JRIIE Journal of Research Innovation and Implications in Education
Center for Research Implications & Practice

Website: www.jriiejournal.com ISSN 2520-7504 (Online) Vol.10, Iss.4, 2026 (pp. 1963 - 1974)

Product Differentiation Strategy and Insurance Penetration among Agricultural Cooperatives under MINAGRI in Rwanda

Gato Johnan and Martin Kimemia
Mount Kigali University, Rwanda
Email: gatojohnan55@gmail.com

Abstract: *Insurance penetration in Rwanda remains low relative to the country's level of financial inclusion. Agricultural cooperatives under the Ministry of Agriculture and Animal Resources continue to report enrolment far below national targets, despite the availability of subsidised agricultural insurance products. This study examined the influence of product differentiation strategy on insurance penetration among agriculture cooperatives under MINAGRI in Rwanda. The study was guided by the Diffusion of Innovations Theory, with Expected Utility Theory and Institutional Theory providing complementary interpretation. A descriptive cross-sectional design was adopted. The target population comprised 537 individuals drawn from cooperative leaders, administrative personnel, enrolled members and non-enrolled members. Yamane's formula yielded a sample of 229 respondents, selected through proportionate stratified random sampling and purposive sampling; 220 (96.1%) returned usable questionnaires. Data were collected using structured questionnaires, semi-structured interviews, key informant interviews, observation checklists and document review. Analysis used descriptive statistics, Pearson correlation and multiple regression in SPSS version 27, complemented by thematic analysis of interview data. Product differentiation strategy recorded a grand mean of 4.11 (SD = 0.93), indicating strong respondent agreement that customized, simple and risk-specific products encourage enrolment. The strategy correlated strongly and positively with insurance penetration ($r = .781$, $p < .001$). It was the strongest predictor in the regression model ($\beta = 0.401$, $t = 6.621$, $p < .001$). The three predictors jointly accounted for 70.9% of the variance in penetration ($R^2 = .709$; $F(3, 216) = 178.962$, $p < .001$). The null hypothesis was therefore rejected. Qualitative and documentary evidence converged with these results, linking customization to farmer trust and product relevance. The study concludes that product design, rather than availability alone, appears to be the decisive strategic lever for converting cooperative membership into insurance coverage. It recommends customer-centred product innovation aligned to regional production systems, simplified policy language, and closer alignment between the National Agriculture Insurance Scheme and cooperative-level risk profiles.*

Keywords: *Product differentiation, Insurance penetration, Agricultural microinsurance, Agriculture cooperatives, MINAGRI, Rwanda*

How to cite this work (APA):

Gato, J. & Kimemia, M. (2026). Product Differentiation Strategy and Insurance Penetration among Agricultural Cooperatives under MINAGRI in Rwanda. *Journal of Research Innovation and Implications in Education, 10*(4), 1963 – 1974. **https://doi.org/10.59765/nwo9b**

1. Introduction

Agricultural insurance has become the principal instrument through which low-income economies attempt to transfer climate and production risk away from smallholder households. Its reach, however, remains narrow. In mature markets such as the United States, Japan and Europe, insurance penetration stands at 11.7%, 8.4% and 9.2% respectively, supported by sophisticated risk assessment, reinsurance arrangements and mature regulatory frameworks. Even where microinsurance has expanded, coverage remains limited: recent estimates put the number insured in developing markets at 377 million people, less than 20% of their combined population (Kiwanuka & Sibindi, 2023). The gap is not a gap in the existence of

products but in their fit to the populations they are meant to serve.

Africa illustrates this distinction clearly. Continental insurance penetration averages below 3%, with South Africa at 11.54%, Nigeria at 8.1%, Kenya at 2.25%, Uganda at 1.1% and Tanzania at 0.62% (Deloitte Africa, 2024/25). Structural constraints poverty, low financial literacy, limited formal banking infrastructure and fragmented regulation explain part of the variation (Deloitte Africa, 2024/25). Coverage is also concentrated in a narrow product range: an estimated 5.4% of the population of Africa was covered by microinsurance, and that business remained primarily confined to life and credit-life cover rather than to health, property and agriculture (Bernards, 2022). In many African countries, agricultural insurance coverage does not exceed 1% (Tadesse et al., 2024). The remainder of the explanation is attributable to design: microinsurance schemes concentrated in sub-Saharan Africa, often delivered through cooperatives and community structures, have increased adoption where products matched local production risks, yet overall penetration rarely exceeds 10% of the eligible population.

Rwanda sits squarely within this pattern and, in several respects, ahead of it. Insurance penetration is estimated at 1.64% of GDP, against 2.25% in Kenya and 0.62% in Tanzania. Agriculture employs about 70% of the labour force (Kagoyire & Nyandwi, 2022). It contributes approximately 29% of GDP, exposing the majority of households directly to climate and market risk. Regulatory reform, mobile money integration and cooperative-based insurance initiatives have all been pursued. Under the National Agriculture Insurance Scheme (*Tekana Urishingiwe Muhinzi Mworozi*), government provides a 40% subsidy on premiums for both crops and livestock, with farmers funding the remaining 60% (Adolphe & Amolo, 2026; Ngango et al., 2022). Uptake in agriculture nonetheless remains uneven, constrained by limited awareness, affordability and distrust in providers (Muremyi et al., 2025; FinScope Rwanda, 2024).

Product differentiation is the strategic response most directly aimed at the trust and relevance problem. Where conventional insurance products are designed for salaried, urban and asset-holding clients, differentiated microinsurance designs coverage around the actual production systems of smallholder farmers: maize and beans rather than generic crop loss, livestock disease rather than generic mortality, payment schedules tied to harvest rather than to the calendar month. The Rwandan evidence is suggestive: cooperatives adopting structured awareness programmes, flexible payments and digital platforms report penetration 2–3% higher than those relying on traditional approaches, while less than 3% of eligible cooperative members are actively enrolled in agricultural microinsurance, with Eastern Province cooperatives averaging 3.5% and Western Province cooperatives 1.8% (Access to Finance Rwanda et al., 2024; RAB, 2025). Such variation across cooperatives facing comparable rainfall, markets and subsidy arrangements points to product design and its communication as a differentiating factor.

This article therefore isolates one strategic initiative, product differentiation, and examines its influence on insurance penetration among agriculture cooperatives under MINAGRI. Isolating a single strategy allows the magnitude of its contribution to be estimated with precision, which the combined three-strategy analysis reported in the parent study cannot do at the level of individual design decisions such as customization, simplification and risk-specific coverage.

1.1 Statement of the Problem

Rwanda has made substantial progress in expanding financial inclusion. The proportion of adults accessing financial products increased from 77% in 2020 to 92% in 2024, while insurance uptake rose from 17% (approximately 1.2 million adults) to 27% (approximately 2.1 million adults). Nevertheless, insurance penetration as a share of GDP remained at approximately 2.1% over the same period (MFW4A, 2025). These figures suggest that financial inclusion has expanded more rapidly than insurance coverage, leaving many cooperative members exposed to risks such as crop failure, livestock disease, and income volatility without adequate mechanisms for transferring those risks.

The National Agriculture Insurance Scheme, *Tekana Urishingiwe Muhinzi Mworozi*, was introduced to strengthen agricultural risk protection. It is jointly implemented by MINAGRI, the Rwanda Agriculture and Animal Resources Development Board, and participating insurance companies. The scheme provides a 40% premium subsidy for both crop and livestock insurance, with farmers responsible for the remaining 60% (Adolphe & Amolo, 2026; Ngango et al., 2022). However, the reported insurance uptake and penetration figures suggest that the availability of insurance and the provision of subsidies have not, by themselves, translated into broader coverage.
According to the Rwanda FinScope 2024 findings, approximately 48% of uninsured adults did not recognise their exposure to risk, while 37% lacked adequate knowledge of insurance products and their benefits. The survey also indicates that 42% of cooperative members reported difficulties accessing insurance because of limited digital literacy, while 35% cited affordability as a barrier, even under subsidised schemes.

These figures locate the problem in the design and comprehensibility of the product rather than in its existence. Agricultural cooperative members require cover that corresponds to what they actually produce: crop farmers to seasonal weather and pest risk, livestock farmers to disease and mortality, mixed enterprises to both. Where products are generic, where policy documents are drafted in technical language, and where coverage categories do not map onto

the enterprise being insured, members cannot assess what they are buying, and neither price subsidy nor distribution reach will convert intention into enrolment. The resulting cost is borne disproportionately by the households least able to absorb it: a single failed season can erase the asset base of a smallholder household and foreclose access to credit in the following cycle.

Despite this, cooperative-level evidence linking product differentiation strategy to measurable insurance penetration outcomes enrolment, coverage rate and premium growth remains thin in Rwanda, and the studies that exist are national in scope or concerned with affordability and distribution rather than with design. It is not established whether customization, simplicity and risk-specific coverage are associated with higher penetration among MINAGRI cooperatives, nor how large that contribution is relative to other strategic levers. This study therefore examined the influence of product differentiation strategy on insurance penetration among agriculture cooperatives under MINAGRI in Rwanda, in order to generate evidence capable of guiding product design decisions by insurers, cooperatives and policymakers.

1.2 Research Objectives

The study aimed to examine the influence of product differentiation strategy on insurance penetration among agriculture cooperatives under MINAGRI in Rwanda.

1.3 Hypothesis

The study tested the following hypothesis at the 5% level of significance:

H_{01}: Product differentiation strategy has no statistically significant influence on insurance penetration among agriculture cooperatives under MINAGRI in Rwanda.

H_1: Product differentiation strategy has a statistically significant influence on insurance penetration among agriculture cooperatives under MINAGRI in Rwanda.

2. Literature Review

2.1 Theoretical Review

The Diffusion of Innovations Theory, developed by Everett Rogers in 1962 and further refined in Rogers (2003), explains how innovations are communicated through specific channels over time among members of a social system. According to the theory, the adoption of an innovation is influenced by five key attributes: relative advantage, compatibility, complexity, trialability, and observability (Alajmi et al., 2016; Stefaniak & Carey, 2019). These attributes are central to the adoption process and have been reported to explain between 49% and 87% of the variance in adoption rates (Alajmi et al., 2016).

Each attribute has a direct application to microinsurance design. Relative advantage concerns whether a differentiated insurance product offers protection that members perceive as more beneficial than bearing the risk themselves. Compatibility refers to the extent to which the product aligns with existing cooperative practices and farmers' seasonal income patterns. Complexity relates to the simplicity and clarity of policy terms and procedures. Trialability and observability concern the extent to which members can experience the product on a limited basis and observe its benefits, particularly through the experiences of neighbours who have successfully made claims.

The theory is particularly relevant to cooperative settings because it explains adoption within social systems rather than treating individuals as isolated decision-makers. Cooperatives operate through interconnected social networks in which early adopters can influence the decisions of other members. The National Bank of Rwanda (2022) reports that cooperative-based financial dissemination increases insurance awareness by more than 40% compared with individual marketing channels. Similarly, Musimenta (2021) found that index-based agricultural insurance diffused more rapidly in Uganda when cooperative leaders endorsed the product.

Nevertheless, the theory has attracted criticism. Hall (2020) and Kaminski (2022) argue that it places considerable emphasis on individual adoption decisions while giving insufficient attention to structural constraints, including poverty, institutional barriers, and regulation. They also question its tendency to treat innovations as inherently beneficial. These criticisms are relevant to the present study because affordability and accessibility can influence insurance adoption independently of the perceived attributes of a product. Accordingly, this study adopts the Diffusion of Innovations Theory as its principal explanatory framework for understanding product differentiation, while recognising that the effectiveness of this strategy is also shaped by the financial and institutional constraints examined elsewhere in the parent study.

2.2 Empirical Review

Churchill and Matul (2021), in a cross-country comparative study across Kenya, Ghana and Tanzania using a mixed-method design, found that agricultural index-based products recorded adoption levels 18–27% higher than generic life microinsurance products because they responded directly to crop and weather risks. Tadesse and Brans (2022), studying 612 cooperative farmers in Ethiopia, found that customized weather-index insurance raised enrolment from 9% to 21% within two agricultural seasons. Dercon et al. (2021) concluded that context-specific agricultural risk packaging is necessary because farmers perceive differentiated products as more relevant and trustworthy. Taken together, these studies indicate that the mechanism at work is perceived relevance: a product that names the risk the

farmer actually faces is judged credible in a way that a generic product is not.

Karlan et al. (2021) reported from randomised controlled trials in Kenya that insurance bundled with agricultural input credit increased take-up by 24%, compared with below 12% for standalone offerings, across an experimental field design involving 3,200 farmers in Western Kenya. Miranda and Farrin (2022), using panel data regression on Ugandan data, found a statistically significant effect of multi-peril crop insurance on cooperative-level penetration relative to single-risk products ($p < .05$). Cole et al. (2021) recommended bundling on the grounds that integration with financial services reduces transaction costs and behavioural barriers. These findings establish that differentiation is not confined to the actuarial content of the policy; it extends to how the product is embedded in services farmers already use.

Rwandan evidence on product differentiation is thinner, but consistent. Akinwale (2021), in a cross-sectional survey of 420 farmers in Nigeria, found that product customization increased adoption by 18%. Wanyama (2022) reported that agricultural insurance uptake in Kenyan cooperatives rose by nearly 24% after insurers simplified contracts and developed crop-specific packages. Olabisi (2022) found that differentiated products increased penetration in Nigerian cooperatives using an experimental design, although pricing and distribution were not analysed jointly. Njoroge (2023) reported that bundled products led to 15% higher uptake in a Kenyan field experiment, again without examining distribution mechanisms through a regression framework. Reporting on global microinsurance, the Microinsurance Network (2024) concluded that insurers introducing simplified agricultural products increased farmer participation by approximately 26% across developing countries. Within Rwanda itself, published work has concentrated on the effect of the national scheme on farm production, income and savings among cooperative representatives (Robinah & Njenga, 2023), rather than on the strategic determinants of cooperative-level penetration.

2.3 Research Gap

Three gaps justify the present study. Geographically and institutionally, the empirical literature is dominated by Nigerian, Kenyan, Ethiopian and Ugandan evidence, and the institutional arrangements of MINAGRI cooperatives a ministry-linked structure operating alongside the National Agriculture Insurance Scheme and a defined premium subsidy regime have not been examined at cooperative level in Rwanda. Conceptually, product differentiation has generally been studied alongside pricing and distribution or replaced by a proxy such as bundling, so the specific contribution of customization, simplicity and risk-specific coverage has not been isolated. Methodologically, most prior studies rely on descriptive percentage-increase comparisons from cross-sectional surveys or field experiments; they rarely report standardized regression coefficients within an overall model that is validated through analysis of variance. The present study addresses these gaps by estimating, within a single cooperative-level dataset, the standardized contribution of product differentiation strategy to insurance penetration in the MINAGRI context.

3. Methodology

3.1 Research Design

The study adopted a descriptive cross-sectional design. The descriptive component allowed systematic description of the characteristics of product differentiation strategy and the prevailing level of insurance penetration among cooperatives, in line with the position that descriptive designs are appropriate where the objective is an accurate profile of a situation. The cross-sectional component permitted data to be collected from respondents at a single point in time, allowing the relationship between the strategic initiative and penetration to be examined efficiently while multiple variables were measured simultaneously. Quantitative methods were used to measure the strength and direction of the relationship between product differentiation strategy and insurance penetration, supported by qualitative data that aided interpretation of the quantitative results.

3.2 Target Population

The target population comprised 537 individuals drawn from agriculture cooperatives operating under MINAGRI, including cooperative leaders, members enrolled in microinsurance schemes, members not yet enrolled, and administrative personnel responsible for implementing microinsurance initiatives. The population was purposively structured to represent all stakeholders affected by microinsurance strategy: non-enrolled members formed the largest proportion (215; 40%), given the low penetration documented by the National Bank of Rwanda (2022), followed by enrolled members (162; 30%), cooperative leaders (107; 20%) and administrative personnel (53; 10%).

Table 1: Distribution of the target population

Category	Study population	Proportion (%)
Cooperative members (not enrolled)	215	40
Cooperative members (enrolled)	162	30
Cooperative leaders	107	20
Administrative personnel	53	10
Total	537	100

3.3 Sampling Technique and Sample Size

The sample size was determined using Yamane's formula, $n = N / (1 + Ne^2)$, where n represents the sample size, N the target population, and e the margin of error. The resulting sample comprised 229 respondents, proportionately distributed among four categories: 92 non-enrolled members, 69 enrolled members, 46 cooperative leaders and 22 administrative personnel. Proportionate stratified random sampling was used to ensure adequate representation of each category, while purposive sampling selected key informants with relevant knowledge and experience of microinsurance implementation for the qualitative component.

3.4 Data Collection Instruments and Procedures

Structured questionnaires were the principal instrument and were administered to cooperative members and leaders. The instrument contained closed-ended Likert items measuring product customization, product simplicity, risk-specific coverage, flexibility of insurance packages, relevance of products to agricultural activities, clarity of policy terms and responsiveness to farmers' needs, together with items measuring insurance penetration through the number of insured members, coverage rate and premium growth. Semi-structured interviews were conducted with cooperative leaders, insurance agents and officials involved in managing microinsurance programmes, and key informant interviews targeted district cooperative offices, insurance companies partnering with cooperatives and sector-level agricultural officers. Observation checklists verified the practical presence of distribution mechanisms, and document review checklists captured enrolment records, participation reports and policy guidelines issued by MINAGRI and other institutions.

Administration followed a systematic procedure. Official authorization was obtained from the university and from MINAGRI, district agricultural offices and cooperative leadership. Questionnaires were distributed physically and, where feasible, electronically. Interviews were audio-recorded with consent and transcribed. Documents were reviewed on site. Triangulation across questionnaires, interviews, observation and documents was used to strengthen the reliability and validity of the findings.

3.5 Validity and Reliability

Face validity was addressed by ensuring that items were clearly stated and comprehensible to members and administrators. Content validity was addressed by designing items that covered all study objectives, and confirmed through expert review by the academic supervisor and professionals familiar with microinsurance. Construct validity was examined to confirm that items aligned with the theoretical constructs, supported by assessment of convergent and criterion validity against existing benchmarks.

Reliability was tested using Cronbach's alpha, with 0.70 taken as the acceptable threshold. A pilot study was conducted among cooperative members and leaders institutionally related to MINAGRI but outside the selected sample, in order to test clarity, relevance and consistency before full-scale administration; feedback guided refinement of ambiguous items, restructuring of response scales and adjustment of sequencing. As reported in Table 2, all variables exceeded the threshold. Product differentiation strategy, measured with seven items, recorded $\alpha = 0.874$, while the instrument as a whole recorded $\alpha = 0.894$ across 36 items. Pilot respondents also rated the instrument highly, with an overall mean of 4.41 (SD = 0.54) on clarity, simplicity, logical arrangement, relevance and adequacy of response options.

Table 2: Reliability test results

Study variable	Number of items	Cronbach's alpha
Product differentiation strategy	7	0.874
Affordable pricing strategy	7	0.886
Innovative distribution strategy	7	0.912
Insurance penetration	7	0.893
Government policies (intervening variable)	8	0.905
Overall reliability	36	0.894

3.6 Data Analysis

Data were analysed using SPSS version 27. Descriptive statistics (frequencies, percentages, means and standard deviations) summarized respondents' characteristics and study variables. Normality was assessed using skewness (±1) and kurtosis (±3). Pearson correlation examined relationships among variables and potential multicollinearity, while multiple regression assessed the individual and combined influence of product differentiation, affordable pricing and innovative distribution strategies on insurance penetration. ANOVA tested the overall model significance, and standardized beta coefficients established the relative contribution of each predictor. Statistical significance was set at $p < .05$. Qualitative interview data were analysed thematically to complement the quantitative findings.

3.7 Ethical Considerations

Formal authorization was obtained before entering any cooperative or institutional site. An introductory letter from the university was presented to MINAGRI headquarters, district agricultural offices, and cooperative leaders. Written informed consent was obtained from all participants after they had been informed of the study's purpose, procedures, duration, potential risks, and anticipated benefits. Participation was voluntary, and respondents were free to decline to answer any question or withdraw from the study at any stage without penalty or any adverse effect on their cooperative membership or access to insurance services.

No inducements were offered, and questionnaires were administered individually rather than under management direction to minimise the risk of hierarchical coercion. Confidentiality was maintained through the use of numerical codes to identify questionnaire responses and the reporting of findings in aggregate form. Hard-copy records were stored in locked cabinets, while electronic files were kept on password-protected devices. Audio recordings were destroyed after transcription. Interview extracts are presented using role-based identifiers rather than participants' personal names, in accordance with the study's commitment to confidentiality.

4. Results and Discussion

4.1 Response Rate and Demographic Characteristics

Of the 229 questionnaires administered, 220 were completed and returned, representing a response rate of 96.1%, while nine questionnaires (3.9%) were not returned or were incomplete and were excluded. This rate exceeds the 70% minimum recommended for quantitative research and was attributed to close collaboration with cooperative leaders, adequate follow-up and respondents' interest in agricultural risk management.

Respondents were predominantly male (132; 60.0%), and the largest age group was 31–40 years (78; 35.5%), followed by 41–50 years (63; 28.6%), indicating an economically active respondent base. Secondary education was the most common level of attainment (69; 31.4%), followed by bachelor's degrees (58; 26.4%) and diplomas (56; 25.5%). Ordinary cooperative members formed the largest category (126; 57.3%), followed by committee members (39; 17.7%), administrative staff (31; 14.1%) and chairpersons (24; 10.9%). Work experience of 6–10 years was most frequent (73; 33.2%), and the largest share of respondents came from the Eastern Province (74; 33.6%), reflecting the concentration of agricultural cooperatives and government-supported insurance initiatives in that region. Crop farming cooperatives accounted for 58.2% of respondents (128), livestock for 21.4% (47) and mixed farming for 20.4% (45). At the time of the survey, 143 respondents (65.0%) were enrolled in microinsurance and 77 (35.0%) were not, providing a distribution appropriate for assessing the influence of product differentiation on penetration.

Table 3: Demographic characteristics of respondents (n = 220)

Variable	Category	Frequency	Percentage
Gender	Male	132	60.0
	Female	88	40.0
Age group	18–30 years	42	19.1
	31–40 years	78	35.5
	41–50 years	63	28.6
	Above 50 years	37	16.8
Education level	Primary	21	9.5
	Secondary	69	31.4
	Diploma	56	25.5
	Bachelor's degree	58	26.4
	Postgraduate degree	16	7.2
Position in cooperative	Chairperson	24	10.9
	Committee member	39	17.7
	Administrative staff	31	14.1
	Cooperative member	126	57.3
Work experience	Less than 3 years	44	20.0
	3–5 years	61	27.7
	6–10 years	73	33.2
	Above 10 years	42	19.1
Province	Eastern	74	33.6
	Northern	41	18.6
	Southern	48	21.8
	Western	34	15.5
	Kigali City	23	10.5
Type of cooperative	Crop farming	128	58.2
	Livestock farming	47	21.4
	Mixed farming	45	20.4
Microinsurance status	Enrolled	143	65.0
	Not enrolled	77	35.0

4.2 Descriptive Findings

Respondents rated seven statements on product differentiation using a five-point Likert scale. As Table 4 shows, the strategy recorded a grand mean of 4.11 with a standard deviation of 0.93, indicating strong agreement that customized, simple and risk-responsive products drive enrolment, and comparatively homogeneous opinion across respondents.

Table 4: Descriptive statistics for product differentiation strategy (n = 220)

Statement	Str. D	D	N	A	Str. A	Mean	Std. dev.	Rank
The available microinsurance products are customized to suit the needs of our agricultural cooperative	5 (2.3)	12 (5.5)	21 (9.6)	96 (43.8)	85 (38.8)	4.11	0.93	3
The microinsurance products are simple and easy to understand	7 (3.2)	14 (6.4)	28 (12.8)	89 (40.6)	81 (37.0)	4.02	0.99	6
The insurance products adequately cover risks faced by farmers	4 (1.8)	11 (5.0)	18 (8.2)	93 (42.5)	93 (42.5)	4.19	0.89	2
The insurance packages address different categories of agricultural activities	6 (2.7)	10 (4.6)	22 (10.0)	95 (43.4)	86 (39.3)	4.12	0.91	4
Product differentiation has encouraged more cooperative members to enroll in microinsurance	4 (1.8)	9 (4.1)	20 (9.1)	90 (41.1)	96 (43.9)	4.21	0.87	1
Insurance policy terms and conditions are clearly explained	8 (3.7)	16 (7.3)	26 (11.9)	88 (40.2)	81 (37.0)	3.99	1.01	7
Product innovation has increased trust in agricultural microinsurance services	5 (2.3)	12 (5.5)	19 (8.7)	94 (42.9)	89 (40.6)	4.14	0.91	5
Grand mean						4.11	0.93	

The highest-rated statement was that product differentiation had encouraged more cooperative members to enroll (M = 4.21, SD = 0.87), with 85.0% of respondents agreeing or strongly agreeing. Respondents also agreed strongly that insurance products adequately covered agricultural risks (M = 4.19, SD = 0.89), that product innovation had increased trust (M = 4.14, SD = 0.91), that packages addressed different categories of agricultural activity (M = 4.12, SD = 0.91) and those products were appropriately customized to cooperative needs (M = 4.11, SD = 0.93). Two items scored lower. Clarity of policy terms and conditions recorded the lowest mean (M = 3.99, SD = 1.01), although 77.2% still agreed or strongly agreed, and simplicity of the products scored 4.02 (SD = 0.99). The pattern is interpretable as a strong consensus on the importance of customization and risk relevance, accompanied by a somewhat weaker assessment of how far current products and documents have achieved it.

4.3 Qualitative Findings

Thematic analysis of the interview transcripts relating to product differentiation generated three recurring themes: demand for locally relevant and risk-specific product design, simplification of policy language and enrolment procedures, and the role of customization in building farmers' trust in providers.

"When the insurance company changed the product to match our maize and beans seasons, more members started asking to join because they could see it covering what actually affects them." (Interviewee 1: Cooperative Leader)

"Farmers used to complain that the contract language was too technical. Once we simplified the terms and used plain, everyday language during enrolment meetings, uptake in our zone improved noticeably." (Interviewee 2: Insurance Agent, Kayonza District)

"Customized livestock and crop packages have made cooperative members trust that the product was designed for them and not simply imported from urban insurance markets." (Interviewee 3: Cooperative Leader)

These accounts describe customization operating as a trust mechanism rather than merely a technical adjustment. The first and third quotations attribute enrolment directly to the moment at which members recognised their own enterprise in the product, which corresponds to the relative advantage and compatibility attributes of the Diffusion of Innovations Theory. The second quotation locates part of the same effect in the language of the contract, consistent with the survey finding that clarity of policy terms scored lowest among the seven indicators. Interviewees are identified by role and district only; the coding key linking these identifiers to individual participants is held separately by the researcher.

4.4 Inferential Findings

The regression model was estimated with all three strategic initiatives as predictors so that the coefficient for product differentiation would be adjusted for the two strategies with which it is correlated in practice. Insurance penetration was the dependent variable.

The three predictors jointly explained 70.9% of the variance in insurance penetration, with a strong multiple correlation and a small standard error of estimate.

Table 5: Model summary

Model	R	R^2	Adjusted R^2	Std. error of the estimate
1	.842	.709	.705	.418

Note. Predictors: (constant), product differentiation strategy, affordable pricing strategy, innovative distribution strategy. Dependent variable: insurance penetration.

The model as a whole was statistically significant, confirming that the predictors collectively explained variation in penetration better than a model without predictors.

Table 6: Analysis of variance

Model	Sum of squares	df	Mean square	F	Sig.
Regression	93.847	3	31.282	178.962	<.001
Residual	37.935	216	.175		
Total	131.782	219			

Product differentiation strategy recorded the highest standardized coefficient in the model, indicating that it was the strongest predictor of penetration once the shared variance among the three strategies was taken into account.

Table 7: Regression coefficients

Model	B	Std. error	Beta (β)	t	Sig.
Constant	0.684	0.211	—	3.241	.001
Product differentiation strategy	0.384	0.058	0.401	6.621	<.001
Affordable pricing strategy	0.291	0.061	0.312	4.770	<.001
Innovative distribution strategy	0.356	0.055	0.371	6.473	<.001

The results indicate that product differentiation strategy is positively and significantly associated with insurance penetration ($B = 0.384$, $\beta = 0.401$, $t = 6.621$, $p < .001$). This implies that a one-unit improvement in the product differentiation score is associated with a 0.384-unit improvement in the penetration score, holding the other strategies constant. The strong positive correlation ($r = 0.781$, $p < .001$) further supports this relationship. The results therefore suggest that developing insurance products tailored to the needs of agricultural cooperatives is associated with higher insurance penetration in Rwanda, though the cross-sectional design does not permit a causal reading of this coefficient.

Table 8: Pearson correlation matrix

Variable	Product differentiation	Affordable pricing	Innovative distribution	Insurance penetration
Product differentiation strategy	1			
Affordable pricing strategy	.674**	1		
Innovative distribution strategy	.703**	.689**	1	
Insurance penetration	.781**	.724**	.759**	1

Note. n = 220. ** Correlation is significant at the .01 level (two-tailed).

H_{01} stated that product differentiation strategy has no statistically significant influence on insurance penetration among agriculture cooperatives under MINAGRI. The regression results were $\beta = 0.401$, $t = 6.621$ and $p < .001$. Since the probability value was below .05, the null hypothesis was rejected. Product differentiation strategy was therefore significantly and positively associated with insurance penetration among agriculture cooperatives under MINAGRI in Rwanda.

4.5 Discussion

The association between product differentiation and insurance penetration was the strongest in the study, and its magnitude is consistent with the international empirical record. Churchill and Matul (2021) found index-based products achieving adoption 18–27% above generic life microinsurance, Tadesse and Brans (2022) observed a rise from 9% to 21% within two seasons in Ethiopia, and the

Microinsurance Network (2024) reported participation gains of approximately 26% where insurers simplified agricultural products. The Rwandan coefficient (β = 0.401) and correlation (r = .781) sit within this range of effect, and the pattern suggests that the mechanism may be general rather than setting-specific: farmers appear to judge insurance by whether it names the risk they face.

This pattern of association is consistent with the Diffusion of Innovations Theory. Each of the five innovation attributes is present in the differentiated products described by respondents. Relative advantage appears in the coverage of drought, floods, pests and livestock disease; compatibility appears in the alignment of products with maize and beans seasons and with livestock enterprises; simplicity appears, though less fully, in the plain-language enrolment meetings described by Interviewee 2, the insurance agent in Kayonza District; observability appears in members' ability to see neighbours claim. Wanyama (2022) reported a similar mechanism in Kenya, where uptake rose by nearly 24% after contracts were simplified and crop-specific packages developed, and Akinwale (2021) reported an 18% increase in Nigeria where products were customized to regional production systems. The consistency across these settings suggests that product differentiation may operate as a general driver of agricultural insurance adoption rather than as an artefact of any single national market.

Clarity of policy terms recorded the lowest mean in the scale (M = 3.99, SD = 1.01) and simplicity of products the second lowest (M = 4.02, SD = 0.99), while customization and risk coverage scored well above 4.10. Differentiation in the actuarial content of the product appears to have advanced further than differentiation in its communication. This matters for policy, because the same FinScope Rwanda (2024) data that record 37% of uninsured adults as lacking adequate knowledge of insurance products also record 48% as not acknowledging their exposure to risk; both conditions are responsive to how a product is explained rather than to what it covers. The qualitative evidence points the same way: Interviewee 2 attributed measurable improvement in uptake to the replacement of technical contract language with plain terms at enrolment meetings, an intervention that costs little and requires no actuarial change.

The comparative ranking of the three strategies warrants further comment. Descriptive results for the affordable pricing and innovative distribution strategies are reported in the parent study and are therefore not reproduced in this article. Consequently, the comparison presented here is based on the standardized coefficients reported in Table 7. These coefficients rank product differentiation first (β = 0.401), followed by innovative distribution (β = 0.371) and affordable pricing (β = 0.312).

This ranking does not necessarily contradict any ordering based on descriptive statistics. Standardized coefficients account for the shared variance among the three predictors. The intercorrelations, ranging from 0.674 to 0.703, indicate that the strategies are often implemented together: cooperatives that customize their products also tend to offer affordable prices and distribute their products through accessible channels. The regression therefore estimates the unique association of each strategy with the outcome, holding the other predictors constant. The results suggest that, although price and distribution are important to cooperative members, their effectiveness may depend partly on whether the product itself meets farmers' needs. An affordable product that is widely accessible may still attract limited demand if it does not suit the specific needs of the farmer's enterprise.

The documentary evidence supports this interpretation. Under the National Agriculture Insurance Scheme, government provides a 40% subsidy on premiums for both crops and livestock, with farmers funding the remaining 60% (Adolphe & Amolo, 2026; Ngango et al., 2022). More than 410 cooperatives had benefited from awareness and registration exercises by the end of 2025, and mobile money accounts for more than 95% of financial transactions in rural areas. Affordability support and distribution infrastructure are therefore substantially in place, yet overall insurance penetration rose only from approximately 1.3% of GDP in 2020 to approximately 1.9% in 2025, and agricultural insurance remains a small proportion of total insurance business, with limited uptake attributed to low awareness, irregular household incomes, inadequate rural distribution and limited product customization. These implementation reports locate the residual constraint in product fit: where products are customized, understandable and risk-specific, they conclude, penetration rises.

The design is cross-sectional, so the associations describe a relationship at a single point in time and do not establish causation; members who are already insured may rate products more favourably precisely because the product has worked for them. Penetration was measured through respondent perception of enrolment, coverage and premium growth rather than through audited insurer records, and perceptual measures are susceptible to recall and social desirability bias. Triangulation with cooperative records, document review and key informant accounts was used to mitigate this, but not to eliminate it.

5. Conclusion and Recommendations

5.1 Conclusion

The study concludes that product differentiation strategy is strongly, positively and significantly associated with insurance penetration among agriculture cooperatives under MINAGRI in Rwanda. The standardized coefficient was the largest in the model (β = 0.401, t = 6.621, p < .001), the bivariate correlation was strong (r = 0.781, p < .001), and the model explained 70.9% of the variation in penetration (R^2 = .709; F(3, 216) = 178.962, p < .001), leading to rejection of the null hypothesis. Because these associations

derive from a cross-sectional design, they identify a relationship rather than a demonstrated effect.

Two qualifications temper the conclusion. First, policy clarity (M = 3.99) and product simplicity (M = 4.02) were rated lowest of the seven indicators, indicating that communication has not kept pace with product content. Second, penetration was measured perceptually, so the estimates describe members' reported experience rather than audited insurer data. Subject to these limits, the evidence indicates that raising insurance penetration requires more than product availability: it requires customized, simple and risk-specific products that reflect farmers' agricultural activities, income patterns and risk profiles, accompanied by clear policy communication capable of building trust and encouraging enrolment.

5.2 Recommendations

Based on the findings of this study, the following recommendations were made:

1. ***For practice***. Insurance companies participating in the National Agriculture Insurance Scheme should strengthen customer-centred product innovation by developing insurance packages tailored to different agricultural enterprises, including crop and livestock farming, and to regional risk profiles. Given the positive rating of enterprise-specific products (M = 4.12) and the relatively low rating of policy clarity, insurers should simplify policy documents by providing clear information on coverage, exclusions and claims procedures in Kinyarwanda, communicated during cooperative enrolment meetings. MINAGRI, the Rwanda Agriculture and Animal Resources Development Board and the National Bank of Rwanda should strengthen premium subsidies, institutional coordination and awareness campaigns to improve farmers' understanding and uptake of differentiated insurance products. In addition, agriculture cooperatives should establish insurance committees to communicate product information, collect members' feedback and facilitate collaboration with insurance providers, and should promote digital registration and mobile premium payments to improve accessibility.
2. ***For policy***. The Government of Rwanda should expand the National Agriculture Insurance Scheme to accommodate additional agricultural commodities, livestock enterprises and value-chain actors while maintaining affordable premium subsidies. Product-appropriateness criteria should also be incorporated into the accreditation of insurance products under the scheme, so that coverage responds to the specific risks of agricultural cooperatives. Relevant authorities should further promote interoperability between cooperative management and insurance information systems to improve farmer registration, risk assessment and product development.
3. ***For further research.*** Future studies should employ longitudinal designs to establish the direction of the relationship between product differentiation strategy and insurance penetration. Experimental or quasi-experimental studies could assess the effects of enterprise-specific coverage, simplified policy documents and bundled insurance products on enrolment. Comparative studies across East African countries are also recommended to establish the generalizability of the findings ($\beta = 0.401$; $r = 0.781$). Finally, future research should examine the moderating effects of financial literacy, digital inclusion and cooperative governance on the relationship between product differentiation strategy and insurance penetration.

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