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FORMAL AND INFORMAL CREDIT ARRANGEMENTS AMONG LIVESTOCK FARMERS IN IMO STATE, NIGERIA

Olumba UM[1], Nwosu FO[1], Chikezie C[1], Anyiam KH[1]*, Ben-Chendo GN[2], Osugiri II[1], Isaiah GI[1], Obinna-Nwandikom CO[2], Enoch OC[1], Nwachukwu EU[1], Anene HU[1], Nnorom EI[1], Igwenagu MO[3] and OE Mbakaogu[2]

Olumba Ujunwa

*Corresponding author email: kelechihenry20@gmail.com

ORCID: https://orcid.org/0000-0002-5439-5904 - Olumba UM
ORCID: https://orcid.org/0000-0002-7562-215X - Nwosu FO
ORCID: https://orcid.org/0000-0002-3552-1485 - Chikezie C
ORCID: https://orcid.org/0000-0003-3775-4714 - Anyiam KH
ORCID: https://orcid.org/0000-0002-5629-3194 - Ben-Chendo GN
ORCID: https://orcid.org/0000-0002-8390-9775 - Osugiri II
ORCID: https://orcid.org/0000-0001-5153-6655 - Isaiah GI
ORCID: https://orcid.org/0000-0003-1401-2187 - Obinna-Nwandikom CO
ORCID: https://orcid.org/0000-0002-0500-3329 - Enoch OC
ORCID: https://orcid.org/0000-0002-3728-1550 - Nwachukwu EU
ORCID: https://orcid.org/0009-0004-0451-0275 - Anene HU
ORCID: https://orcid.org/0009-0007-1826-9242 - Nnorom EI
ORCID: https://orcid.org/0009-0008-6100-1628 - Igwenagu MO
ORCID: https://orcid.org/0009-0006-1240-5130 - Mbakaogu OE

[1]Department of Agricultural Economics, Federal University of Technology Owerri, Nigeria
[2]Department of Agricultural Business, Federal University of Technology Owerri, Nigeria
[3]Department of Natural Resources and Environmental Sciences, Prairies View A&M University, Texas, USA

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ABSTRACT

Financial credibility reflects a borrower's ability to manage finances responsibly, including timely loan repayments and adherence to credit agreements. However, issues like lack of integrity and trustworthiness have reduced borrowers' credibility, limiting their access to formal and informal credit markets. This study evaluated the financial credibility of livestock farmers in Imo State, Nigeria, comparing their repayment behaviours in formal and informal credit arrangements. A multistage sampling procedure was used to select 120 livestock farmers across Imo State. Ten Local Government Areas (LGA) were proportionately chosen from the three agricultural zones, with two purposively selected communities per LGA. From each community, six farmers (three formal and three informal credit users) were drawn from Agricultural Development Programme (ADP) and association lists, yielding a balanced sample of 60 formal and 60 informal credit users. This was done to ensure comparability and statistical validity. Findings revealed that farmers accessed an average of ₦1,515,833 from formal lenders (financial institutions) and ₦244,167 from informal lenders (*esusu*) per annum. Monthly repayments averaged ₦80,919 for formal credit and ₦34,709 for informal credit. While 65% of farmers with formal credit demonstrated credible repayment behaviour, only 28.9% of those with informal credit did the same, indicating a significant trust gap in informal lending. Binary Probit analysis identified key factors influencing financial credibility. For formal credit, income ($P < 0.1$), interest rates ($P < 0.1$), household size ($P < 0.05$), livestock size ($P < 0.1$), and credit duration ($P < 0.01$) were significant determinants. In contrast, gender ($P < 0.01$), education ($P < 0.05$), experience ($P < 0.1$), household size ($P < 0.01$), livestock size ($P < 0.01$), and cooperative membership ($P < 0.01$) influenced credibility in informal arrangements. The study highlights a high interest rate as a critical concern for most farmers with informal credits who failed to meet repayment obligations, undermining trust in informal credit systems. To improve financial credibility, the study recommends financial education to the farmers, responsible borrowing, and credit discipline. In conclusion, while formal credit systems show higher repayment credibility, informal credit suffers from poor adherence to agreements.

(Exchange rate 1.00 USD = ₦ 1,451.5324).

Key words: Financial credibility, informal credit markets, livestock production formal credit market, Determinants

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INTRODUCTION

Enhancing agricultural and rural development requires a holistic approach that emphasizes agricultural finance [1]. Agricultural finance plays a vital role in boosting agricultural production, adopting improved technologies, and enhancing rural income distribution [2], particularly when farmers have access to agricultural credit. Ultimately, agricultural credit enables the socioeconomic development of smallholder farmers by addressing the major constraints of the rural economy [3, 4]. Credit refers to the provision of funds, goods, services, or resources by one party to another, with the expectation of future repayment [5]. Farmers access credit for their agricultural activities through formal and informal arrangements [6, 7].

Formal credit arrangements are done through formal financial institutions such as commercial banks, state-owned credit institutions, microfinance banks and merchant banks. While informal credit arrangements are done through sources such as money lenders, traders, cooperatives, "esusu", friends, relatives and many more [8]. Cooperative society, also known as the credit thrift society or *esusu*, is a non-institutional, informal financial system based on contributions among like-minded individuals. Payments are typically made on a weekly, monthly, or daily basis. This type of funding can be managed in two primary ways. Firstly, members can participate in a rotating savings scheme, where each member receives a lump sum at the end of each week or month. Alternatively, members can contribute funds, which are then lent to individual members at a predetermined interest rate [9]. Informal arrangements, particularly through cooperatives, are often less challenging than formal arrangements, which typically require stringent conditions for credit access [10].

Smallholder farmers often struggle to access formal credit, leading them to rely on informal sources, especially when faced with income shocks or influenced by cultural or religious beliefs that advise against formal credit use [7]. Farmers tend to prefer informal credit from families, friends, and trusted business partners to formal credit sources [11]. Delayed or low repayment is a significant factor limiting formal institutions from establishing formal credit arrangements [12]. Formal institutions have greater confidence in timely loan repayment [13], as delayed repayment of loans adversely affects the financial health of lending institutions, thereby potentially restricting their ability to provide credit in the future [14]. Lack of credibility is another factor hindering farmers from securing formal credit [15].

Despite the importance of credibility in debt repayment, existing studies have only focused on the aspect of creditworthiness, mainly in financial terms such as repayment capacity, while giving less or no attention to credibility, which has to do with reliability, integrity, and trustworthiness [16]. Credibility, unlike creditworthiness,

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is not only financial but also behavioural and relational, shaped by individual characteristics such as age, gender, education, household income and income sources [17,18]. Furthermore, although formal credit institutions often evaluate applicants based on measurable factors such as criminal history, education, job record and free cash flow [19], these criteria may not fully capture the behavioural and social aspects of credibility that influence repayment performance. This creates a research gap, as limited evidence exists on how credibility, beyond creditworthiness, affects livestock farmers' access to and sustainability of credit, borrowing behavior, and financial inclusion in Nigeria's rural areas. Addressing this gap is critical for designing credit frameworks that account for both financial and behavioural dimensions of farmer credibility. In an effort to address this gap, this study aimed to assess the financial credibility of livestock farmers with formal and informal credit arrangements among livestock farmers in Imo State, Nigeria. The specific objectives were to:

i. examine the formal and informal credit agreements and the repayment capacity of livestock farmers in the study area.

ii. analyze the determinants of financial credibility among livestock farmers with formal and informal credit arrangements in the area.

The following null hypotheses were tested:

H_0: there is no significant relationship between the type of credit arrangement and the repayment capacity of livestock farmers in the study area.

H_0: Socioeconomic factors such as age, gender, education, income, and income sources do not significantly determine the financial credibility of livestock farmers with formal and informal credit arrangements in the study area.

MATERIALS AND METHODS

The study was carried out in Imo State, Nigeria. Imo State is located in the Southeastern zone of Nigeria. It is divided into three agricultural zones viz-a-viz Orlu, Okigwe and Owerri. These divisions are for administrative and extension services and not for any agro-ecological difference. The State has 27 Local Government Areas. The state lies between latitudes 4° 45'N and 7° 15'N of the equator and longitudes 6° 50'E and 7° 25'E of the Greenwich Meridian. It occupies the area between the lower River Niger and the upper and middle Imo River. It is bounded on the East by Abia State, on the West by the River Niger and Delta State; and on the North by Anambra State, while Rivers State lies to the South. Imo State covers an area of about 5,135km^2, with an estimated population of 5,459,300 and population density of about 1,063km^2 [20, 21]. The state has an average annual temperature of 24.1°C which can rise to 32.6°C during the dry season, an average annual relative

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humidity of 64.2% which can rise to up to 77.9% during the rainy season, average annual rainfall of 1800mm to 2738mm and an altitude of about 100m above sea level [20]. Agriculture is practiced by a good number of the population in the state. Crop farming is majorly regulated by the seasonal distribution of rainfall, although there are few farmers involved in dry season farming of some food crops and vegetables. Also, livestock like cattle, sheep, goats, pigs, poultry, rabbits and snails are reared through subsistence and commercial farming in the State. Moreover, Imo State's dense population and growing demand for animal protein create economic incentives for livestock farmers to scale up, which in turn intensifies their reliance on both formal and informal credit systems. For this reason, this area was chosen for this study to provide valuable insights into how credit arrangements and financial credibility interact in a setting where livestock farming serves as an important complement to crop production.

A multistage sampling procedure was used in the selection of respondents. Stage one involved the use of all three agricultural zones in Imo State, Orlu, Okigwe, and Owerri, to ensure adequate geographical representation. Stage two entailed the proportionate selection of four LGAs from Orlu zone out of 12 LGAs, two LGAs from Okigwe zone out of 6 LGAs, and four LGAs from Owerri zone out of 9 LGA, giving a total of ten LGAs. This proportional approach was necessary to account for the variation in the number of LGAs across the zones and to ensure fairness in representation. In stage three, two communities were purposively selected from each of the ten LGAs, resulting in twenty communities. The purposive selection was guided by a reconnaissance survey, which identified communities with a sufficient concentration of livestock farmers engaged in either formal or informal credit arrangements. Stage four focused on the selection of respondents. From each of the twenty communities, six livestock farmers were purposively chosen, comprising three farmers with formal credit arrangements and three with informal credit arrangements. This ensured an equitable and balanced representation of both categories of credit users. The lists of registered livestock farmers were obtained from the Agricultural Development Programme (ADP) office in collaboration with the Livestock Farmers' Association, providing a reliable sampling frame. Altogether, this process yielded a total sample size of 120 livestock farmers, with 60 farmers drawn from formal credit users and 60 from informal credit users. These respondents constituted the sample for the study.

A set of a well-structured questionnaire was administered to the farmers. Data collected were analyzed using descriptive statistics, Timely repayment credibility score (TRCS), binary Probit model, and Z-statistical tools. Objective (i) was analyzed using descriptive statistics and a Z-test. Objective (ii) was analyzed using the Timely repayment credibility score. Objective (iii) was analyzed using a probit model.

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Hypothesis (i) was realized using Z-statistics. Hypothesis (ii) was realized from the results of objective (iii) using the Chi-square statistical tool. The Z-statistical test used is stated as:

$$Z = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \quad (1)$$

Where,

Z = Value under consideration
$\overline{X_1}$ =Mean of the value of formal credit used
$\overline{X_2}$= Mean of the value of informal credit used
S_1^2 = Variance of the formal credit used
S_2^2 = Variance of the informal credit used
n_1 = Number of respondents that used formal credit
n_2 = Number of respondents used informal credit

The financial credibility of livestock farmers with formal and informal credit arrangements was determined using the timely repayment credibility scores (TRCS) according to Creswell and Creswell [26]. In this case, livestock farmers were classified into two mutually exclusive categories (those with formal and informal credit arrangements). Their integrity and trustworthiness were tied to the ability to honour the repayment agreements promptly. Scores were assigned to farmers by the researcher based on their adherence to repayment dates stipulated in their respective agreements with formal or informal credit sources. In this case, farmers in each agreement category with less than 80% scores were considered not credible, while those with more than 80% scores were considered credible, as stated:

$TRCS_i < 80\%$ *with more than one month loan default* = *Not Credibl*

$TRCS_i \geq 80\%$ *with no or less than one month loan default* = *Credible*

Furthermore, the credibility status (not credible and credible) was then recorded as a dichotomous variable for the dependent variable in the probit analysis. Coded as:

$TRCS_i < 80\%$ *with more than one month loan default* = 0

$TCS_i \geq 80\%$ *with no or less than one month loan default* = 1

Therefore, the determinants of financial credibility of livestock farmers were ascertained using the binary Probit model. The seemingly unrelated bivariate probit (SURBP) model would have been fitted, but the mutual exclusivity of the two equations (formal and informal credit agreement equations) violated the assumptions of the SURBP model. The seemingly unrelated bivariate probit model

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is used when two equations are to be estimated and the dependent variable of one of them is an explanatory variable in the other [22]. As a result, separate probit models were employed for each equation. Therefore, the probit model is specified as:

$$y_i^* = \beta_j x_i + U_i \quad (2)$$

Given the financial credibility status of each group, livestock farmers were observed to be financially credible if y_i^* crosses the threshold value 0. That is,

$y_i = 1 \; if \; y_i^* \geq 80\%$, if ith farmer has no or less than one month loan default (3)

$y_i = 0 \; if \; y_i^* < 80\%$, if ith farmer has more than one month loan default (4)

This is stated as:

$$y_i = \begin{cases} 1 \; if \; y_i^* \geq 80\% \\ 0 \; if \; y_i^* < 80\% \end{cases} \quad (5)$$

Where,

y_i = Observed dichotomous dependent variable (financial credibility: 1 = credible, 0 = not credible)
y_i^* = Underlying latent variable
β_j = Vector parameters estimate of jth variable
X_i = Vector exogenous variables (Determinants)

Where,
X_1 = Age of the ith farmer (years)
X_2 = Sex (dummy, male =1, otherwise = 0)
X_3 = Marital status (dummy variable, married = 1, otherwise = 0)
X_4 = Level of education (years)
X_5 = Years of experience (years)
X_6 = Level of income (naira)
X_7 = Interest rate on borrowed amount (percent)
X_8 = Household size (number)
X_9 = Livestock size (number)
X_{10} = Membership of cooperative society (dummy variable, yes =1, otherwise =0)
X_{11} = Credit duration (months)

RESULTS AND DISCUSSION

Formal and informal credit arrangements and the repayment capacity of livestock farmers

Table 1 shows the estimated formal and informal credit arrangements and repayment capacity of livestock farmers in the study area. Results showed that the

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average amount of credit accessed by livestock farmers from formal arrangements was one million five hundred and fifteen thousand, eight hundred and thirty-three naira (₦1,515,833), while average of two hundred and forty-four thousand one hundred and sixty-seven naira (₦244,167) was accessed from informal credit arrangements, with a percentage difference of 83.89%. The Z-test value (6.7646), which was significant at 5% level, further confirmed that there is a significant difference between formal and informal credit arrangements in the area. Therefore, the null hypothesis that the amount of formal credit accessed by livestock farmers is not different from informal credit accessed by farmers was rejected. The study accepted the alternative hypothesis and concluded that the amount of formal credit accessed by farmers is significantly different from informal credit accessed by farmers in the area. This could be linked to the fact that formal credit markets supply more amount of credit to livestock farmers than their counterparts in the informal sector.

Results also showed that the average interest rate charged by formal credit sources was 7.025%, while that of the informal credit sector was 0.729%, with a percentage difference of 89.62%. The Z-test value (10.4319), which was also significant at 5% level, further confirmed that there is a significant difference in the interest rate charged by formal and informal credit sources in the area. This implies that formal credit markets charge higher interest rates than informal sources such as cooperatives. High interest rates are one of the factors limiting farmers from accessing credit from formal credit markets [20]. High interest rate increases the production costs as farmers spend more servicing their borrowed loans. Appiah-Twumasi *et al*. [23] reported that the interest rate is the key factor influencing the high cost of financing in agriculture. Results also showed that the average duration of formal credit was 17.55, approximately eighteen (18) months, while that of the informal credit was seven (7) months, with a percentage difference of 60.11%. The Z-test value (7.2729), which was significant at the 5% level, further confirmed that there is a significant difference between the credit durations of formal and informal credit sources in the area. Hence, the null hypothesis that there is no significant difference in the interest rate charged by formal and informal credit sources in the area was rejected. This is an indication that informal credit sources, such as farmers' cooperatives or associations, charge a lower interest rate and shorter credit durations.

Results showed that the average amount of formal credit repaid monthly by livestock farmers was eighty thousand nine hundred and nineteen naira (₦80,919), while that of informal credit was thirty-four thousand seven hundred and nine naira (N34,709), with a percentage difference of 57.11%. This is an indication that farmers with formal credit arrangements have higher repayment capacity than their counterparts with

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informal credit arrangements in the area. This also suggests that the formal credit sources extend more credit to farmers with strong repayment histories. Farmers with low repayment capacity face credit constraints, as lenders are cautious about extending larger amounts to borrowers with a higher risk of default [12]. According to Ajibade *et al.* [10], farmers are more likely to use formal credit sources if they relax their stringent rules, as this would provide a longer repayment period compared to the informal credit sector. The Z-test value (7.418687), which was significant at the 5% level, further confirmed that there is a significant difference between the repayment capacity of farmers with formal credit arrangements and those with informal credit arrangements in the area. Therefore, the null hypothesis that there is no difference between the repayment capacity of livestock farmers with formal and informal credit arrangements was rejected. The study accepted the alternative hypothesis and concluded that there is a significant difference between the repayment capacity of livestock farmers with formal and informal credit arrangements in the area. This could stem from the difference in the credit amount accessed by livestock farmers with formal and informal credit arrangements in the area.

Financial credibility of livestock farmers with formal and informal credit arrangements

Table 2 shows the percentage distribution of livestock farmers with formal and informal credit arrangements by credibility status. Results showed that the majority (65%) of livestock farmers with formal credit arrangements credibly honoured their credit repayment agreements, while the majority (71.1%) of farmers with informal credit arrangements did not credibly honour their credit repayment agreements. This implies that most farmers with formal credit arrangements fulfill their obligations to repay their loans on time and in a trustworthy manner, while most farmers with informal credit arrangements do not fulfill their obligations to repay on time. Lu *et al.* [15] posited that most farmers lack credibility. This could be linked to integrity issues and problems with financial management. The integrity issues and lack of trustworthiness lead to high loan risks, and financial institutions are usually cautious about extending loans to farmers with high loan risks [24, 25]. Topor *et al.* [13] asserted that financial institutions, especially formal sources, have greater confidence in timely loan repayment. Non-repayment of loans affects the financial health of credit institutions [14].

Determinants of financial credibility among livestock farmers with formal and informal credit arrangements

Table 3 shows a probit analysis of the determinants of financial credibility of livestock farmers with formal and informal credit arrangements in the study area. It shows the coefficient and marginal effects of the Probit model. The Likelihood Ratio (LR) Chi-

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square statistics (which show the model's goodness-of-fit) for farmers with formal (39.70) and informal (41.36) credit arrangements were significant at 1%. Therefore, the null hypotheses that there is no significant relationship between socioeconomic factors and the financial credibility of livestock farmers with formal and informal credit arrangements, respectively, were rejected. This shows that there is a significant relationship between the socioeconomic factors and the financial credibility of livestock farmers.

Results showed that the coefficients of income, interest rate, household size, flock size, and credit duration for livestock farmers with formal credit arrangements were statistically significant at 1%, 5% and 10%, respectively, while sex, level of education, years of experience, household size, flock size and cooperative membership of farmers with informal credit arrangements were statistically significant at 1%, 5% and 10%, respectively. However, since the Probit model is non-linear, the estimated coefficients cannot give the correct measure of the effect of the explanatory variables on the dependent variable. The most fitting method is to use marginal effects rather than their coefficients. Hence, the study focused on the marginal effects of probit analysis.

The results of the determinants of financial credibility of farmers with formal credit arrangements showed that the coefficient of income level was positive and statistically significant at 1%, and the marginal value was 1.30e-06. This is an indication that income level has a positive effect on the financial credibility of livestock farmers. The implication is that an increase in income level by one percent increases the probability of livestock farmers being considered financially credible by formal financial institutions by 1.30e-04%. This implies that the formal credit institutions take into account the income level of livestock farmers when assessing their eligibility for livestock financing and farmers' repayment capabilities. This, in turn, determines the credibility for further financing. The coefficient of interest rate was negative and significant at 10%, and the marginal value was -0.0288. This implies that a one percent increase in farmers' interest on loans decreases the probability of being financially credible by 2.88%. This stems from the fact that high interest rate rips off the part of the farmer's profits that would have been used to service the loan. This in turn leads to loan defaults, and hence financial incredibility.

The coefficient of household size was negative and statistically significant at 5%, and the marginal value was -0.0780. This is an indication that household size has a negative effect on the financial credibility of livestock farmers. The implication is that an increase in household size by one percent, decreases the probability of livestock farmers of being considered financially credible by formal credit institutions by 7.8%. This implies that the formal credit institutions also take into account the household size of livestock farmers when assessing their eligibility for livestock financing and

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repayment capabilities. An increase in household size increases the financial responsibilities of farmers, and farmers are likely to focus their income on domestic and non-business-related issues, such as spending more on feeding, paying children's school fees, and other obligations. This brings about the issue of loan defaults, and in turn, farmers are considered ineligible for livestock financing.

The coefficient of livestock size was positive and statistically significant at 10%, and the marginal value was 0.0013. This is an indication that farmers' livestock size has a positive effect on the financial credibility of livestock farmers. This is an indication that an increase in livestock size by one percent increases the probability of livestock farmers being considered financially credible by formal credit institutions by 0.13%. This implies that the formal financial institutions consider livestock size when assessing farmers' eligibility and credibility for livestock financing and repayment capabilities. Finally, the coefficient of credit/loan duration was positive and statistically significant at 1%, and the marginal value was 0.0305. This is an indication that loan duration has a positive effect on the financial credibility of livestock farmers. This implies that an increase in loan duration by one month increases the probability of livestock farmers being financially credible by 3.1%. An increase in loan duration reduces the repayment pressure and gives the livestock farmers more time to transact and generate more profits for loan servicing and increases the financial credibility of livestock farmers.

On the other hand, the results of the determinants of financial credibility of farmers with informal credit arrangements showed that the coefficient of gender was positive and statistically significant at 1%, and the marginal value was 0.3185. This is an indication that the probability of extending financing to male-headed livestock farmers increases by 31.9% more than their female counterparts in livestock production. This implies that the informal credit sources consider more of male-headed livestock farms than female-headed farms when assessing their eligibility for livestock financing. This also implies that male livestock farmers are more financially credible than their female counterparts in managing finances, repaying debts, and maintaining a stable financial position. The coefficient of educational attainment was positive and statistically significant at 5%, and the marginal value was 0.0460. This is an indication that an increase in the educational attainment of livestock farmers by one percent increases the probability of being financially credible by 4.6%. Educated farmers are financially credible and more likely to manage their finances, repay debts, and maintain a steady financial position than their counterparts who are less educated.

The coefficient of years of experience was positive and statistically significant at 10%, and the marginal value was 0.0098. This is an indication that an increase in years of experience by one percent, increases the probability of being more

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financially credible in livestock business by 1.0%. This implies that livestock farmers gain knowledge of financial management through years of experience in livestock business and the more years they have in livestock business, the more accountable they are in fulfilling financial obligations. The coefficient of household size was negative and statistically significant at 1%, and the marginal value was -0.0797. This is an indication that household size has a negative effect on the financial credibility of livestock farmers with informal credit arrangements. The implication is that an increase in household size by one percent decreases the probability of livestock farmers being considered financially credible by informal credit sources by 8.0%. This implies that the informal credit sources take into account the household size of livestock farmers when assessing their eligibility for livestock financing and repayment capabilities. An increase in household size increases the financial responsibilities of farmers, and farmers focus more of their income on domestic and non-business issues, such as spending more on feeding, paying children's school fees, and other obligations. This brings about the issue of loan defaults and a lack of credibility in managing their financial commitments to their livestock business.

The coefficient of livestock size was positive and statistically significant at 1%, and the marginal value was 0.0052. This is an indication that farmers' livestock size has a positive effect on the financial credibility of livestock farmers. This implies that an increase in livestock size by one percent increases the probability of livestock farmers being financially credible by 0.5%. This implies that the informal credit sources consider livestock size when assessing farmers' eligibility and credibility for livestock financing. The coefficient of cooperative membership was positive and statistically significant at 1%, and the marginal value was 0.3561. This is an indication that cooperative membership has a positive effect on the financial credibility of livestock farmers. This implies that an increase in membership of cooperatives by one percent increases the probability of being financially credible by 35.61%. Informal financial institutions such as cooperatives extend credit to their members and facilitate effective loan utilization among members, ensuring funds are used for their intended purpose. This, in turn, increases the financial credibility of her membership. Finally, the coefficient of credit/loan duration was positive and statistically significant at 1%, and the marginal value was 0.0544. This is an indication that loan duration has a positive effect on the financial credibility of livestock farmers. This implies that an increase in loan duration by one month (or one percent of the normal duration) increases the probability of livestock farmers being financially credible by 5.4%. An increase in loan duration reduces the repayment pressure and gives the livestock farmers more time to transact and generate more profits for loan servicing and increases the financial credibility of livestock farmers. This is in line with Zheng and Ho [17], and Sun and Ho [18], who

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also reported that the characteristics of farmers' age, gender, education level, household income, and income source significantly affect the financial credibility.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

Financial credibility entails demonstrating a strong ability to manage finances and make timely payments (repayments) and showing trustworthiness in honouring loan repayment agreements. Unfortunately, integrity and lack of trustworthiness have undermined the credibility of borrowers, thereby limiting their access to both formal and informal credit markets. Results of this showed that most farmers with formal credit arrangements fulfill their obligations to repay their credit on time and in a trustworthy manner, while most farmers with informal credit arraignments do not fulfill their obligations to repay their loans on time. For formal credit arrangements, credit institutions should align loan amounts with farmers' income levels and promote income-stabilizing programmes to enhance repayment capacity. Policymakers should provide flexible or subsidized interest rates to reduce financial strain. Training on household financial planning is needed to counter the negative effects of large family sizes, while targeted livestock development schemes should be introduced to help farmers expand flock size, thereby strengthening creditworthiness. Banks should also adopt longer, livestock-cycle–appropriate repayment tenures to ensure sustainable credit repayment.

For informal credit arrangements, capacity-building through financial literacy programme is critical to improve credit management and repayment culture. Tailored education initiatives address the role of gender, highlight the benefits of formal education, and strengthen farmers' financial planning skills. Cooperative membership should be encouraged and supported, as it improves credibility and collective loan security. Additionally, experience-based mentoring systems should be promoted to leverage the knowledge of older farmers in guiding younger ones toward better financial practices.

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Conflict of interest

There is no conflict of interest among the authors.

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Table 1: Estimated formal and informal credit arrangements and repayment capacity of livestock farmers per annum

Items	Formal Credit Arrangements	Informal Credit Arrangements	% Difference	Z-values
Average amount of credit accessed	1,515,833	244,167	83.89	6.7646*
Average interest rate	7.025	0.729	89.62	10.4319*
Average credit duration	17.55	7.00	60.11	7.2729*
Repayment capacity (average amount repaid)	80,919	34,709	57.11	7.418687*

*Significant at 5%
Source: Field Survey Data, 2023

Table 2: Percentage distribution of livestock farmers with formal and informal credit arrangements by credibility status

Credibility Status	Farmers with Formal credit arrangements		Farmers with Informal credit arrangements	
	Frequency	% Distribution	Frequency	% Distribution
Credible	39	65	17	28.3
Not credible	21	35	43	71.7
Total	**60**	**100**	**60**	**100**

Source: Field Survey Data, 2023

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Table 3: Probit Analysis of the determinants of financial credibility of livestock farmers with formal and informal credit arrangements in the study area

Activities	Formal Credit Arrangements		Informal Credit Arrangements	
	Coefficients	Marginal Effects	Coefficients	Marginal Effects
Age	0.0164 (0.0505)	0.0024	0.0001 (0.0246)	-0.00002
Sex	-0.1005 (0.6829)	-0.01495	1.7054*** (0.6440)	0.3185***
Marital Status	-0.1016 (0.2845)	-0.0149	-0.5235 (0.5758)	-0.0978
Education	-0.0288 (0.0633)	-0.0042	0.2462** (0.1057)	0.0460**
Years of Experience	0.0803 (0.0892)	0.0118	0.0526* (0.0309)	0.0098*
Level of Income	8.85e-06*** (2.96e-06)	1.30e-06***	-2.60e-07 (3.30e-06)	-4.86e-08
Interest Rate	-0.1955* (0.1058)	-0.0288*	-0.0318 (0.0296)	-0.0059
Household size	-0.5301** (0.2423)	-0.0780**	-0.4266*** (0.1533)	-0.0797***
Livestock Size	0.0087* (0.0048)	0.0013*	0.0277*** (0.0097)	0.0052***
Cooperative Membership	-0.8341 (0.7308)	-0.1227	1.9070*** (0.7180)	0.3561***
Credit Duration	0.2076*** (0.0708)	0.0305***	0.2915*** (0.1045)	0.0544***
LR chi-Square (X^2)	**39.70*** **		**41.36*** **	
Prob > chi^2	**0.0000**		**0.0000**	
Pseudo R^2	**0.5555**		**0.5037**	
Log likelihood	**-15.9135**		**-20.3758**	

*Significant at 1%, **significant at 5%, ***significant at 10%. Values in parentheses are standard errors
Source: Computer analysis of the field survey data (2023) using STATA

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