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Receipt Financing as Drivers of Smallholder
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Agricultural Credit Cooperatives and Warehouse Receipt Financing as Drivers of Smallholder Productivity in Nakuru County

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Abstract

This study examines the influence of Agricultural Credit Cooperatives (ACCs) and Warehouse Receipt Financing (WRF) on smallholder farmers' productivity in Nakuru County. Drawing on data from 272 farmers, findings show that both ACCs ($\beta = .211, p < .001$) and WRF ($\beta = .265, p < .001$) significantly enhance productivity by increasing access to affordable credit, enabling timely input acquisition, reducing distress selling, and stabilizing market participation. Descriptive results reveal strong reliance on cooperatives but limited access to certified warehouses. The study recommends strengthening cooperative governance, expanding rural warehouse infrastructure, digitizing warehouse receipts, and integrating WRF into national food reserve systems.

Keywords: *Credit Cooperatives, Warehouse Receipt Financing, Productivity, Collateral Financing, Kenya*

1. Introduction

Access to affordable and timely credit remains one of the most significant challenges facing smallholder farmers in Kenya. Conventional lending institutions often perceive smallholders as high-risk borrowers due to irregular incomes, lack of formal collateral, and limited financial records (Berger & Udell, 1995). As a result, many farmers rely on informal financing, which is often costly and inadequate. In Nakuru County, home to dairy farmers, horticultural producers, cereal growers, and agroforestry farmers, the financing gap undermines productivity, limits access to improved inputs, and suppresses income stability.

Agricultural Credit Cooperatives (ACCs) have emerged as farmer-friendly institutions that pool member resources, offer lower interest loans, and provide credit tailored to agricultural cycles. Cooperatives also offer financial literacy, extension services, and collective bargaining advantages. Meanwhile, Warehouse Receipt Financing (WRF) provides a collateral-based financing system where farmers deposit their produce in certified warehouses and receive a receipt that can be used to obtain credit. This system allows farmers to avoid distress selling during harvest periods when prices are low and instead sell later when prices improve.

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Despite the proven benefits of ACCs and WRF, their uptake in Nakuru County remains uneven. While cooperatives are widely used, warehouse receipt systems are still underdeveloped, limiting farmers' ability to store produce safely and access associated financing. This study investigates how ACCs and WRF influence smallholder productivity, providing evidence-based insights that can help strengthen rural financial systems.

2. Literature Review

2.1 Conceptual Review

Agricultural Credit Cooperatives are member-owned financial institutions established to provide affordable credit, mobilize savings, and enhance financial inclusion within rural farming communities (Khafagy, 2019). By operating on principles of collective action and shared responsibility, these cooperatives reduce transaction costs, offer lower and more flexible interest rates, and promote risk-sharing among members. Their key advantages include the provision of tailored loan products suited to agricultural production cycles, the use of collective collateral mechanisms that enable farmers without traditional assets to access credit, group guarantee systems that minimize default risks, and strengthened bargaining power that allows farmers to negotiate better prices for inputs and outputs.

Warehouse Receipt Financing, on the other hand, allows farmers to store produce in certified warehouses and use receipts as collateral for loans. The system reduces post-harvest losses, stabilizes prices, and enhances liquidity (Miranda et al., 2019). WRF is particularly useful for cereal and legume farmers who face seasonal price fluctuations.

2.2 Theoretical Review

Cooperative Theory, originally advanced by Owen and later expanded by sociologists such as Durkheim, emphasizes the power of collective action in overcoming structural barriers that individuals cannot tackle alone. The theory posits that when people organize into cooperatives, they are able to reduce transaction costs, pool resources, share risks, and improve their overall access to information and markets (Chen, 2016). In the context of smallholder agriculture, this explains why cooperatives have become essential institutions for farmers who often lack the financial and bargaining power required to negotiate better terms with suppliers, buyers, and

financial service providers. Through shared ownership, joint decision-making, and collective bargaining, cooperatives help smallholders' secure affordable credit, negotiate fair prices, access timely inputs, and receive technical support, services that would otherwise be inaccessible or too costly for them as individuals. By lowering operational barriers and empowering farmers through solidarity and shared responsibility, Cooperative Theory provides a strong conceptual foundation for understanding why Agricultural Credit Cooperatives are often more effective in rural areas than traditional commercial banks.

Agency Theory offers a complementary perspective by explaining the role of information asymmetry and collateral in financial transactions. According to Jensen and Meckling (1976), lenders face significant risk when borrowers possess information that lenders cannot easily verify, such as expected yields, production practices, or likelihood of default. Because of this imbalance, lenders require credible collateral to reduce uncertainty and protect their investment. Warehouse Receipt Financing (WRF) directly aligns with Agency Theory because warehouse receipts act as verifiable, tangible collateral that both parties recognize and trust. The receipt certifies not only the quantity and quality of stored produce but also its market value, thereby reducing the need for lenders to rely solely on farmers' self-reported information. This minimizes risk, increases lending confidence, and enables farmers with limited physical collateral to access credit. By turning stored crops into a trusted financial instrument, WRF bridges a long-standing gap in agricultural finance and demonstrates how an Agency Theory lens can be applied to improve lending efficiency in smallholder systems.

2.3 Empirical Review

Global evidence consistently demonstrates that Agricultural Credit Cooperatives (ACCs) and Warehouse Receipt Financing (WRF) play a crucial role in easing liquidity constraints and stabilizing agricultural markets. International studies highlight that cooperative-based lending models reduce transaction costs, strengthen trust, and increase farmers' ability to adopt modern inputs and technologies (Berger & Udell, 1995). Empirical research across Asia and Latin America shows that WRF systems help mitigate price volatility by allowing farmers to store produce and access credit while waiting for favorable market prices (Miranda et al., 2019). These global findings align with Agency Theory, which argues that collateral substitutes, such as warehouse

receipts, reduce information asymmetry and encourage lending by offering reliable, verifiable security (Jensen & Meckling, 1976). This research reflects this same global consensus, noting that well-designed warehouse receipt systems “minimize liquidity restrictions, create incentives for investment, and enhance market connections”.

Regionally, empirical studies across Sub-Saharan Africa further confirm the importance of ACCs and WRF in transforming smallholder productivity. Research in Tanzania shows that warehouse receipt systems significantly increase farmers’ incomes, stabilize prices, and improve post-harvest management (Mapunda et al., 2018). Mardia et al. (2021) similarly found that farmers using warehouse receipts in Tanzania earned higher margins due to improved storage quality and better timing in market sales. Across West and Central Africa, cooperatives remain one of the most accessible sources of agricultural finance, often outperforming commercial banks in farmer outreach and credit affordability. This research echoes these findings by noting that WRF has proven effective across Ghana, Tanzania, and Indonesia in promoting price stabilization and post-harvest efficiency despite persistent challenges of poor infrastructure and high transaction costs. Within the African regional context, cooperatives serve not just as financial institutions but also as social and production hubs. Studies from Kenya, Ghana, and Nigeria consistently show that farmers who participate in credit cooperatives experience improved technical efficiency, higher yields, and expanded access to financial services (Chandio et al., 2021). Cooperatives enable resource pooling, group guarantees, and collective bargaining, mechanisms highlighted in Cooperative Theory, which emphasizes risk-sharing and democratic control (Chen, 2016). This research reinforces these insights by stating that ACCs significantly enhance productivity outcomes ($\beta = 0.211$, $p = 0.001$) because they offer “affordable loans, pooled resources, and reduced transaction costs” that empower farmers to invest in inputs, labor, and technologies that would otherwise remain inaccessible. Despite these benefits, governance inefficiencies, free-riding behaviour, and limited access to external capital still constrain the full impact of cooperatives in much of the region.

Locally, empirical findings from Nakuru County confirm that both credit cooperatives and warehouse receipt financing are statistically significant predictors of smallholder productivity. This research shows that WRF has the strongest effect of all financing mechanisms studied, with

a coefficient of $\beta = 0.265$ ($p < 0.001$), enabling farmers to access credit using stored produce as collateral and improving their ability to time the market strategically. Likewise, ACCs play a critical role by offering low-interest loans and improving farmers' cash flow throughout the production cycle. However, the study also notes that the effectiveness of these systems is limited by poor rural storage infrastructure, weak cooperative governance, and low awareness of warehouse receipt systems among farmers. These barriers mirror the broader regional challenges but also highlight specific local constraints, such as limited certified warehouses and inconsistent financial literacy that must be addressed for ACCs and WRF to reach their full transformative potential in Nakuru County.

3. Research Methodology

The study adopted a descriptive quantitative research design, which was appropriate for systematically examining the relationships between different agricultural financing mechanisms and smallholder farmers' productivity outcomes. This design allowed the researcher to capture measurable patterns, compare levels of access to financing tools, and quantify how specific mechanisms, such as cooperative credit or warehouse receipt financing, contributed to productivity variations across farming households. The target population consisted of 1,288 smallholder farmers in Nakuru County, representing diverse farming categories including dairy, horticulture, livestock, cereal, agroforestry, organic, commercial, and subsistence farming. To ensure fair representation across these heterogeneous groups, a stratified random sampling technique was employed, resulting in a final sample size of 272 respondents. Stratification helped minimize sampling bias and ensured that the responses reflected the realities of all major farming sub-sectors within the county.

Data were collected using a structured questionnaire designed to gather both demographic information and specific indicators related to agricultural financing. The instrument included sections on access to cooperative credit, affordability of interest rates, awareness of warehouse receipt financing, availability of certified storage facilities, and usage of warehouse receipts as collateral. Most items were measured using a five-point Likert scale to capture respondent perceptions, while other components required binary or categorical responses. Before full deployment, the questionnaire underwent a pilot test in a neighbouring farming community with

similar characteristics, enabling refinement of ambiguous items. Reliability testing using Cronbach’s alpha produced coefficients above .80 for all major constructs, indicating strong internal consistency and suitability for quantitative analysis.

Following data collection, responses were coded and entered into statistical software for cleaning and analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize farmers’ access levels, financing experiences, and perceptions of credit and warehouse receipt systems. To determine the extent to which financing mechanisms influenced productivity, the study employed multiple regression analysis. This inferential technique made it possible to assess the individual and combined effects of cooperative credit access, interest affordability, warehouse availability, and warehouse receipt utilization on productivity, while controlling for key demographic characteristics such as age, farm size, and farming experience. Ethical considerations, including informed consent, confidentiality, and voluntary participation, were strictly observed throughout the research process to ensure compliance with academic research standards.

4. Findings and Discussion

4.1 Descriptive Statistics

Table 1: Descriptive Statistics for Agricultural Credit Cooperatives

Statement	N	Minimum	Maximum	Mean	Std. Deviation
1. Improve smallholder farmers' access to affordable credit	272	1	5	3.73	0.887
2. Promote financial inclusion and empowerment of farmers	272	1	5	3.60	0.904
3. Encourage collective savings and risk-sharing among farmers	272	1	5	3.65	0.913

Table 1 shows descriptive statistics of agricultural credit cooperatives amongst 272 respondents in Nakuru County. Respondents concurred that credit cooperatives enhance access to affordable credit by smallholder farmers (mean = 3.73, SD = 0.887), financial inclusion and empowerment (mean = 3.60, SD = 0.904), and sharing risks and savings (mean = 3.65, SD = 0.913). The scores were above 3.6 suggesting that the perception of credit cooperatives was mostly positive as a

mechanism that makes financial accessibility and cooperative practices more effective among farmers. The SDs less than 1 indicate a moderate degree of agreement in the responses, which indicates similar experience among the participants. The implications of the findings are that agricultural credit cooperatives contribute to enhancing the financial ability of farmers and empowering them as well as collective risk management which are crucial in increasing the smallholder productivity and resilience in Nakuru County.

4.2 Regression Findings

Table 2: Regression Coefficients for Predicting Smallholder Farmers’ Productivity

Model	Variable	B	Std. Error	Beta	t	Sig.
1	(Constant)	0.409	0.164		2.499	0.013
	Agricultural Credit Cooperatives	0.219	0.059	0.211	3.706	0.000

Note. a = Dependent Variable: Smallholder Farmers’ Productivity.

Table 2 shows the regression coefficients of predicting the productivity of smallholder farmers using four agricultural financing mechanisms. The constant (intercept) = 0.409 (p=0.013) represents the level of productivity the country has when all the predictors take the value of zero. The effect was positive and significant. Agricultural credit cooperatives (B = 0.219, 0.211, p < 0.001) and warehouse receipt financing (B = 0.267, 0.265, p < 0.001) are also important in terms of productivity. Ultimately, these findings validate that the availability of agricultural credit cooperatives has a positive and significant effect on the productivity of smallholder farmers in Nakuru County.

5. Conclusion and Recommendations

5.1 Conclusion

The study concludes that Agricultural Credit Cooperatives and Warehouse Receipt Financing significantly contribute to smallholder farmers’ productivity in Nakuru County. Cooperatives improve liquidity and facilitate timely purchase of agricultural inputs, while WRF helps farmers stabilize incomes by avoiding distress selling during harvest periods. However, limited warehouse

availability, governance challenges in cooperatives, and low farmer awareness constrain the full potential of these financing mechanisms.

5.2 Recommendations

Improving the effectiveness of Agricultural Credit Cooperatives and Warehouse Receipt Financing calls for a practical, people-centered approach that strengthens both systems and farmer capacity. Cooperate governance needs to be enhanced, particularly by equipping leaders with stronger financial management skills and promoting transparency so that members feel confident in how their resources are handled. At the same time, there is a clear need to expand certified warehouse infrastructure, and this can be achieved through partnerships between county governments and private investors to ensure that more farmers have access to safe, reliable storage facilities. Modernizing the system by digitizing warehouse receipts, whether through block chain or electronic platforms, would also make transactions more secure, reduce fraud, and simplify the process of accessing credit. Integrating WRF into national food reserve programs could further stabilize prices and reassure farmers that holding their produce is worthwhile, not risky. Farmer training and sensitization on credit literacy, grain quality standards, and receipt-based financing is essential to ensure that farmers fully understand and confidently utilize these tools to improve their productivity and income.

References

- Aboagye, A. (2023). Warehouse receipt financing in African grain markets: Constraints and opportunities. *Journal of Agricultural Economics and Development*, 14(2), 45–59.
- Berger, A. N., & Udell, G. F. (1995). Relationship lending and lines of credit in small firm finance. *Journal of Business*, 68(3), 351–381.
- Chandio, A. A., Jiang, Y., & Rehman, A. (2021). Impact of formal credit on agricultural productivity in Pakistan. *Journal of Asian Economics*, 74, 101–327.
- Chen, M. (2016). Collective action and cooperative structures in agricultural markets. *International Journal of Rural Sociology*, 61(3), 377–395.
- Durkheim, E. (2014). *The division of labor in society*. Free Press. (Original work published 1893)
- Jensen, M. C., & Meckling, W. (1976). Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.

- Khafagy, A. (2019). Credit cooperatives and rural financial inclusion in Sub-Saharan Africa. *Journal of Development Finance*, 10(1), 41–57.
- Mapunda, G., Rweyemamu, D., & Kiwia, H. (2018). Warehouse receipt systems and agricultural performance in Tanzania. *African Journal of Economic Review*, 6(1), 83–102.
- Mardia, K., Munishi, J., & Isaya, E. (2021). Revenue and income outcomes of warehouse receipt systems among maize farmers in Tanzania. *Journal of Agricultural Policy and Economics*, 9(3), 114–130.
- Miranda, M., Mulangu, F., & Kemeze, E. (2019). Warehouse receipts and food security in Sub-Saharan Africa. *World Bank Policy Research Working Paper*, No. 8984.
- Siedlecki, S. L. (2020). Understanding descriptive research designs. *Nursing Science Quarterly*, 33(4), 415–420.
- Wanzala, M., Mutai, S., & Kibet, P. (2024). Credit access and productivity outcomes among coffee farmers in Kenya. *Journal of Agricultural Finance and Cooperative Development*, 7(1), 55–73.
- Zabatantou Louyindoula, M., Malonga, P., & Mukendi, T. (2023). Credit access and agricultural productivity among smallholders in Congo. *International Journal of Agricultural Economics*, 8(4), 175–189.