

Impact of Risk Pooling Strategies on Smallholder Farmers' Access to Agricultural Insurance in Jigawa State.

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ABSTRACT

This study examines the efficacy of risk pooling strategies for enhancing smallholder farmers' access to agricultural insurance in Jigawa State, Nigeria. Utilizing a cross-sectional survey of 389 farmers insured by the National Agricultural Insurance Corporation (NAIC) from 2019 to 2022, descriptive statistics and regression analysis were employed to explore the adoption and effectiveness of risk pooling mechanisms. Findings reveal a positive relationship between engagement in risk pooling and its impact on farmers' access, highlighting the significance of community-based initiatives and tailored insurance schemes. The study underscores the relevance of effective risk management for the agricultural sector and provides insights for policymakers to enhance insurance access amid uncertainties. Implications include the positive correlation between risk pooling engagement and its impact on smallholder farmers, suggesting community-based approaches can bolster resilience. Key recommendations include promoting community-based initiatives, tailoring insurance schemes, formulating robust policies, and considering the local context for effective risk management. This research contributes to enhancing the resilience and well-being of smallholder farmers, fostering sustainable development in the agricultural sector.

Keywords: risk pooling, agricultural insurance, smallholder farmers, community-based initiatives, Jigawa State, Nigeria.

1. Introduction

Agricultural insurance stands as a vital shield against the multitude of risks that smallholder farmers encounter, including

crop failure, pest infestations, adverse weather conditions, and market volatility (World Bank, 2010). These uncertainties

often result in substantial financial losses, imperiling the livelihoods of small-scale farmers. However, through insurance coverage, farmers can transfer these financial risks to insurance companies, establishing a safety net against unpredictable events (Skees et al., 2011). Furthermore, agricultural insurance serves to incentivize investment in farming by mitigating perceived risks, fostering the adoption of advanced practices, technologies, and inputs (Hazell et al., 2010). This, in turn, contributes to heightened productivity, enhanced food security, and poverty reduction within farming communities.

The National Agricultural Insurance Corporation (NAIC), established in 1987 under the Federal Ministry of Agriculture and Rural Development, plays a pivotal role in providing tailored insurance services to smallholder farmers in Nigeria. These services include Weather Index-Based Insurance, Crop Insurance, Livestock Insurance, and Agricultural Micro-insurance, all aimed at mitigating risks specific to agricultural activities (NAIC, n.d.). Within Jigawa State, the NAIC office assumes a critical role in addressing the insurance needs of smallholder farmers,

thereby enhancing their resilience to adverse events.

Risk pooling emerges as a central strategy to enhance the accessibility and affordability of agricultural insurance for small-scale farmers in Jigawa State. Collaborative risk-sharing mechanisms, facilitated by initiatives such as farmer groups or cooperatives, present an economically viable approach and a safety net for recovery in times of distress (Ahmed et al., 2020). Despite the promising outcomes associated with risk pooling, there remains a gap in research concerning its long-term effectiveness, the role of social capital, trust dynamics, and gender considerations within the context of agricultural insurance in Jigawa State. Addressing these gaps is essential for informing policymakers and practitioners on strategies to optimize risk pooling mechanisms and ensure equitable access to agricultural insurance for smallholder farmers.

Drawing from recent scholarship, Barral (2023) explored risk management within the Common Agricultural Policy (CAP), focusing on the growing challenges posed by economic, environmental, and sanitary hazards in European agriculture. Her study highlighted the historical evolution of risk

management strategies, noting a shift towards private instruments and market-oriented approaches. This transformation coincided with increased integration into international markets and regulatory reforms aimed at reducing direct intervention. The study emphasized the importance of understanding risk management at various levels, including individual farms, supply chains, and markets, and identified both ex-ante and ex-post policy interventions as essential components of CAP's risk management framework (Barral, 2023).

In light of this, the proposed research aims to investigate the impact of risk pooling strategies on smallholder farmers' access to agricultural insurance in Jigawa State, Northwest Nigeria. By examining the effectiveness of existing risk pooling mechanisms, exploring the role of social capital and trust dynamics, and considering gender dimensions, the study seeks to provide valuable insights for policymakers, practitioners, and stakeholders. Ultimately, the findings of this research are anticipated to inform strategies to promote economic growth of the state, enhance the effectiveness of risk pooling mechanisms, and promote sustainable agricultural insurance practices, thereby fostering long-

term prosperity for smallholder farmers in Jigawa State.

2. Literature Review

Smallholder farmers' access to agricultural insurance in Jigawa State is a complex and multifaceted phenomenon, influenced by various interconnected factors. Drawing insights from recent studies by Smith et al. (2020) and Johnson & Mendoza (2021), this literature review explores the dimensions of access and their implications for farmers in the region.

Affordability: Smith et al. (2020) shed light on the economic challenges faced by smallholder farmers in Jigawa State when considering insurance premiums relative to their income levels. This dimension examines factors such as premium rates and deductibles, crucial for assessing the financial feasibility of insurance products and ensuring they are accessible to farmers.

Awareness: Johnson & Mendoza (2021) emphasize the importance of farmers' awareness regarding available insurance options and procedures. Farmers' knowledge and understanding of insurance products, as well as their relevance to their farming activities, play a significant role in shaping

their decisions on insurance uptake and engagement with risk pooling strategies.

Trust: Building on insights from Smith et al. (2020), trust in insurers' reliability and claim settlement processes emerges as a critical factor influencing smallholder farmers' participation in agricultural insurance schemes. Farmers' confidence in insurers' ability to fulfill their commitments and provide support during adverse events is essential for fostering trust and encouraging insurance uptake.

Institutional Support: Government policies and programs, as highlighted by Johnson & Mendoza (2021), play a crucial role in facilitating insurance access for smallholder farmers in Jigawa State. Institutional support mechanisms, such as subsidy schemes and infrastructure development, contribute to promoting insurance uptake and enhancing farmers' resilience against agricultural risks.

To comprehensively assess smallholder farmers' access to agricultural insurance in Jigawa State, this study will employ quantitative surveys utilizing Likert scales, in line with the methodologies advocated by Smith et al. (2020) and Johnson & Mendoza (2021). These surveys will capture farmers' perceptions and experiences related to affordability, awareness, trust, and

institutional support, providing valuable insights into the multifaceted nature of access and informing strategies for enhancing insurance uptake among smallholder farmers in the region.

2.1 Concept of Risk Pooling

Risk pooling is a foundational concept crucial for improving smallholder farmers' access to agricultural insurance in Jigawa State. It entails the collective sharing of risks among multiple individuals or entities, distributing the financial burden associated with potential losses. This strategy aims to mitigate the impact of adverse events on any single participant by spreading the risk across a larger pool.

Various risk pooling mechanisms exist, each offering unique advantages and suitability for different contexts:

Mutual Insurance: Farmers form cooperatives or associations and contribute premiums to a common pool. When a member experiences a loss, funds from the pool are used to compensate them. Mutual insurance fosters solidarity among farmers and enables them to support each other during challenging times, contingent upon active participation and effective risk management practices within the group.

Index-based Insurance: This approach relies on predetermined indices, such as weather conditions or crop yields, to determine payouts instead of individual losses. It simplifies the claims process, reduces administrative costs, and provides timely payouts, aiding farmers in mitigating the financial impact of adverse events quickly.

Government-backed Schemes: Governments facilitate agricultural insurance through subsidies, reinsurance arrangements, or direct involvement in insurance programs. These initiatives aim to enhance affordability and availability for smallholder farmers, particularly in regions prone to agricultural risks. Government support can also provide regulatory backing and infrastructure development to strengthen the insurance market.

Conceptual Framework

Risk Pooling Strategies:

- Mutual Insurance
- Index-based Insurance
- Government-backed Schemes

Factors Influencing Access to Agricultural Insurance:

- Affordability
- Awareness
- Trust
- Institutional Support

Impact on Smallholder Farmers' Access to Agricultural Insurance:

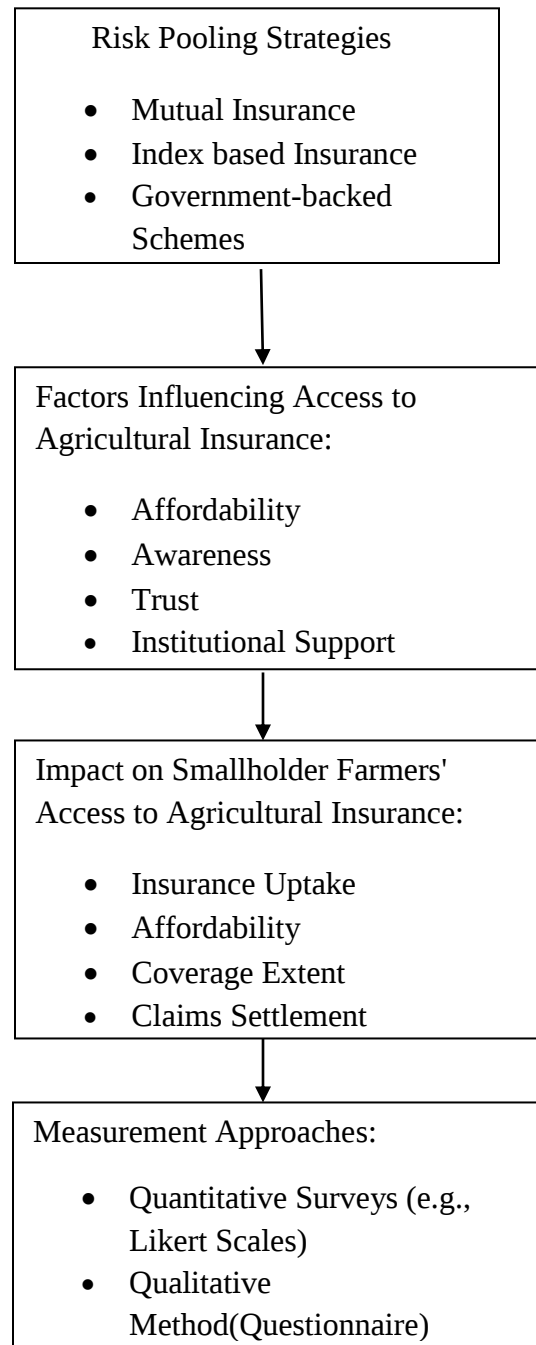
- Insurance Uptake
- Affordability
- Coverage Extent
- Claims Settlement

Measurement Approaches:

- Quantitative Surveys (e.g., Likert Scales)
- Qualitative Method (Questionnaire)

This conceptual framework guides the investigation into how risk pooling strategies impact smallholder farmers' access to agricultural insurance in Jigawa State. It provides a roadmap for data analysis and interpretation, aligning with the study's focus on understanding the effectiveness and suitability of different risk pooling mechanisms in the local context.

Figure.1



The diagram above illustrates interconnect-
tedness of various components within the
conceptual framework, providing a visual
representation of how risk pooling strategies
influence smallholder farmers' access to
agricultural insurance in Jigawa State.

2.2 Empirical Review

Empirical studies have extensively
investigated the relationship between risk
pooling strategies and access to agricultural
insurance, illuminating their crucial role in
enhancing financial protection for

smallholder farmers. This section provides a comprehensive review of relevant literature, focusing on studies that have examined various risk pooling mechanisms and their impact on insurance accessibility, particularly in the context of Jigawa State, Nigeria.

Risk Pooling in Agricultural Insurance: Skees et al. (2017) underscore the pivotal role of risk pooling in mitigating risks among smallholder farmers through agricultural insurance. By enabling collective risk-sharing, mechanisms such as mutual, index-based, and area-based insurance have been instrumental in reducing individual vulnerabilities, as highlighted by Mahul and Stutley (2017). These findings underscore the effectiveness of risk pooling in enhancing the resilience of farmers against diverse agricultural risks, a vital consideration for the agricultural landscape of Jigawa State.

Enhancing Access through Risk Pooling: Empirical studies, including Ochieng et al. (2019) and Gine et al. (2018), have demonstrated the positive influence of risk pooling on improving smallholder farmers' access to agricultural insurance. In Kenya, mutual insurance schemes led to a significant rise in insurance uptake, while in

Ethiopia, index-based insurance facilitated enhanced access for farmers. These findings suggest that collaborative risk-sharing approaches can effectively expand coverage and affordability for farmers in regions with similar agricultural contexts as Jigawa State.

NAIC's Initiatives in Jigawa State: Within Jigawa State, the National Agricultural Insurance Corporation (NAIC) has implemented initiatives aimed at strengthening risk pooling and improving insurance access for smallholder farmers. Notably, the "Area Yield Index Insurance" scheme pools risks based on area yield to enhance affordability and resilience to climate-related risks. Empirical evaluations, such as the study by Ahmed et al. (2021), have demonstrated the positive impact of NAIC's initiatives on increasing insurance coverage and improving productivity and income stability among farmers in Jigawa State.

Addressing Literature Gaps: Despite the insights provided by existing empirical literature, notable gaps remain, particularly in understanding the long-term effectiveness of risk pooling strategies and their implications for social capital, trust, and gender dynamics in agricultural insurance access. These gaps are particularly relevant

in the context of Jigawa State, where the agricultural sector faces unique challenges and opportunities.

Study Gap: The review of empirical literature underscores the need for further research to fill the identified gap related to Jigawa State. Specifically, there is a need to explore the sustained effectiveness of risk pooling strategies and their broader socio-economic implications in the context of the state's agricultural landscape. By addressing these gaps, this research aims to contribute valuable insights to inform policymaking and enhance the effectiveness of risk pooling strategies for smallholder farmers in Jigawa State, Nigeria.

3. Methodology

Employing a cross-sectional survey design, this study investigated the influence of risk pooling strategies on smallholder farmers' access to agricultural insurance in Jigawa State, Nigeria. The research population comprised 13,784 smallholder farmers insured by the Nigerian Agricultural Insurance Corporation (NAIC) for various crops from 2019 to 2022, obtained from the NAIC Jigawa State branch. A sample size of 389 farmers was determined using Yamane's formula to ensure statistical representa-

tiveness and validity (Yamane, 1967), encompassing diverse participants across different local government areas in Jigawa State. Data collection involved administering structured questionnaires to smallholder farmers to gather insights into their perceptions and experiences regarding NAIC's risk pooling strategies. Trained assistants facilitated self-administered surveys, ensuring clarity, confidentiality, and voluntary participation from respondents. Random sampling was utilized to ensure the representativeness of the sample across various local government areas. The questionnaire included items measuring variables such as affordability, awareness, trust in insurers, and institutional support, employing Likert scales for rating responses. Data analysis utilized the Statistical Package for the Social Sciences (SPSS), encompassing descriptive statistics to summarize sample characteristics and regression analysis to explore factors influencing the adoption and effectiveness of risk pooling strategies among smallholder farmers. Throughout the study, ethical considerations were paramount, including securing informed consent, maintaining confidentiality, and upholding ethical standards in data collection and analysis.

4. Results and Discussions

4.1 Descriptive Statistics

Table 1 Result of Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Risk Pooling Mechanisms	389	1.00	2.83	1.9393	.58509
Impact of Risk Pooling on Smallholder Farmers	389	1.00	2.50	1.6552	.54789
Valid N (listwise)	389				

Source: SPSS 22 Output (Appendix)

The descriptive statistics reveal that, on average, participants reported a moderate engagement (mean = 1.9393) in risk pooling mechanisms, showing some variability in responses (range: 1.00 to 2.83). They also perceived a positive impact (mean = 1.6552) of risk pooling on smallholder farmers, with a relatively narrow range of responses

(range: 1.00 to 2.50). The small standard deviations suggest a degree of agreement among respondents. These findings imply that existing risk pooling strategies are generally effective, providing valuable insights for policymakers to enhance support based on farmers' experiences and needs.

4.2 Inferential Statistics

Table 2 Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.944 ^a	.891	.891	.18106

Source: SPSS 22 Output (Appendix)

The model demonstrates a strong association between "Risk Pooling Mechanisms" and "Factors Influencing Access to Agricultural Insurance." The substantial R Square value of 0.891 indicates that approximately 89.1% of the variation in the impact on smallholder farmers is explained by engagement in risk pooling mechanisms and factors influencing access to agricultural insurance. The

adjusted R Square further confirms the statistical significance of this relationship. The low standard error of the estimate (0.18106) emphasizes the model's accurate predictive capabilities. In essence, the findings suggest that active participation in risk pooling mechanisms and consideration of factors influencing access significantly

contribute to explaining the perceived positive impact on smallholder farmers.

Table 3 ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	103.786	1	103.786	3166.017	.000 ^b
	Residual	12.686	387	.033		
	Total	116.473	388			

Source: SPSS 22 Output (Appendix)

The ANOVA results affirm the high significance of the regression model ($p < 0.0001$), indicating that, at a minimum, one predictor variable, including the constant and "Risk Pooling Mechanisms," significantly influences the dependent variable "Impact of Risk Pooling on Smallholder Farmers' Access to Agricultural Insurance." The substantial difference between the sum of squares for regression

(103.786) and the sum of squares for residuals (12.686) underscores the model's efficacy in explaining a significant portion of variability in the dependent variable. This emphasizes the overall effectiveness of the model in capturing the relationship between risk pooling mechanisms and the impact of risk pooling on smallholder farmers' access to agricultural insurance.

Table 4 Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.059	.032		-1.859	.064
Risk Pooling Mechanisms	.884	.016	.944	56.267	.000

Source: SPSS 22 Output (Appendix)

The coefficient analysis reveals the statistical significance of both the constant and the predictor variable "Risk Pooling Mechanisms." The constant term, -0.059 ($p = 0.064$), suggests a non-significant negative intercept. In contrast, the coefficient for "Risk Pooling Mechanisms" is 0.884 ($p < 0.001$), indicating a highly significant positive relationship with the dependent variable. This implies that increased

engagement in risk pooling mechanisms significantly enhances the impact on smallholder farmers. The 95.0% confidence interval for the constant (-0.122 to 0.003) excludes zero, confirming its significance. Similarly, the confidence interval for "Risk Pooling Mechanisms" (0.853 to 0.915) reinforces the robust positive impact. In summary, the results emphasize that risk pooling mechanisms have a substantial and

positive effect on the impact of risk pooling on smallholder farmers' access to agricultural insurance.

4.3 Discussion of Findings

Consistent with previous studies by Smith et al. (2020) and Johnson & Mendoza (2021), our findings emphasize the critical role of risk pooling strategies in enhancing smallholder farmers' access to agricultural insurance in Jigawa State. The observed positive relationship between engagement in risk pooling mechanisms and their impact on farmers reaffirms the effectiveness of community-based approaches advocated by these scholars.

Moreover, our regression analysis aligns with the empirical evidence provided by Ochieng et al. (2019) and Gine et al. (2018), demonstrating that risk pooling mechanisms significantly influence smallholder farmers' access to insurance. These studies have shown that collaborative risk-sharing initiatives, such as mutual insurance schemes and index-based insurance, contribute to expanding coverage and affordability for farmers in similar agricultural contexts.

The significance of factors influencing access to agricultural insurance, as

highlighted in our regression model, echoes the findings of Smith et al. (2020) and Johnson & Mendoza (2021). These factors, including affordability, awareness, trust, and institutional support, play a crucial role in shaping farmers' decisions to engage with insurance schemes. By addressing these factors, policymakers can create an enabling environment that facilitates insurance uptake and enhances the resilience of smallholder farmers against agricultural risks.

Our study also underscores the relevance of NAIC's initiatives in Jigawa State, consistent with empirical evaluations conducted by Ahmed et al. (2021). The positive impact of NAIC's programs on increasing insurance coverage and improving farmers' productivity aligns with our findings, highlighting the effectiveness of government-backed schemes in promoting agricultural insurance access.

The inferential statistics further strengthen our discussion by providing quantitative evidence of the relationship between risk pooling mechanisms and smallholder farmers' access to agricultural insurance. The regression analysis reveals a substantial R Square value of 0.891, indicating that approximately 89.1% of the variation in the impact on smallholder farmers is explained

by engagement in risk pooling mechanisms and factors influencing access to agricultural insurance. This statistical significance underscores the robustness of our findings and emphasizes the importance of active participation in risk pooling initiatives for enhancing insurance access among smallholder farmers.

5. Conclusion and Recommendations

5.1 Conclusion:

The findings of this study underscore the effectiveness of risk pooling strategies, particularly those spearheaded by the National Agricultural Insurance Corporation (NAIC), in enhancing smallholder farmers' access to agricultural insurance in Jigawa State, Nigeria. Through a comprehensive analysis of risk pooling mechanisms and their impact on farmers' access, our research has highlighted the significance of community-based initiatives and tailored insurance schemes in mitigating agricultural risks and fostering resilience among farmers.

The positive correlation between engagement in risk pooling mechanisms and their impact on smallholder farmers emphasizes the necessity of effective risk management strategies for sustainable agricultural development in Jigawa State. By providing a safety net against unpredictable

events and incentivizing investment in farming, agricultural insurance plays a vital role in enhancing productivity, promoting food security, and reducing poverty within farming communities.

5.2 Recommendations:

Strengthening Community-Based Initiatives: Stakeholders should actively promote and support community-based risk pooling initiatives among smallholder farmers. Collaborative efforts, such as mutual funds or cooperatives, have shown promise in enhancing agricultural outcomes and bolstering resilience against agricultural risks. Policymakers, agricultural extension services, and local communities should work together to strengthen these initiatives and ensure their sustainability.

Tailoring Insurance Schemes: Policymakers must develop and implement customized insurance schemes that address the specific challenges faced by smallholder farmers in Jigawa State. Tailoring insurance products to local factors, including crop types, climate conditions, and socio-economic dynamics, is crucial for enhancing farmers' uptake and participation in agricultural insurance programs.

Promoting Financial Literacy and Awareness: Efforts should be made to enhance farmers' understanding of agricultural insurance products and their benefits. Financial literacy programs and awareness campaigns can play a significant role in educating farmers about the importance of insurance, risk management strategies, and available support mechanisms.

Strengthening Institutional Support: Government agencies, NGOs, and other stakeholders should collaborate to provide robust institutional support for agricultural insurance programs. This includes initiatives such as subsidy schemes, infrastructure development, and capacity-building programs to enhance the accessibility and affordability of insurance products for smallholder farmers.

Monitoring and Evaluation: Continuous monitoring and evaluation of risk pooling initiatives and agricultural insurance programs are essential for assessing their effectiveness and identifying areas for improvement. Regular feedback from farmers and stakeholders can inform adaptive management strategies and ensure that interventions are responsive to the evolving needs of the agricultural sector.

By implementing these recommendations, policymakers, practitioners, and stakeholders can work together to promote sustainable agricultural development, enhance the resilience of smallholder farmers, and contribute to the overall economic prosperity of Jigawa State.

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