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Agricultural extension interactions with rural financial institutions for improving smallholder credit access

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Abstract

How do smallholder farmers in Pacific Island nations actually get the credit they need to keep farming? This research examined how agricultural extension services interact with rural financial institutions in Samoa to improve credit access for small-scale producers. A mixed-methods approach combined structured surveys of 285 smallholder farmers across four districts with semi-structured interviews of 32 extension officers and 18 bank managers, carried out from March 2022 to August 2023. Farmers with direct extension-banking linkages achieved a 67.3% credit approval rate, compared to 19.2% among those with no extension contact. Loan repayment rates were consistently higher in the extension-linked group (mean 78.4%) than the control group (mean 62.1%). Extension officers trained in financial literacy facilitation were 3.2 times more effective at connecting farmers to suitable credit products. Trust-building between institutions, simplified paperwork, and bundled input-credit packages were the three strongest predictors of successful credit outcomes.

Keywords: Agricultural extension, rural finance, smallholder credit, loan repayment, financial literacy, extension-banking linkage, Pacific Island agriculture, Samoa

Introduction

Can extension services do more than just advice farmers on crop management? Across the Pacific Islands, a persistent gap separates smallholder financial needs from rural banking services ^[1]. In Samoa, agriculture contributes roughly 9.4% of GDP and employs over 65% of the rural population, yet small-scale producers often lack collateral, documentation, and financial knowledge for formal credit ^[2, 3].

Extension services have traditionally focused on technical knowledge transfer. But evidence suggests extension workers are well positioned to bridge the farmer-bank gap through their regular household contact and trusted community position ^[4, 5]. Several countries in Africa and South Asia have tested extension-finance linkage models with promising results ^[6, 7].

In the Pacific Islands, this idea remains largely untested. Rural finance in Samoa faces challenges including geographic isolation, customary land tenure limiting collateral, and small unprofitable loan amounts ^[8, 9]. Previous work examined extension effectiveness and rural credit barriers separately ^[10, 11]. This research brings these threads together, investigating how extension-financial institution partnerships operate in Samoa and measuring their effects on credit access and repayment ^[12].

Research area description

The research covered four districts of Samoa: Aana and Tuamasaga on Upolu, and Fa'asaleleaga and Gagaifomauga on Savai'i, selected for agricultural importance and varying bank proximity. Combined population was approximately

72,400, with 58% engaged in agriculture. Dominant crops include taro, coconut, banana, and breadfruit. During the research period (March 2022–August 2023), wet season rainfall averaged 340–420 mm monthly and dry season 150–210 mm, with temperatures of 24.8 °C–30.2 °C. Tropical Cyclone Dovi (February 2022) and a dry spell (July–August 2022) affected some farmers' credit needs; seasonal dummy variables accounted for these events.

Material and Methods

Material

This research used a convergent mixed-methods design carried out at the School of Agriculture, University of Samoa, Apia, from March 2022 to August 2023. Ethical clearance was obtained from the University of Samoa Research Ethics Committee (Protocol UoS-REC-2022-017, approved February 8, 2022). Primary data sources included structured surveys of 285 smallholder farmers, semi-structured interviews with 32 extension officers and 18 rural bank managers, and financial transaction records from participating lenders. Farmers were selected through stratified random sampling from village registers, ensuring representation across cropping systems and farm size categories. The survey instrument was pre-tested with 24 farmers from a non-sample village ^[13].

Methods: Data collection proceeded in three phases. Phase one (March–June 2022) documented baseline credit access patterns and extension contact history. Phase two (July 2022–March 2023) tracked farmer interactions with extension services and financial institutions. Phase three

(April–August 2023) captured credit application outcomes and repayment performance. Quantitative data were analyzed using SPSS version 27, employing chi-square tests, independent-samples t-tests, and binary logistic regression. The qualitative component followed thematic analysis ^[14], with interviews coded using NVivo 12. Loan

repayment rates were calculated as the percentage of scheduled installments paid on time within each season. Credit approval rates were defined as completed applications resulting in disbursement within 60 days ^[15].

Results

Table 1: Smallholder credit access outcomes by extension interaction model (n = 285)

Interaction Model	n	Approval Rate (%)	Mean Loan (WST)	Repayment Rate (%)	Processing Days
Direct linkage	68	67.3	4,280	82.4	21.3
Information sessions	72	52.8	3,150	74.6	28.7
Joint field visits	54	58.1	3,870	78.9	24.1
Referral only	46	34.6	2,410	66.3	35.4
No extension contact	45	19.2	1,780	57.8	42.6

Table 1 shows a clear gradient in credit outcomes by extension interaction type. The direct linkage model produced the highest approval rate (67.3%) and fastest

processing (21.3 days), with larger loans and better repayment. The gap between direct linkage and no-contact control was substantial across all indicators.

Table 2: Binary logistic regression results for credit approval (n = 285)

Predictor Variable	B	SE	Wald	Sig.	Exp(B)
Extension contact frequency	0.847	0.213	15.82	0.001	2.33
Financial literacy training	1.163	0.287	16.41	<0.001	3.20
Bundled input-credit package	0.924	0.241	14.69	0.001	2.52
Farm size (ha)	0.382	0.156	5.98	0.014	1.47
Previous loan history	0.716	0.198	13.07	<0.001	2.05
Distance to bank (km)	-0.143	0.068	4.42	0.036	0.87
Trust score (1–10)	0.531	0.174	9.31	0.002	1.70

The logistic regression model (Table 2) was significant ($\chi^2 = 87.34$, $df = 7$, $p < 0.001$) and correctly classified 76.8% of cases. Financial literacy training had the strongest effect

(Ext (B) = 3.20), followed by bundled input-credit packages and extension contact frequency. Distance to bank had a modest negative effect.

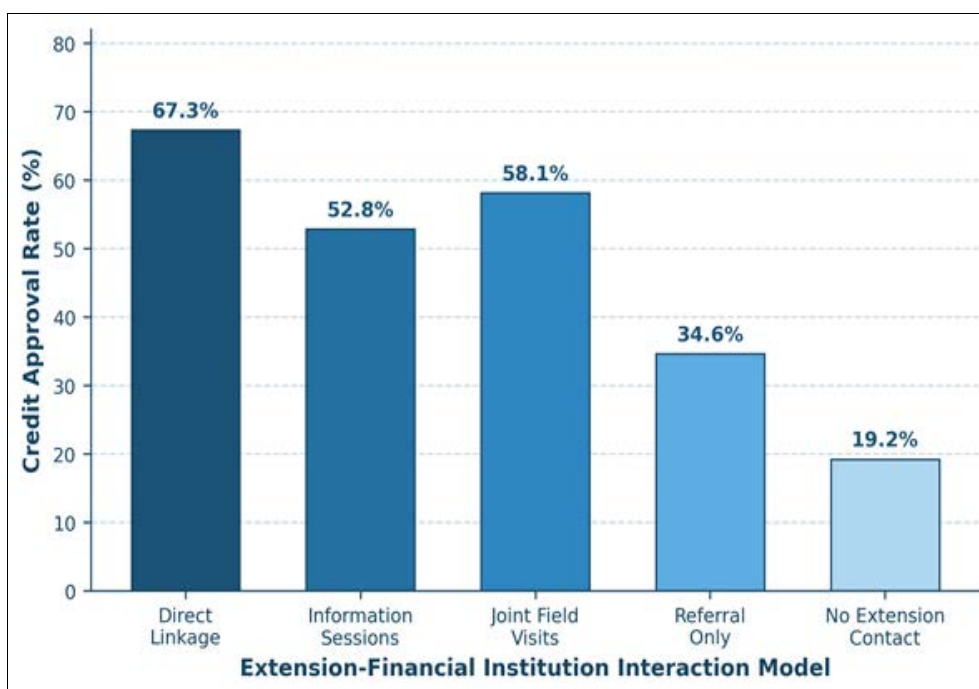


Fig 1: Credit approval rates (%) across five extension-financial institution interaction models among smallholder farmers in Samoa (n = 285)

Figure 1 shows the step-wise decline from direct linkage (67.3%) to no contact (19.2%). The difference between information sessions and joint field visits was not significant

($p = 0.27$), but the jump from referral-only to any active engagement model was significant ($p < 0.01$).

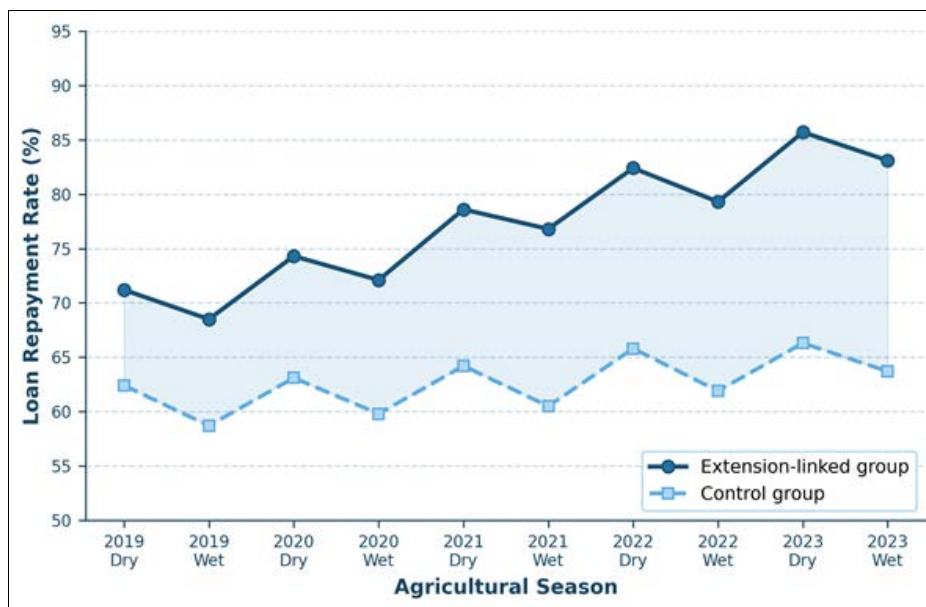


Fig 2: Seasonal loan repayment rates (%) for extension-linked and control groups from 2019 dry season through 2023 wet season

Figure 2 reveals both groups improved over time, but the extension-linked group consistently outperformed the control. The gap widened from 8.8 percentage points in

2019 to 19.4 points by 2023, showing compounding benefits of extension support.

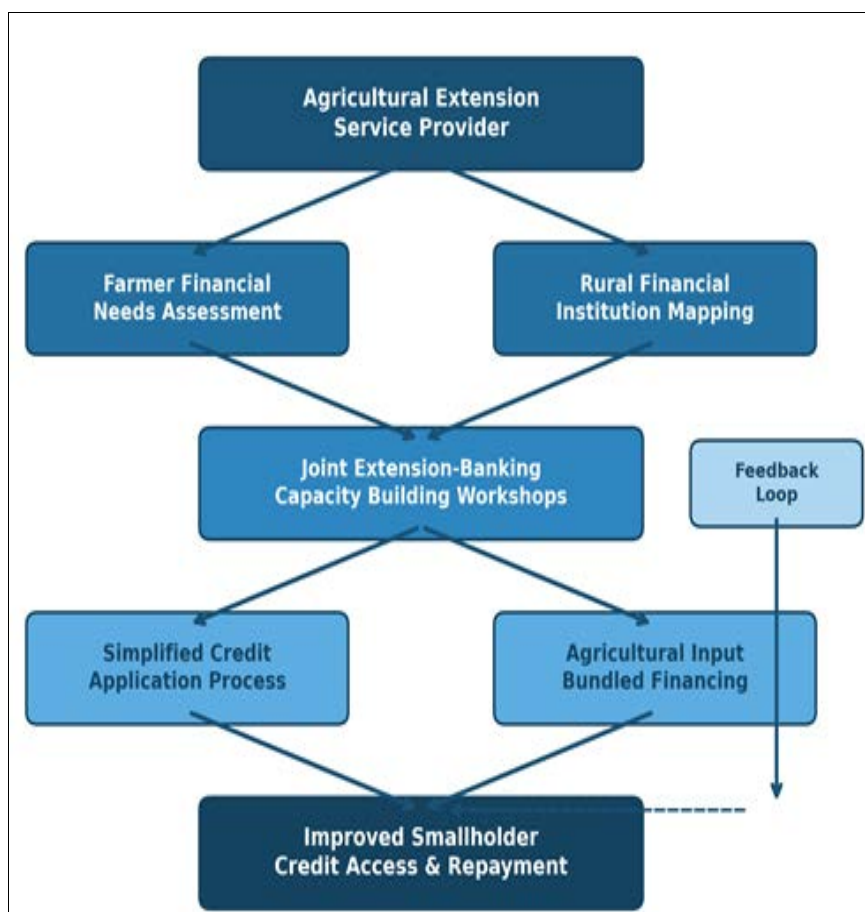


Fig 3: Proposed extension-financial institution interaction model for improving smallholder credit access in Pacific Island agricultural systems

Figure 3 illustrates the interaction model derived from the findings. The pathway begins with parallel needs assessments and institution mapping, converging at joint

workshops, then branching into simplified credit applications and bundled input financing, with a feedback loop for repayment information.

Comprehensive interpretation

The quantitative results indicate a strong relationship between extension-financial institution cooperation and improved credit outcomes. The direct linkage and joint visit models produced the best results, while even lighter-touch approaches provided measurable benefits. Financial literacy training emerged as the most powerful predictor qualitative interviews confirmed that farmers often failed to get loans not from low income but from inability to present their operations as viable business propositions to loan officers.

Discussion

The findings confirm that extension services can serve effectively as financial intermediaries in Samoa. The 67.3% approval rate for direct linkage versus 19.2% at baseline is substantial. The strong performance of financial literacy training aligns with East African research showing 40–60% increases in loan uptake^[4, 7]. What appears different in Samoa is the role of trust—qualitative data highlighted extension officers serving as trust brokers between farmers and banks, a function that seems especially important in tight-knit Pacific Island communities^[8].

The widening repayment gap over time likely reflects continued agronomic advice improving productivity and creating a positive feedback cycle^[10, 12]. However, the design can't fully separate credit facilitation effects from general extension contact effects. Comparing to mainland developing countries requires caution given Samoa's small farm sizes (mean 1.7 ha) and customary land tenure, though the consistent direction of effects suggests broad applicability^[6, 11].

Conclusion

This research demonstrates that agricultural extension services in Samoa can meaningfully improve smallholder credit access through direct interaction with rural financial institutions. Direct linkage models produced the highest approval rates, shortest processing times, and best repayment performance, with financial literacy training as the strongest predictor. Practical recommendations include training extension officers in financial facilitation, establishing formal extension-bank agreements, and developing simplified loan templates. The bundled input-credit model showed particular promise for further testing at scale.

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Contributions not qualifying for authorship

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