted mean = 0.467). Mobile food vending showed similar levels (weighted mean 0.488), though with complete absence in KS (0.000).

Dairy processing was completely absent (0.000 weighted mean across all districts). Fish farming and bee keeping showed negligible participation (weighted mean = 0.008 each). However, some traditional processing activities showed moderate involvement: fruit juice


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production (weighted mean = 0.500) with notable activity in KC (0.854) and KS (0.486). Traditional fermented food production (weighted mean = 0.417) showed more balanced district participation. Overall, fresh produce retailing (0.042), market stall operations (0.042), wholesale agricultural commodities (0.046) and legume farming (0.054) showed very low engagement. The result in Table 2b further reveals that KC had the highest level of involvement (92.7%) while only 7.3% showed low involvement. KN revealed low (86.1%) involvement and only (13.9%) high involvement. KS exhibited the lowest involvement levels (95.8%) with merely 4.2%, showing high involvement.

**Table 2a: Distribution of Respondents Based on Involvement in Agro-entrepreneurship**

| Item | Percentage | | | Weighted mean | | | |
|---|---|---|---|---|---|---|---|
| | Not at all | Occasionally | Always | Overall | KC | KN | KS |
| Bee keeping and honey production | 99.2 | 0.8 | 0.0 | 0.008 | 0.021 | 0.000 | 0.000 |
| Cash crop production (cotton, groundnuts, sesame) | 56.2 | 15.8 | 27.9 | 0.717 | 1.500 | 0.250 | 0.139 |
| Cattle rearing / fattening | 73.3 | 22.5 | 4.2 | 0.308 | 0.563 | 0.083 | 0.194 |
| Contract farming arrangements | 80.8 | 19.2 | 0.0 | 0.192 | 0.010 | 0.500 | 0.125 |
| Diary processing (yogurt, cheese, butter) | 100.0 | 0.0 | 0.0 | 0.000 | 0.000 | 0.000 | 0.000 |
| Diary production | 77.9 | 19.2 | 2.9 | 0.250 | 0.531 | 0.042 | 0.083 |
| Feed production | 90.8 | 8.3 | 0.8 | 0.100 | 0.229 | 0.028 | 0.000 |
| Fish farming (aquaculture) | 99.2 | 0.8 | 0.0 | 0.008 | 0.021 | 0.000 | 0.000 |
| Food processing (tomato paste, dried vegetables) | 79.6 | 19.6 | 0.8 | 0.213 | 0.406 | 0.139 | 0.028 |
| Fresh produce retailing | 96.2 | 3.3 | 0.4 | 0.042 | 0.052 | 0.014 | 0.056 |
| Fruit farming (mango, guava, citrus fruits) | 90.4 | 8.3 | 1.2 | 0.108 | 0.240 | 0.042 | 0.000 |
| Fruit juice / jam production (kunu, zobo, drinks) | 60.0 | 30.0 | 10.0 | 0.500 | 0.854 | 0.042 | 0.486 |
| Grain milling (flour production) | 81.7 | 15.8 | 2.5 | 0.208 | 0.281 | 0.125 | 0.194 |
| Grain trading | 62.5 | 28.3 | 9.2 | 0.467 | 0.781 | 0.306 | 0.208 |
| Leafy greens production (spinach, moringa, amaranth) | 79.6 | 19.6 | 0.8 | 0.213 | 0.313 | 0.194 | 0.097 |
| Legume farming (cowpea, bambara nuts) | 95.4 | 3.8 | 0.8 | 0.054 | 0.073 | 0.056 | 0.028 |
| Market stall operations | 95.8 | 4.2 | 0.0 | 0.042 | 0.052 | 0.000 | 0.069 |
| Meat / fish processing (dried fish / meat, sausages) | 97.5 | 2.5 | 0.0 | 0.025 | 0.063 | 0.000 | 0.000 |
| Mobile food vending | 56.7 | 37.9 | 5.4 | 0.488 | 0.865 | 0.472 | 0.000 |
| Oil extraction (groundnut, sesame) | 55.8 | 29.6 | 14.6 | 0.588 | 0.615 | 0.639 | 0.500 |


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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Poultry farming (chickens, guinea fowl, turkeys) | 21.2 | 26.2 | 52.5 | 1.313 | 1.938 | 0.653 | 1.139 |
| Rural food distribution | 91.2 | 8.3 | 0.4 | 0.092 | 0.188 | 0.014 | 0.042 |
| Seed production and multiplication | 64.6 | 23.8 | 11.7 | 0.471 | 0.927 | 0.167 | 0.167 |
| Small ruminant rearing (goats, sheep) | 18.8 | 26.2 | 55.0 | 1.363 | 1.906 | 0.694 | 1.306 |
| Snack food manufacturing (groundnut cake, plantain chips) | 71.2 | 24.2 | 4.6 | 0.333 | 0.490 | 0.389 | 0.069 |
| Spice cultivation (ginger, turmeric, garlic) | 95.0 | 3.3 | 1.7 | 0.067 | 0.052 | 0.069 | 0.083 |
| Spice processing and packaging | 72.5 | 22.1 | 5.4 | 0.329 | 0.531 | 0.097 | 0.292 |
| Staple crop farming (maize, sorghum, millet rice) | 41.2 | 16.2 | 42.5 | 1.013 | 1.802 | 0.375 | 0.597 |
| Traditional fermented food production (locust bean condiments) | 60.0 | 38.3 | 1.7 | 0.417 | 0.542 | 0.444 | 0.222 |
| Tuber crop cultivation (cassava, sweet potatoes) | 74.2 | 15.8 | 10.0 | 0.358 | 0.844 | 0.028 | 0.042 |
| Vegetable cultivation (tomatoes, peppers, onions) | 56.2 | 36.7 | 7.1 | 0.508 | 0.708 | 0.417 | 0.333 |
| Wholesale agricultural commodities | 95.8 | 3.8 | 0.4 | 0.046 | 0.083 | 0.000 | 0.042 |

**Table 2b: Respondents' Level of Involvement in Agro-entrepreneurship**

| Level | Overall F(%) | KC F(%) | KN F(%) | KS F(%) | mean | SD | Max | Min |
|---|---|---|---|---|---|---|---|---|
| High | 102 (42.5) | 89 (92.7) | 10 (13.9) | 3 (4.2) | 10.84 | 6.63 | 35 | 1 |
| Low | 138 (57.5) | 7 (7.3) | 62 (86.1) | 69 (95.8) | | | | |

**Access to Credit**

Table 3a presents results on credit access patterns across different sources, comparing overall usage with variations across three senatorial districts. The result overall (97.5%) never accessed credit from commercial banks while 2.5% accessed credit occasionally. Microfinance institutions also showed that 98.8% never accessed credit while 1.2% accessed it occasionally. In the same vein, 94.6% never accessed credit from the government but 5.4% occasionally did. Semi-formal sources showed slightly better but still low access. Accordingly, 94.2% never accessed credit from cooperative societies, with only 4.2% and 1.7% having access occasionally and regularly respectively. Informal networks dominated respondents' access. While 57.9% and 67.9% never accessed credit, 31.7% and 31.2% accessed it occasionally from


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family and friends respectively. Results on senatorial level revealed that KC had the most balanced access pattern, with friends (0.635) and family (0.490) having the highest weighted mean credit access. Formal institutions like banks (0.021) and government (0.052) provided access. KN demonstrated severely restricted access with minimal family access (0.014) and friends access (0.028).

The government (0.111) provided the highest access while cooperative societies provided zero access. KS (1.083) showed a concentrated pattern with families providing exceptional access to all districts. Cooperative society (0.167) provided moderate access. The result on Table 3b further shows the distribution of credit access levels across the senatorial districts. The results revealed significant disparities in credit access. While KS showed the highest (51.4%) credit access, with 48.6% having low access, KC demonstrated moderate access, with 47.9% having high credit access and 52.1% with low access. KN faced severe credit constraints, with only 2.8% achieving high credit access, while 97.2% remained in the low access category. The overall result showed that 64.6% had low credit access while 35.4% recorded high credit access.

**Table 3a: Distribution of Respondents Based on Credit Access**

| Item | Percentage | | | Weighted mean | | | |
|---|---|---|---|---|---|---|---|
| | Not at all | Occasionally | Always | overall | KC | KN | KS |
| Commercial banks | 97.5 | 2.5 | 0.0 | 0.025 | 0.021 | 0.056 | 0.000 |
| Cooperative societies | 94.2 | 4.2 | 1.7 | 0.075 | 0.063 | 0.000 | 0.167 |
| Family | 57.9 | 31.7 | 10.4 | 0.525 | 0.490 | 0.014 | 1.083 |
| Friends | 67.9 | 31.2 | 0.8 | 0.329 | 0.635 | 0.028 | 0.222 |
| Government programme | 94.6 | 5.4 | 0.0 | 0.054 | 0.052 | 0.111 | 0.000 |
| Informal group | 97.5 | 2.5 | 0.0 | 0.025 | 0.052 | 0.014 | 0.000 |
| Microfinance institution | 98.8 | 1.2 | 0.0 | 0.013 | 0.021 | 0.014 | 0.000 |

**Table 3b: Distribution of Respondents Based on Level of Credit Access**

| Level | Overall F(%) | KC F(%) | KN F(%) | KS F(%) | Mean | SD | Max | Min |
|---|---|---|---|---|---|---|---|---|
| High | 85 (35.4) | 46 (47.9) | 2 (2.8) | 37 (51.4) | 1.05 | 1.06 | 5 | 0 |
| Low | 155 (64.6) | 50 (52.1) | 70 (97.2) | 35 (48.6) | | | | |

**Credit Utilization**

Table 4a presents how credit recipients utilized accessed credit. Overall utilization result shows that diversion into household/non-business needs was the most problematic, with 75% poor utilization, 17.1% moderate and only 7.9% high utilization, and a weighted mean of 1.329. Agricultural investments showed severe under utilization. Fertilizers, and seeds (79.6%) were


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poorly utilized. Intended agro-enterprise purpose (88.8%), land expansion/improvement (90.8%), storage facilities (82.1%) and transportation/logistics (83.8%) were poorly utilized. The result across the district shows better weighted mean performance in agricultural inputs (1.417) and diversion control (1.427), storage facilities (1.333) and product packaging (1.302). KN showed mixed performance with moderate utilization in intended agro-enterprise (1.264) and timeliness of fund utilization (1.319). KS exhibited most constrained utilization with lowest weighted mean utilization in intended agro-enterprise (1.028), land improvement (1.014) and moderate timeliness in fund utilization (1.375).

Critical areas of concern include low timeliness of fund utilization (77.1%) and high diversion rate (75%). Table 4b presents the overall levels of credit utilization across the districts. The result in KC showed that 41.7% achieved high utilization level and 58.3% showed low utilization rate. KS showed that 27.8% reached high utilization rate and 72.2% experienced low utilization. In KN, only 20.8% achieved high utilization while 79.2% remained in the low utilization category. Overall utilization performance showed troubling utilization patterns as 68.8% demonstrated low credit utilization and only 31.2% achieved high utilization.

**Table 4a: Distribution of Respondents Based on Credit Utilization**

| Item | Percentage | | | Weighted mean | | | |
|---|---|---|---|---|---|---|---|
| | High | Moderate | Poor | overall | KC | KN | KS |
| Diversion into household / non-business needs | 7.9 | 17.1 | 75 | 1.329 | 1.427 | 1.194 | 1.333 |
| Investment in agricultural input (fertilizers, seeds) | 2.9 | 17.5 | 79.6 | 1.233 | 1.417 | 1.111 | 1.111 |
| Investment in intended agro-enterprise purpose | 4.2 | 7.1 | 88.8 | 1.154 | 1.167 | 1.264 | 1.028 |
| Investment in land expansion / improvement | 3.3 | 5.8 | 90.8 | 1.125 | 1.229 | 1.097 | 1.014 |
| Investment in product packaging / branding | 2.9 | 11.2 | 85.8 | 1.171 | 1.302 | 1.139 | 1.028 |
| Investment in storage facilities | 2.5 | 15.4 | 82.1 | 1.204 | 1.333 | 1.167 | 1.069 |
| Timelines of fund utilization after receipt | 9.6 | 13.3 | 77.1 | 1.325 | 1.292 | 1.319 | 1.375 |
| Transportation / logistics improvement | 4.2 | 12.1 | 83.8 | 1.204 | 1.396 | 1.111 | 1.042 |
| Utilization in hiring labour / expert | 2.9 | 11.7 | 85.4 | 1.175 | 1.240 | 1.194 | 1.069 |


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**Table 4b: Distribution of Respondents Based on Level of Credit Utilization**

| Level | Overall F(%) | KC F(%) | KN F(%) | KS F(%) | Mean | SD | Max | Min |
|---|---|---|---|---|---|---|---|---|
| High | 75 (31.2) | 40 (41.7) | 15 (20.8) | 20 (27.8) | 10.804 | 3.463 | 27 | 0 |
| Low | 165 (68.8) | 56 (58.3) | 57 (79.2) | 52 (72.2) | | | | |

**Challenges to Credit Utilization**

Table 5 presents results on challenges faced by respondents. Using the weighted mean scores, the results reveal that, overall, poor market conditions affecting planned investments (1.867) emerged as top challenge, followed by lack of business registration/formalization (1.863), limited information for investment decisions (1.842), inadequate business management skills (1.842), restrictions on fund usage by lenders (1.813), and inability to hire labour/expertise (1.808). Across the districts, KC showed higher challenge scores across most items while KS faced the most severe difficulties with gender-related barriers. KN generally reported lower challenge levels. Gender and cultural barriers, notably religious/cultural restrictions on women taking loans, showed senatorial variation with weighted mean scores of 0.403 and 1.573 for KS and KC respectively. The least challenging areas included market access issues (1.158), transport costs (1.146), and storage problems (1.104).

**Table 5: Distribution of Respondents Based on Challenges to Credit Utilization**

| Item | Percentage | | | Weighted mean | | | |
|---|---|---|---|---|---|---|---|
| | High | Moderate | Not a challenge | overall | KC | KN | KS |
| Complex application procedure | 80.4 | 16.2 | 3.3 | 1.771 | 1.906 | 1.597 | 1.764 |
| Crop failure / livestock disease outbreaks | 44.6 | 47.9 | 7.5 | 1.371 | 1.938 | 1.042 | 0.944 |
| Delay in loan disbursement | 79.2 | 17.5 | 3.3 | 1.758 | 1.958 | 1.319 | 1.931 |
| Difficulty in record keeping of credit utilization | 78.8 | 17.9 | 3.3 | 1.754 | 1.927 | 1.792 | 1.486 |
| Distance of financial institutions | 39.6 | 33.8 | 26.7 | 1.129 | 1.844 | 0.764 | 0.542 |
| Family emergencies / health expenses | 42.5 | 50 | 7.5 | 1.350 | 1.875 | 1.014 | 0.986 |
| Fear of debt / aversion | 71.2 | 23.3 | 5.4 | 1.658 | 1.823 | 1.167 | 1.931 |
| High interest accumulation | 74.2 | 23.3 | 2.5 | 1.717 | 1.927 | 1.333 | 1.819 |
| High interest rate | 68.8 | 19.2 | 12.1 | 1.567 | 1.958 | 0.889 | 1.722 |
| Inability to hire labour / expertise for expansion | 81.2 | 18.3 | 0.4 | 1.808 | 1.885 | 1.611 | 1.903 |
| Inadequate business management skills | 85.8 | 12.5 | 1.7 | 1.842 | 1.927 | 1.903 | 1.667 |


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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inflexible repayments schedules | 68.3 | 27.1 | 4.6 | 1.638 | 1.885 | 1.333 | 1.611 |
| Insufficiency of the loan for business needs | 75.8 | 23.3 | 0.8 | 1.750 | 1.865 | 1.500 | 1.847 |
| Lack of advisory support on how to use credit | 77.9 | 21.7 | 0.4 | 1.775 | 1.844 | 1.611 | 1.847 |
| Lack of business registration / formalization | 87.9 | 10.4 | 1.7 | 1.863 | 1.958 | 1.681 | 1.917 |
| Lack of collateral | 57.9 | 25 | 17.1 | 1.408 | 1.969 | 0.889 | 1.181 |
| Lack of emergency savings for repayment | 49.2 | 44.6 | 6.2 | 1.429 | 1.896 | 1.083 | 1.153 |
| Lack of financial literacy / knowledge about loan | 81.7 | 15 | 3.3 | 1.783 | 1.969 | 1.611 | 1.708 |
| Lack of identification documents | 59.6 | 16.7 | 23.8 | 1.358 | 1.958 | 0.597 | 1.319 |
| Language barrier with financial institutions | 50 | 42.1 | 7.9 | 1.421 | 1.521 | 1.639 | 1.069 |
| Limited alternative income sources | 53.8 | 35.8 | 10.4 | 1.433 | 1.854 | 0.875 | 1.431 |
| Limited information for investment decisions | 85 | 14.2 | 0.8 | 1.842 | 1.906 | 1.694 | 1.903 |
| Limited market information | 73.3 | 26.2 | 0.4 | 1.729 | 1.833 | 1.528 | 1.792 |
| Low profitability of agro-enterprise | 72.5 | 24.2 | 3.3 | 1.692 | 1.875 | 1.306 | 1.833 |
| Market access issues limiting sales revenue | 39.2 | 37.5 | 23.3 | 1.158 | 1.844 | 0.861 | 0.542 |
| Multiple loan obligations | 47.9 | 48.3 | 3.8 | 1.442 | 1.833 | 1.139 | 1.222 |
| Natural disasters / extreme weather events | 37.5 | 58.8 | 3.8 | 1.338 | 1.760 | 1.097 | 1.014 |
| No prior credit history / banking relationship | 80 | 17.1 | 2.9 | 1.771 | 1.927 | 1.486 | 1.847 |
| Poor market conditions affecting investments | 87.9 | 10.8 | 1.2 | 1.867 | 1.927 | 1.806 | 1.847 |
| Pressure to divert loan funds to household needs | 67.9 | 23.8 | 8.3 | 1.596 | 1.990 | 1.222 | 1.444 |
| Price fluctuations for agricultural products | 76.7 | 20 | 3.3 | 1.733 | 1.979 | 1.250 | 1.889 |
| Religious and cultural restrictions on women | 44.2 | 33.3 | 22.5 | 1.217 | 1.573 | 1.556 | 0.403 |
| Requirement for male guarantor / spouse approval | 47.1 | 14.6 | 38.3 | 1.088 | 1.938 | 0.625 | 0.417 |
| Restrictions imposed by lenders on use of funds | 83.3 | 14.6 | 2.1 | 1.813 | 1.948 | 1.639 | 1.806 |


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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Security challenges affecting business operations | 68.3 | 19.6 | 12.1 | 1.563 | 1.969 | 0.708 | 1.875 |
| Storage problems leading to post-harvest losses | 38.3 | 33.8 | 27.9 | 1.104 | 1.813 | 0.722 | 0.542 |
| Transport costs to make payments | 39.2 | 36.2 | 24.6 | 1.146 | 1.823 | 0.694 | 0.694 |
| Weather / climate risks affecting agric investments | 42.9 | 55 | 2.1 | 1.408 | 1.573 | 1.500 | 1.097 |

**Credit Repayment Pattern**

Table 6a presents a detailed result of the credit repayment pattern across the state. Using the weighted means scores, "I view loan repayment as a moral obligation" showed the highest overall score (3.925) with 69.2% strongly agreeing. "I repay loans to ensure future access" (3.758) had 55% strongly agreeing. Also, "I consider myself financially responsible" (3.729) had 60.4% strongly agreeing. At the district level, KC showed the highest mean scores across most positive repayment behaviors with moral obligation (4.115), future access (3.740) and understanding consequences (3.792) topping the list. KN demonstrated strong practical behaviors in emergency fund maintenance (3.931), seasonal consistency (3.958) and prioritizing repayments (3.931). KS showed lower scores across most categories, suggesting possible greater repayment challenges. Areas of concern were 54.1% and 50.9% that defaulted on repayments and experienced late payment penalties respectively.

Reputation issues varied dramatically by districts as 3.677, 2.611, 2.569 acknowledged having reputation problems in KC, KN and KS respectively. Table 6b presents the summary analysis of overall repayment levels across the state. The result on overall repayment performance reveals that unfavorable repayment behaviour dominated with 53.3% of all the respondents showing poor repayment patterns, while only 46.7% demonstrated favorable repayment behavior. Results from senatorial districts showed performance disparities. KC recorded 60.4% favorable repayment behaviour while KN had 45.8% favorable repayment behaviour. KS showed the poorest performance with only 29.2% favorable repayment behaviour and 70.8% unfavorable.

**Table 6a: Distribution of Respondents Based on Repayment Pattern**

| Item | Percentage | | | | | Weighted mean | | | |
|---|---|---|---|---|---|---|---|---|---|
| | SA | A | N | D | SD | Total | KC | KN | KS |
| I consider myself financially responsible regarding credit repayment | 60.4 | 26.7 | 9.6 | 3.3 | | 3.729 | 3.823 | 3.792 | 3.542 |
| I have built a reputation of non repayment | 32.9 | 32.5 | 6.2 | 14.6 | 13.8 | 3.025 | 3.677 | 2.611 | 2.569 |
| I have defaulted on credit repayment | 7.9 | 46.2 | 2.9 | 26.2 | 16.7 | 2.446 | 3.156 | 1.528 | 2.417 |


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|---|---|---|---|---|---|---|---|---|---|
| I have experienced penalties due to late repayment | 4.2 | 46.7 | | 32.9 | 16.2 | 2.221 | 2.875 | 1.236 | 2.333 |
| I keep emergency fund to ensure credit repayment | 42.9 | 52.5 | 2.9 | 0.8 | 0.8 | 3.463 | 3.240 | 3.931 | 3.292 |
| I make repayments regardless agricultural season | 49.2 | 45.8 | 3.8 | 1.2 | | 3.542 | 3.365 | 3.958 | 3.361 |
| I prioritize repayments over other financial obligations | 46.2 | 47.1 | 5 | 0.4 | 1.2 | 3.542 | 3.427 | 3.931 | 3.306 |
| I repay loans to ensure future access | 55 | 31.2 | 12.1 | 1.7 | | 3.758 | 3.740 | 3.986 | 3.556 |
| I understand the consequences of non-repayment | 79.6 | 16.2 | | 4.2 | | 3.713 | 3.792 | 3.833 | 3.486 |
| I view loan repayment as a moral obligation | 69.2 | 16.7 | 12.9 | 1.2 | | 3.925 | 4.115 | 4.000 | 3.597 |
| Satisfaction with my business affects my willingness to repay | 50.8 | 35.4 | 10.4 | 0.8 | 2.5 | 3.675 | 3.844 | 3.653 | 3.472 |

**Table 6b: Distribution of Respondents Based on Level of Repayment Pattern**

| Repayment | Overall | % overall | % KC | % KN | % KS | Mean | SD | Max | Min |
|---|---|---|---|---|---|---|---|---|---|
| Favourable | 21 | 46.7 | 60.4 | 45.8 | 29.2 | 36.88 | 4.66 | 51.00 | 0.00 |
| Unfavourable | 51 | 53.3 | 39.6 | 54.2 | 70.8 | | | | |

**Test of Differences**

The ANOVA result on Table 7a reveals significant differences across the districts. Involvement in agricultural activities showed the existence of variations F(243.48, p = < 0.0001) just as challenges to credit access and utilization (F = 193.72, p < 0.0001) differed substantially by district. Credit access (F = 39.97, p < 0.0001) also differed as some districts have had better credit access than others. Repayment behaviour (F = 24.29, p < 0.0001), credit utilization (F = 8.00, p < 0.001) and enterprise performance (F = 7.19, p < 0.001) also varied significantly. The post-hoc analysis result (Table 7b) reveals that both KN and KS showed significantly lower involvement compared to KC (mean differences: -11.20 and -10.94, p < 0.001). No significant difference existed between KN and KS (p = 0.909). The result on credit access reveals that KN had significantly lower credit access than KC (mean -1.10, p < 0.001) while KS showed significantly better credit access than KN (mean = 1.24, p < 0.001). However, no significant difference occurred between KS and KC (p = 0.600). KS showed the poorest credit utilization compared to KC (mean = -2.07, p < 0.001), while KN's difference from KC neared significance (mean = -1.18, p = 0.064).

No significant difference occurred between North and South (p = 0.254). Repayment behaviour results reveal that all pairwise comparisons showed significant differences. KS had the poorest repayment behaviour compared to KC (mean = -4.59, p < 0.001) while KN also showed


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significant poorer repayment than KC (mean = -2.56, $p < 0.001$). KS performed significantly worse than KN (mean = -2.03, $p = 0.013$). On performance, KS showed significantly lower performance than KC (mean = -5.41, $p < 0.001$) while KS also under performed compared to KN (mean = -3.92, $p = 0.032$). No significant difference was recorded between KN and KC ($p = 0.557$). The results on challenges faced revealed that there were significant differences among districts. Though both KN and KS faced significantly more challenges than KC (mean = -23.11 and -17.25, $p < 0.001$) respectively, KN faced more challenges than KS (mean = 5.86, $p < 0.001$).

**Table 7a: ANOVA Measuring Differences across Districts by Key Variables**

| Variable | Effect | Df | Sum Sq | Mean Sq | F value | Pr(>F) | Decision |
|---|---|---|---|---|---|---|---|
| Involvement | Senatorial_Dist. | 2 | 7060.38 | 3530.19 | 243.48 | 0.0000 | Significant |
| | Residuals | 237 | 3436.28 | 14.50 | | | |
| Credit Access | Senatorial_Dist. | 2 | 68.23 | 34.12 | 39.97 | 0.0000 | Significant |
| | Residuals | 237 | 202.26 | 0.85 | | | |
| Credit Utilization | Senatorial_Dist. | 2 | 181.20 | 90.60 | 8.00 | 0.0004 | Significant |
| | Residuals | 237 | 2684.60 | 11.33 | | | |
| Repayment Behaviour | Senatorial_Dist. | 2 | 884.76 | 442.38 | 24.29 | 0.0000 | Significant |
| | Residuals | 237 | 4315.49 | 18.21 | | | |
| Enterprise performance | Senatorial_Dist. | 2 | 1238.39 | 619.19 | 7.19 | 0.0009 | Significant |
| | Residuals | 237 | 20409.01 | 86.11 | | | |
| Challenges to Credit Access & Utilization | Senatorial_Dist. | 2 | 24702.65 | 12351.32 | 193.72 | 0.0000 | Significant |
| | Residuals | 237 | 15110.52 | 63.76 | | | |

**Table 7b: Post-hoc Analysis**

| Comparison | mean_diff | lower_ci | upper_ci | p_adj |
|---|---|---|---|---|
| **Involvement** | | | | |
| 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 |
| **Credit access** | | | | |
| KN-KC | -1.0972 | -1.4369 | -0.7575 | 0.0000 |
| KS-KC | 0.1389 | -0.2008 | 0.4786 | 0.6001 |
| KS-KN | 1.2361 | 0.873 | 1.5993 | 0.0000 |
| **Credit utilization** | | | | |
| KN-KC | -1.184 | -2.4216 | 0.0535 | 0.0641 |
| KS-KC | -2.0729 | -3.3105 | -0.8354 | 0.0003 |
| KS-KN | -0.8889 | -2.2119 | 0.4341 | 0.2543 |


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| | | | | |
|---|---|---|---|---|
| **Repayment behaviour** | | | | |
| KN-KC | -2.5625 | -4.1315 | -0.9935 | 0.0004 |
| KS-KC | -4.5903 | -6.1593 | -3.0212 | 0.0000 |
| KS-KN | -2.0278 | -3.7052 | -0.3504 | 0.0131 |
| **Performance** | | | | |
| KN-KC | -1.4931 | -4.9052 | 1.9191 | 0.5574 |
| KS-KC | -5.4097 | -8.8219 | -1.9975 | 0.0007 |
| KS-KN | -3.9167 | -7.5644 | -0.2689 | 0.0320 |
| **Challenges** | | | | |
| KN-KC | -23.1146 | -26.0506 | -20.1786 | 0.0000 |
| KS-KC | -17.2535 | -20.1895 | -14.3174 | 0.0000 |
| KS-KN | 5.8611 | 2.7224 | 8.9999 | 0.0000 |

**Determinants of Credit Performance**

The analysis examined factors that influenced credit performance across the state. The result shows that credit access for overall ($\beta = 2.25$, $p < 0.001$) was the strongest predictor. Across the districts, it was marginally a significant predictor in both KN ($\beta = 19.90$, $p < 0.01$), KC ($\beta = 1.38$, $p < 0.05$) and KS ($\beta = 0.93$, $p < 0.1$). Credit utilization was the second strongest predictor overall ($\beta = 1.16$, $p < 0.001$). However, while it was not a significant predictor in KN ($\beta = 0.38$, $p < 0.01$), it was a significant determinant in both KC ($\beta = 0.56$ $p < 0.05$) and KS ($\beta = 0.93$, $p < 0.1$). Overall good credit repayment behaviour was a strong determinant ($\beta = 0.48$, $p < 0.001$). In KN ($\beta = -0.22$, $p < 0.01$), it was not a significant predictor. However, it had a strong effect in both KC ($\beta = 0.74$, $p < 0.01$) and KS ($\beta = 0.55$, $p < 0.1$). Overall, challenges ($\beta = -0.19$, $p < 0.001$) were negative predictors. In KN ($\beta = 0.02$, $p < 0.01$), KC ($\beta = -0.81$, $p < 0.05$) and KS $\beta = -0.22$, $p < 0.1$) challenges posed strong and moderate negative effects respectively. Years of experience overall ($\beta = 0.25$, $p < 0.001$) and age ($\beta = -0.17$, $p < 0.001$) were predictors, but both failed as predictors at district levels.

**Table 8: Multiple Linear Regression on Determinants of Credit Performance among Respondents**

| Variable | Overall | KN | KC | KS |
|---|---|---|---|---|
| (Intercept) | 3.0751(4.607) | 19.8817(7.7454)* | 37.9102(22.3474) | 3.6786(4.7212) |
| Age | -0.1721(0.0575)** | -0.0142(0.0736) | -0.1889(0.1299) | 0.0968(0.0805) |
| Years.of.experience | 0.2537(0.0723)*** | 0.0762(0.0817) | 0.2287(0.177) | -0.0577(0.0979) |
| Family.size | -0.1005(0.1254) | -0.074(0.1366) | 0.5551(0.3726) | -0.2649(0.1811) |
| involvement_composite | 0.0645(0.0958) | -0.4777(0.2142)* | -0.0204(0.1604) | -0.3691(0.2087). |
| credit_composite | 2.2473(0.4901)*** | 19.898(1.8623)*** | 1.3819(0.7685). | 0.9253(0.486). |
| credit_utilization_composite | 1.1605(0.1555)*** | 0.3815(0.2515) | 0.5564(0.2046)** | 0.9259(0.3943)* |


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| | | | | |
|---|---|---|---|---|
| repayment_composite | 0.4835(0.1184)*** | -0.22(0.2024) | 0.7395(0.2285)** | 0.5526(0.1195)*** |
| challenge_composite | -0.1902(0.0484)*** | 0.0213(0.0657) | -0.8147(0.23)*** | -0.2237(0.0709)** |
| Marital.status_Otherwise | 0.3004(1.1022) | 3.7116(1.698)* | 0.5162(2.0002) | 0.7011(1.0791) |
| Education.qualification_Primary | 2.4209(1.9729) | 4.6495(2.7202). | 9.4304(7.0634) | -1.3174(1.6007) |
| $R^2$ | 0.4775 | 0.8294 | 0.5557 | 0.5017 |
| Adj. $R^2$ | 0.4547 | 0.8014 | 0.5034 | 0.42 |
| F-statistic | 20.9298 | 29.6516 | 10.6319 | 6.1422 |
| Model p-value | 0 | 0 | 0 | 0 |
| n | 240 | 72 | 96 | 72 |

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.1$

Format: Beta(Standard Error)Significance

## DISCUSSION OF FINDINGS

The demographic analysis revealed distinct characteristics of rural women agro-entrepreneurs across the three senatorial districts. The age distribution showed KS district having an older population compared to KC and KN. This age difference reflects varying levels of agricultural experience and established social networks, which are good for agro-entrepreneurial success. The religious homogeneity (Islam) and predominance of Quranic education indicate the cultural context within which these women operate, suggesting that Islamic principles and traditional learning systems influenced their entrepreneurial activities. These results are in tandem with Musa and Ikwuakam (2024)'s findings on rural women entrepreneurial traits in rural household-based enterprises in Katsina State. The low level of formal education across the districts indicates the educational constraints facing rural women in the state. This is in conformity with the findings of Ikwuakam and Lawal (2015), who added that the attribute often translates to reduced entrepreneurial capabilities and limited access to formal financial services. However, the result contradicts Bodai et al. (2023), who found that women entrepreneurs in Kuwait attained a bachelor's degree. The large household size is an indication of substantial household responsibilities that may both motivate entrepreneurial activities for income generation and constrain time and resources available for business development.

The involvement in agricultural activities reveals significant variations across districts, with KC consistently showing the highest engagement levels across most activities. Small ruminant rearing and poultry farming emerged as the dominant activities, reflecting their cultural appropriateness and lower capital requirements for rural women. These activities are traditionally considered suitable for women in Northern Nigeria's Islamic context, allowing them to generate income while maintaining cultural norms. This is in line with the study outcome of (Musa & Ikwuakam, 2024).

The pronounced district disparities in agricultural involvement, particularly KC's superior performance compared to KN and KS, suggest varying levels of agricultural development,


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market access, and supportive infrastructure. KC's high involvement in cash crops production, compared to KN and KS, indicates better market linkages and agricultural extension services in this district. The complete absence of dairy processing across all districts and negligible participation in fish farming and beekeeping, though surprising, is an indication of missed opportunities for agricultural diversification and value addition.

The credit access analysis revealed severe financial exclusion among rural women agro-entrepreneurs, with formal financial institutions largely inaccessible. The finding that the majority never accessed credit from commercial banks and microfinance institutions demonstrates the failure of formal financial systems to reach rural women in Katsina State. This exclusion may stem from collateral requirements, documentation challenges, geographical barriers, and cultural restrictions on women's financial autonomy. The result has also been found to impede production, processing and marketing enterprises [International Fund for Agricultural Development (IFAD), 2001] and entrepreneurial traits in rural household-based enterprises in Katsina State (Musa & Ikwuakam, 2024). The dominance of informal credit sources, particularly family and friends, indicates the continued importance of social networks in rural financing. However, the reliance on informal sources limits the amount of capital availability and may perpetuate small-scale, subsistence-level operations. The district variations, with KS showing the highest family-based credit access and KN facing severe restrictions across all sources, suggest different social capital structures and family support systems in the districts. The credit utilization patterns revealed concerning trends that undermine agro-entrepreneurial development. The high rate of diversion to household/non-business needs reflects the dual role of women as household managers and entrepreneurs. This finding is in conformity with gender literature, suggesting that women often prioritize family welfare over business expansion, sometimes at the expense of enterprise growth.

The poor utilization of credit for intended agricultural purposes—fertilizers and seeds, land expansion/improvement, and storage facilities—indicates missed opportunities for productivity enhancement and business scaling. The pattern suggests that even when credit is accessed, structural constraints, inadequate business training, and competing household demands prevent optimal utilization. The district variations, with KC showing better performance across most utilization indicators, may reflect better agricultural extension services, market infrastructure, and business support systems. In corroboration, Musa and Abubakar (2017) added that the scenario hampers the development of targeted interventions and policies to support women agro-entrepreneurs. The repayment analysis presented a paradoxical situation where rural women demonstrated strong moral commitment to loan repayment but faced significant practical challenges in meeting repayment obligations. The district variations in repayment behavior, with KC showing favorable repayment compared to KS, may be due to differences in agricultural productivity, market access, and income stability across districts. The high rates of default and late payment penalties indicate systemic challenges in the credit delivery model that may not adequately consider the seasonal nature of agricultural income and the vulnerability of rural women to economic shocks. Abdullahi et al. (2023) attributed such repayment inefficiency to financial literacy and farming experience.

The identification of poor market conditions as a top challenge shows the importance of market development in supporting agro-entrepreneurship. Limited market access constrains the returns to agricultural investment, making credit repayment difficult and discouraging future borrowing. The prominence of business formalization challenges and inadequate business


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management skills suggest the need for integrated support services that combine credit access with capacity building. The gender and cultural barriers, particularly pronounced in some districts, reflect the complex intersection of Islamic culture, traditional gender roles, and women's economic participation. The variation in religious/cultural restrictions on women taking loans across different districts suggests different interpretations and applications of cultural norms, indicating the potential for targeted interventions that work within cultural frameworks.

The ANOVA results confirming significant differences across districts for all major variables buttresses the importance of place-based interventions. KC's consistent superior performance across involvement, credit access, utilization, and repayment suggests the district could serve as a model for best practices. The post-hoc analysis revealing KS's consistently poor performance across multiple indicators identifies the district as requiring priority intervention. Musa and Ikwuakam (2024) had recently found that involvement levels and access to interventions differ among the three senatorial districts.

The regression analysis identifying credit access as the strongest predictor of performance confirms the fundamental importance of financial inclusion for agro-entrepreneurial success. However, the finding that credit access alone is insufficient—as evidenced by poor utilization patterns—emphasizes the need for comprehensive support systems. The strong positive effect of credit utilization and repayment behaviour on performance validates the importance of financial management capabilities. The negative effect of challenges is also an indication of how structural constraints can undermine even well-designed credit interventions. The relationship between credit access and business performance has also been found to positively influence agricultural production in Nigeria, with variations across regions and farmer categories (Adewale et al., 2022; Osabohien et al., 2020).

## CONCLUSION

The study revealed that rural women's agro-entrepreneurship in Katsina State is characterized by potential systemic challenges. While rural women demonstrated an entrepreneurial spirit through involvement in various agricultural activities and strong moral commitment to financial obligations, they faced severe challenges in accessing formal credit, effectively utilizing available funds, and maintaining consistent repayment patterns. The district variations as revealed are informative on the importance of location-specific interventions in addressing constraints while building on existing strengths. The findings therefore remain a call for formidable strategies that should integrate financial inclusion with capacity building, market development, and cultural sensitivity to unlock the potential of rural women agro-entrepreneurs in the state.

## RECOMMENDATIONS

Based on the findings of the study, it is recommended that:

1. The government should leverage the older, more experienced population by establishing them as trainers and mentors for younger women.


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2. Islamic finance-compliant agro-entrepreneurial financing policies that respect religious principles while promoting women's economic participation should be developed by the government.

3. Banks should reduce collateral requirements by accepting alternative forms of security, including group guarantees and productive assets.

4. Financial institutions should develop seasonal repayment schedules aligned with agricultural cycles to accommodate income patterns.

5. The government should leverage strong family-based credit networks by formalizing and scaling successful informal mechanisms while strengthening KC as a financial services hub for rural women.

6. The government should implement culturally appropriate business skills training through Islamic women's associations and existing social structures.

7. The government should partner with Islamic educational institutions to incorporate entrepreneurship and agricultural skills training into existing Quranic education systems.

8. The government should promote dairy processing initiatives through targeted training and equipment provision.

9. The government should introduce appropriate beekeeping, cash crop production and fish farming technologies suitable for rural women's capacity and cultural context.

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