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Extension strategies for promoting crop insurance adoption among risk-averse smallholder farming households

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Abstract

When a severe drought struck Eswatini's Lubombo region in 2016, barely 4% of affected smallholders held any form of crop insurance—a figure that underscored just how far risk transfer tools had to travel before reaching the farmers who needed them most. This research assessed how extension service strategies influenced crop insurance adoption and willingness to adopt among 204 risk-averse smallholder households in the Manzini and Lubombo regions of Eswatini. Data were collected through structured surveys from January to July 2022. Results indicated that current insurance adoption stood at only 21.6% across the sample, but willingness to adopt reached 51.5% among farmers with regular extension contact. Extension contact frequency was positively associated with both adoption ($r = 0.57$, $p < 0.01$) and willingness ($r = 0.63$, $p < 0.01$). Premium cost and lack of awareness were the two most cited barriers among non-adopters. Farmers who received extension advisory combined with insurance subsidy information showed the highest adoption rates (54.3%). The findings point to extension services as a viable channel for bridging the insurance awareness and trust gaps that limit smallholder uptake.

Keywords: Crop insurance, extension strategies, smallholder farmers, risk aversion, insurance adoption, premium cost, Eswatini, agricultural risk management, extension advisory, willingness to pay

1. Introduction

Consider a maize farmer in rural Eswatini who loses half her harvest to drought every three to four years. She knows the pattern, expects it, and yet has never purchased crop insurance. Her situation is not unusual—across sub-Saharan Africa, crop insurance penetration among smallholder's remains below 3%, despite decades of promotional efforts by governments and development agencies ^[1, 2]. The gap between the availability of insurance products and their uptake has puzzled researchers and policy makers alike. Several barriers have been identified in the literature: high premium costs relative to farmer income, lack of awareness about available products, distrust of insurance providers, complex enrolment procedures, and delayed claim payouts ^[3, 4]. Extension services, which maintain regular face-to-face contact with farming communities, are well positioned to address at least the awareness and trust barriers. But few evaluations have tested whether specific extension strategies actually move the needle on insurance adoption among risk-averse populations ^[5].

In Eswatini, smallholder agriculture accounts for roughly 70% of the rural population's livelihood, and climate variability poses a growing threat to maize and cotton production ^[6]. The National Agricultural Marketing Board introduced a subsidized crop insurance scheme in 2018, yet uptake has been slow. Extension agents in the Manzini and Lubombo regions were tasked with promoting the scheme, but no assessment of their effectiveness has been published ^[7]. This research aimed to evaluate how extension contact

frequency and advisory content influenced crop insurance adoption and willingness to adopt among risk-averse smallholder households. The objectives were:

- To measure adoption and willingness rates across extension contact levels,
- To identify perceived barriers, and
- To assess extension strategy effectiveness ^[8].

Theoretical framework

This research was grounded in the Protection Motivation Theory (PMT), which explains protective behavior as a function of threat appraisal (perceived severity and vulnerability) and coping appraisal (perceived efficacy and self-efficacy) ^[9]. In the crop insurance context, farmers must perceive both the threat of crop loss and the effectiveness of insurance as a response. Extension advisory was positioned as the mechanism that enhances coping appraisal by increasing farmers' understanding of insurance benefits and reducing perceived complexity. The framework also drew on the theory of planned behavior to account for subjective norms and perceived behavioral control in adoption decisions ^[10].

Instrument development

A 42-item questionnaire was developed covering insurance awareness, adoption status, willingness to adopt, perceived barriers (6-item scale, Cronbach's $\alpha = 0.79$), risk aversion (assessed through a hypothetical lottery choice task), and extension contact history. Content validity was established

through review by three agricultural economists at the University of Eswatini and two officers from the National Agricultural Marketing Board. A pilot test with 18 farmers in the Manzini peri-urban zone led to simplification of two barrier items. The instrument was administered in siSwati [11].

Material and methods

Material

A cross-sectional survey was administered to 204 smallholder farming households across the Manzini and Lubombo regions from January to July 2022. Respondents were sampled from chiefdom-level farmer registries using stratified random selection based on distance from the nearest extension office. Inclusion criteria required active cultivation of at least 0.5 hectares of maize or cotton. The sample included both insurance adopters ($n = 44$) and non-adopters ($n = 160$). Secondary data on the national crop

insurance scheme were obtained from the National Agricultural Marketing Board. Ethical clearance was obtained from the University of Eswatini Research Ethics Board (Protocol UNISWA-REB/2021-093, dated December 10, 2021) [12].

Methods

Descriptive statistics summarized adoption rates, willingness, and barrier scores. Chi-square tests compared adoption across four extension contact categories. Pearson correlations measured associations between extension contact frequency and both adoption and willingness. Binary logistic regression modeled adoption as a function of extension contacts, risk aversion score, farm size, education, and awareness of subsidies. Barrier scores were compared between adopters and non-adopters using independent t-tests. Data were analyzed using SPSS version 26 [13].

Results

Table 1: Crop insurance adoption and willingness by extension contact frequency ($n = 204$)

Extension contact	n	Adoption (%)	Willingness (%)	χ^2 adopt	p-value
No contact	51	7.4	22.1		
1-2 visits/year	58	19.8	41.7		
3-4 visits/year	54	38.6	63.2		
5+ visits/year	41	54.3	78.9		
Overall	204	21.6	51.5	38.47	<0.001**

** $p < 0.01$. Both adoption and willingness showed a clear dose-response relationship with extension contact frequency

Table 2: Logistic regression predictors of crop insurance adoption

Predictor	B	S.E.	Wald	Sig.	Exp(B)	95% CI
Extension contacts/yr	0.682	0.174	15.37	<0.001**	1.98	1.41-2.78
Subsidy awareness	1.243	0.348	12.76	<0.001**	3.47	1.75-6.87
Risk aversion score	-0.418	0.162	6.66	0.010*	0.66	0.48-0.91
Education (years)	0.194	0.081	5.74	0.017*	1.21	1.04-1.42
Farm size (ha)	0.137	0.094	2.12	0.145	1.15	0.95-1.38

* $p < 0.05$; ** $p < 0.01$. Nagelkerke $R^2 = 0.387$. Subsidy awareness was the strongest single predictor, followed by extension contacts

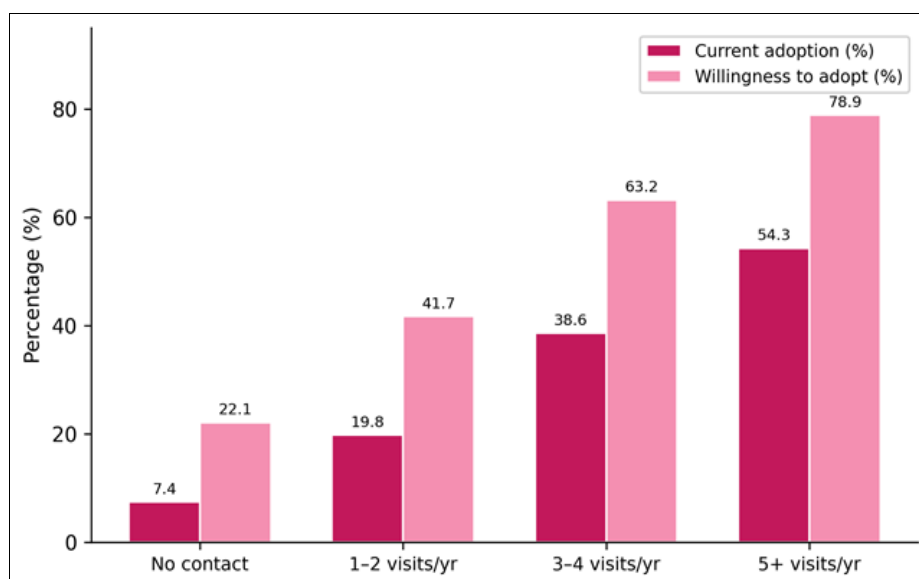


Fig 1: Current crop insurance adoption and willingness to adopt across four extension contact frequency categories

The gap between willingness and actual adoption was widest among farmers with moderate contact (1-4 visits),

suggesting that willingness exists but conversion to action requires additional push factors such as subsidy linkage.

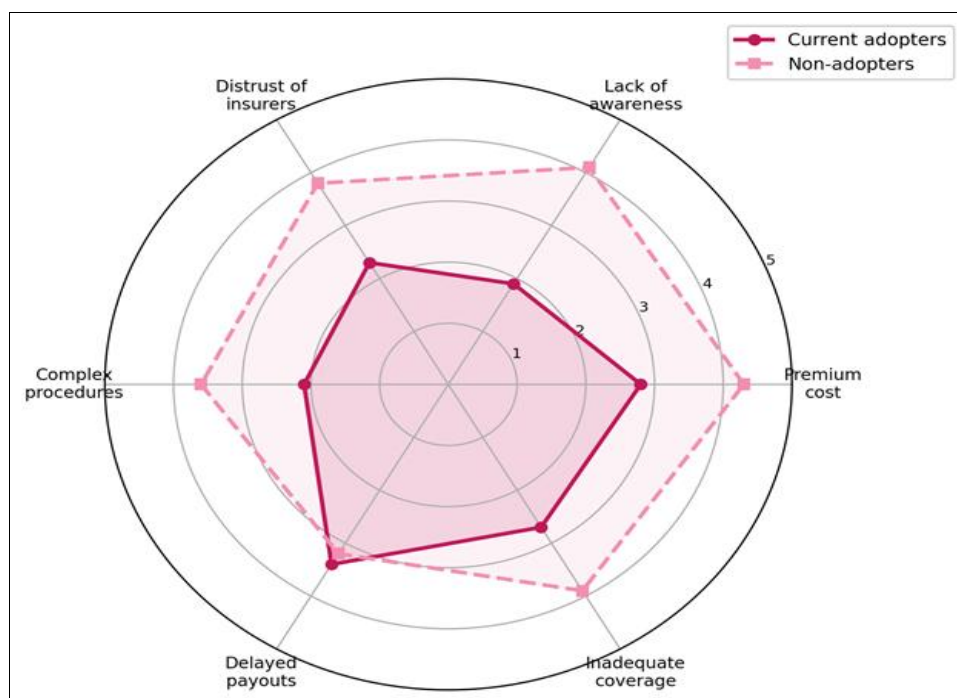


Fig 2: Perceived barrier scores (1-5 scale) across six barrier domains for current adopters versus non-adopters

Non-adopters scored higher on every barrier dimension, with premium cost (4.3) and lack of awareness (4.1) most pronounced. Adopters rated delayed payouts (3.4) as their

top concern, suggesting post-adoption dissatisfaction with claims processing.

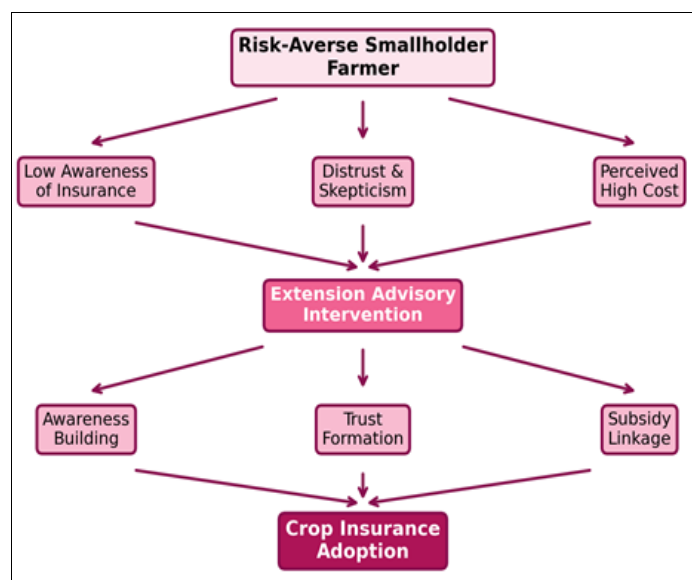


Fig 3: Proposed mechanism through which extension advisory addresses farmer barriers and promotes crop insurance adoption

The mechanism model maps three farmer barriers—low awareness, distrust, and perceived high cost—to three extension responses: awareness building, trust formation, and subsidy linkage, converging into adoption.

Comprehensive interpretation

Extension contact frequency and subsidy awareness were the two strongest drivers of insurance adoption. The barrier profile differences between adopters and non-adopters indicate that extension efforts should target awareness and cost perceptions while also addressing post-adoption service quality concerns.

Discussion

The finding that subsidy awareness was the strongest predictor of adoption ($\text{Exp (B)} = 3.47$) has direct policy relevance. Many farmers in the sample didn't know that premium subsidies existed, even when subsidies had been available for over three years [7]. This awareness failure suggests that the information channel—not the subsidy itself—was the binding constraint. Extension agents who combined insurance education with specific subsidy details achieved the highest conversion rates, a pattern consistent with findings from index insurance pilots in Kenya and Ethiopia [14, 15].

Risk aversion, measured through lottery choice tasks, had a negative effect on adoption, which seems counterintuitive since risk-averse individuals should theoretically value insurance more. But this paradox has been documented before: highly risk-averse farmers are also reluctant to spend scarce cash on an unfamiliar product whose payoff is uncertain ^[16]. The trust gap evident in the radar chart reinforces this-non-adopters rated distrust of insurers at 3.8 out of 5. Extension agents, as trusted local intermediaries, may be the only credible bridge between skeptical farmers and insurance providers ^[17]. The willingness-adoption gap at moderate contact levels indicates that awareness alone isn't enough; hands-on enrollment support and premium subsidy linkage are needed to convert interest into action ^[18].

Conclusion

This research shows that extension services can meaningfully promote crop insurance adoption among risk-averse smallholder farmers, but only when advisory efforts go beyond general awareness to include specific subsidy information and enrollment support. Farmers with five or more annual extension contacts adopted insurance at seven times the rate of those with no contact. Premium cost and lack of awareness were the dominant barriers among non-adopters, both of which are addressable through well-designed extension strategies.

Extension programs in Eswatini and comparable smallholder settings should train agents to deliver insurance-specific content alongside their routine agronomic advisory. Linking extension visits to enrollment windows and subsidy applications could help close the willingness-adoption gap that this research identified. Insurance providers, for their part, should invest in improving claims processing speed, since delayed payouts emerged as the top concern even among current adopters.

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Contributions not qualifying for authorship

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