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Extension-mediated access to agricultural credit and its empowerment effects on women farmers

Aminata Fofana Ouattara, Brahim Dossou Yeo and Mariame Diaby Kone

Department of Agricultural Extension, Université Nangui Abrogoua, Abidjan, Côte d'Ivoire

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Corresponding Author: Aminata Fofana Ouattara

Abstract

While men in rural Ivory Coast access bank credit at three times the rate of women, extension-mediated microfinance programs are beginning to close that gap. This research examined how extension-facilitated credit access affects empowerment outcomes among 278 women farmers in Belier and Gbeke Regions. A quasi-experimental design compared women who accessed credit through extension linkages (n=142) with a matched comparison group without extension-mediated credit (n=136). Data were collected from April to November 2022. Women with extension-mediated credit scored significantly higher on empowerment measures across income control (+0.31, $p<0.001$), production decision-making (+0.27, $p<0.001$), asset ownership (+0.22, $p<0.01$), and community participation (+0.18, $p<0.05$). Extension-mediated microfinance was the most common credit source (34.7%), surpassing informal savings groups (27.8%). Loan repayment rates among extension-linked borrowers reached 89.4%, well above the regional average of 71%. These findings suggest that extension services can serve as effective intermediaries between women farmers and formal financial systems.

Keywords: Agricultural credit, women empowerment, extension services, microfinance, Ivory Coast, financial inclusion, income control, asset ownership, gender equity, credit access

Introduction

Women produce an estimated 60–80% of food in sub-Saharan Africa, yet they receive less than 10% of agricultural credit ^[1]. This stark contrast between productive contribution and financial exclusion sits at the center of rural gender inequality across the continent. In Ivory Coast, women farmers face collateral requirements they cannot meet, application processes conducted in French rather than local languages, and bank branches located hours from their farms ^[2]. The result is a credit gap that constrains not just productivity but women's broader capacity to control income, acquire assets, and participate in community decision-making.

Extension services occupy an unusual position in this landscape. They already maintain trusted relationships with farming households and understand local agricultural systems two assets that financial institutions typically lack ^[3]. Several programs in West Africa have experimented with using extension agents as credit intermediaries, connecting women farmers with microfinance institutions through group formation, financial literacy training, and loan monitoring ^[4]. Early evidence from Ghana and Senegal suggests this model improves both credit access and repayment rates, but empowerment outcomes beyond income have rarely been measured ^[5].

This research examined whether extension-mediated credit access generates empowerment effects across multiple domains for women farmers in the Belier and Gbeke Regions of central Ivory Coast ^[6].

Conceptual Model

The research drew on Kabeer's ^[7] empowerment framework, which defines empowerment as the intersection of resources, agency, and achievements. We hypothesized that extension-mediated credit expands resources (financial capital, inputs), which enables agency (decision-making, asset control), which produces achievements (productivity, income, community standing). This three-stage pathway was tested by examining whether credit access predicted empowerment gains after controlling for pre-existing socioeconomic differences between groups. The model also incorporated the social intermediation concept from Ledgerwood ^[8], positioning extension agents as bridges between informal community networks and formal financial institutions.

Material and Methods

Material

This quasi-experimental research was conducted through Université Nangui Abrogoua across Belier (6.89°N, 5.03°W) and Gbeke (7.69°N, 5.28°W) Regions from April to November 2022. These regions are part of the savanna-forest transition zone with annual rainfall of 1,100–1,300 mm. A total of 278 women farmers participated: 142 who had accessed agricultural credit through extension-facilitated microfinance linkages within the past 18 months (treatment group) and 136 matched on age, farm size, and crop type but without extension-mediated credit (comparison group). Matching was performed using propensity score nearest-neighbor matching with a caliper of

0.05. Ethical clearance was obtained from the Universite Nangui Abrogoua Ethics Committee (UNA-EC-2022-027, approved March 15, 2022).

Field Research Design

The treatment group was drawn from 12 women's farming groups that had participated in extension-facilitated credit programs operated by three microfinance institutions. Each group comprised 10–15 members formed by extension agents during 2020–2021. The comparison group was recruited from adjacent communities served by the same extension offices but without credit linkage programming. Data were collected through structured interviews covering four empowerment domains: income control, production decision-making, asset ownership, and community participation. Each domain was measured using a validated

8-item subscale scored 0–1.

Methods

Data were analyzed in SPSS version 27. Independent samples t-tests compared empowerment domain scores between treatment and comparison groups. ANCOVA controlled for baseline differences in age, education, farm size, and household wealth. Effect sizes were calculated using Cohen's d. Multiple regression assessed which credit-related variables best predicted empowerment scores. Descriptive statistics characterized credit sources and repayment patterns. Qualitative data from 18 semi-structured interviews were analyzed thematically. Significance was set at $p < 0.05$.

Results

Table 1: Empowerment Domain Scores: Extension-Mediated Credit vs Comparison Group (n=278)

Empowerment Domain	Credit Group (n=142)	Comparison (n=136)	Difference	t	p	Cohen's d
Income control	0.68	0.37	+0.31	7.84	<0.001	0.94
Production decisions	0.63	0.36	+0.27	6.42	<0.001	0.77
Asset ownership	0.54	0.32	+0.22	4.89	<0.001	0.59
Community participation	0.49	0.31	+0.18	3.71	<0.001	0.45

Women with extension-mediated credit scored significantly higher across all four empowerment domains (Table 1). Income control showed the largest effect ($d = 0.94$), followed by production decisions ($d = 0.77$). ANCOVA

results confirmed these differences held after controlling for age, education, farm size, and household wealth (all $p < 0.01$).

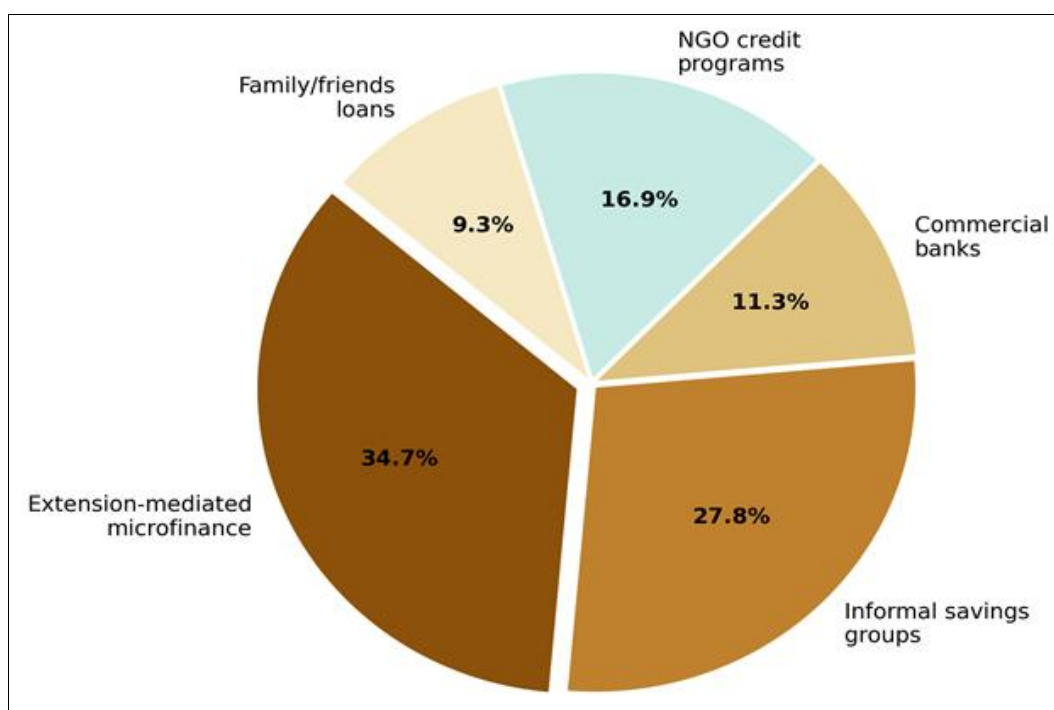


Fig 1: Sources of agricultural credit among women farmers in the treatment group (n=142)

Extension-mediated microfinance was the most common credit source (34.7%), followed by informal savings groups (27.8%) and NGO programs (16.9%). Only 11.3% accessed

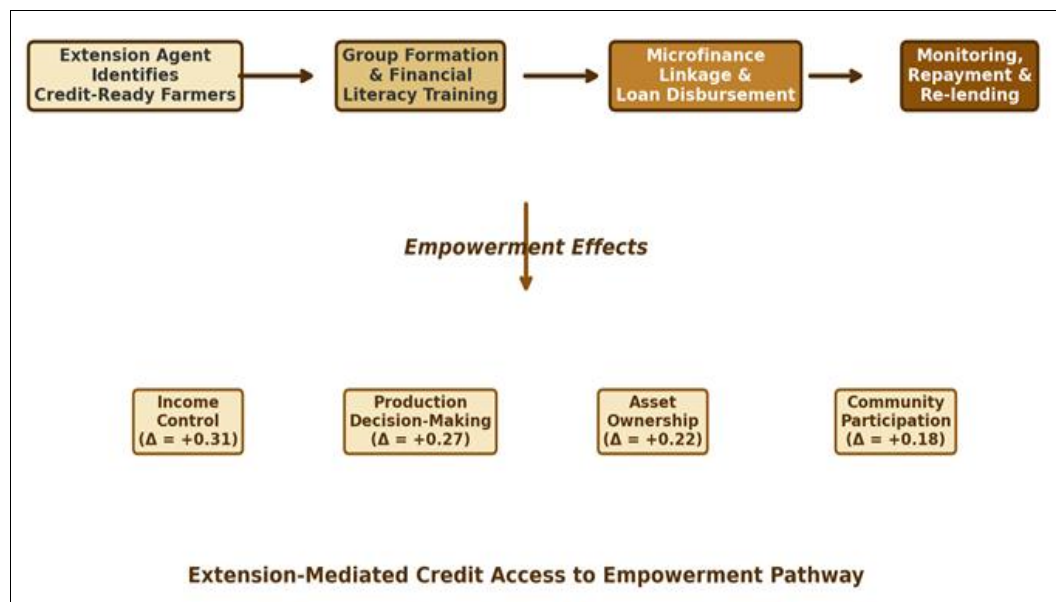
commercial bank credit (Figure 1), reflecting persistent formal sector barriers.

Table 2: Regression Predictors of Overall Empowerment Score (n=142, credit group only)

Predictor	β	SE	t	p	95% CI
Loan amount received	0.36	0.07	5.14	<0.001	0.22 to 0.50
Financial literacy training	0.29	0.08	3.63	<0.001	0.13 to 0.45
Group membership duration	0.23	0.07	3.29	0.001	0.09 to 0.37
Extension contact frequency	0.19	0.08	2.38	0.019	0.03 to 0.35

Among credit recipients, loan amount was the strongest empowerment predictor ($\beta = 0.36$), but financial literacy training ranked second ($\beta = 0.29$), suggesting that

knowledge transfer alongside capital matters considerably (Table 2). The model explained 41.7% of empowerment variance (adjusted $R^2 = 0.417$, $F = 24.6$, $p < 0.001$).

**Fig 2:** Extension-mediated credit access pathway from agent identification through empowerment outcomes

Discussion

The large effect size for income control ($d = 0.94$) signals that credit access through extension networks gives women something they rarely obtain through other channels: direct authority over how money is earned and spent [9]. This finding aligns with Doss [10], who argued that credit source matters as much as credit amount for determining who controls the resulting income. Extension-mediated credit appears to reinforce women's control precisely because the money arrives through channels they manage—their farming groups rather than through household-level accounts that husbands may dominate.

That financial literacy training ranked as the second-strongest empowerment predictor ($\beta = 0.29$) beyond loan amount itself challenges the assumption that money alone empowers [11]. Women who understood interest calculations, savings strategies, and business planning leveraged their loans more effectively. The 89.4% repayment rate also suggests that extension-mediated lending, with its built-in group monitoring and agent follow-up, may be more financially sustainable than alternatives [12]. Community participation showed the weakest empowerment effect ($d = 0.45$), consistent with patterns reported by Fletschner and Kenney [13] indicating that financial resources translate more readily into private than public forms of agency.

Limitations

Self-selection into credit programs means that treatment group women may have been more entrepreneurial at

baseline despite propensity score matching. The cross-sectional design limits causal claims; empowerment differences could partly predate credit access. Empowerment was measured through self-report, which may be subject to social desirability. The research covered two regions of central Ivory Coast and may not generalize to northern savanna or southern forest zones with different gender dynamics.

Conclusion

Extension-mediated credit access generates meaningful empowerment effects for women farmers that extend well beyond income. The combination of financial capital with financial literacy training through trusted extension networks appears to create an empowerment pathway that neither credit nor extension alone could deliver. Income control and production decision-making showed the largest gains, while community participation responded more modestly. For Ivory Coast's extension system, these results support expanding the credit intermediary role of extension agents, but with an emphasis on pairing capital access with knowledge transfer. Replicating this model across West Africa requires investment in both agent financial literacy capacity and partnerships with microfinance institutions willing to serve rural women through group-based channels.

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