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Impact of institutional support to smallholder horticultural farmers on their access to high value markets in Mashonaland West Province of Zimbabwe

Impact of institutional support to smallholder horticultural farmers on their access to high-value markets in Mashonaland West Province of Zimbabwe

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Abstract
This study's purpose was to evaluate the effectiveness of market aggregators (cooperatives) in reducing institutional and informational transaction costs for smallholder horticulture farmers (SHFs) participating in high-value markets in Zimbabwe. The design used a cross-sectional survey of 192 SHFs in Mashonaland West Province, analysed using Chi-square (chi^2) tests of goodness of fit. The findings confirm that aggregator linkage significantly improves SHFs' access to Food Safety and Quality (FSQ) standards ($chi^2(3) = 125.112$, $p < 0.001$) and timely price information ($\chi^2(3) = 78.76$, $p < 0.001$), thus mitigating information asymmetry. However, the stringent application of FSQ standards is a major source of governance friction, eroding farmer trust when produce is rejected. Research implications suggest using Structural Equation Modelling (SEM) to model the recursive relationship between compliance and trust. Practical implications call for mandated transparent grading protocols to manage the trust-compliance trade-off, investment in shared post-harvest infrastructure, and the integration of ICT for real-time market information dissemination.

Introduction
This paper examines the critical influence of the institutional and infrastructural operating environment on the ability of smallholder horticulture producers in Zimbabwe to participate effectively in formal, mainstream markets. Smallholder horticulture constitutes a pivotal component of the Zimbabwean agricultural economy, a structural importance magnified across the wider Sub-Saharan Africa (SSA) region where agriculture remains the primary determinant of livelihood and food security for an estimated over 70% of the population (Abass et al., 2023). Consequently, interventions aimed at enhancing agricultural production and productivity are fundamentally essential strategic measures for achieving overarching developmental objectives, particularly the eradication of extreme poverty and hunger. This necessitates rigorous economic analysis of the factors influencing smallholder output and market participation.

The pervasive globalisation of the agribusiness sector has precipitated a fundamental paradigm shift, moving the focus from a traditional production-oriented approach toward market- or consumer-driven vertical value chain coordination. This restructuring has placed significant strain on smallholder agriculture and rural livelihoods worldwide (Vorley et al., 2023). Stringent demands characterise contemporary global markets: tight vertical coordination and integration, intensified

demand for innovation and high quality/standards, and strict traceability requirements. The confluence of these demands creates considerable transaction costs and adjustment burdens, with the most severe and disproportionate impacts falling upon smallholder horticulture farmers. While smallholders constitute the structural backbone of many rural economies (von Loeper et al., 2022), their capacity to participate effectively in formal markets is significantly curtailed by intensifying competition and trade liberalisation pressures (Louw et al., 2022; Muchopa, 2023). This results in limited engagement by smallholders within mainstream value chains, often leading to their complete exclusion.

Despite the evident aspiration of smallholder farmers to transition from subsistence production towards greater market orientation, they consistently face persistent market exclusion. A critical economic and institutional factor contributing to this marginalisation is the unaccommodating and restrictive operating environment—the institutional and infrastructural milieu—within which these farmers operate. The inherent structure of this environment, encompassing stringent quality standards, limited access to finance, inadequate infrastructure (logistics and storage), insufficient price information, and prohibitive transaction costs, creates both endogenous and exogenous barriers to entry that disproportionately limit smallholder engagement in mainstream commercial channels. Institutional support available to these farmers is part of the enabling environment, which is a critical determinant of success for the agricultural sector (Christy et al., 2023). This enabling environment comprises policies, institutions (e.g., contract enforcement and property rights), public infrastructure (e.g., communication networks), and support mechanisms that collectively shape the conditions for engaging in business (Neven, 2022).

The primary aim of this paper is to analyse the influence of the institutional and infrastructural enabling environment—specifically, institutional support mechanisms and the quality of public infrastructure—on the market participation decisions and the level of market engagement among smallholder horticultural producers in Zimbabwe**.** This analysis seeks to identify the key institutional frictions that act as barriers to entry and to propose evidence-based adaptive strategies and policy recommendations for institutional reform necessary to transition smallholders from subsistence to profitable and sustainable market integration.

Methodology

Study Area

The research was conducted in Mashonaland West Province, Zimbabwe, specifically in the Hurungwe and Makonde districts. These districts were purposively selected due to their high intensity of smallholder horticultural production. This region is characterised by intensive daily vegetable cultivation—primarily tomatoes, onions, cabbage and leafy greens—destined for wholesale markets, including the major urban centres of Karoi, Chinhoyi, and the Mbare Musika terminal market in Harare.

Figure 1: Mashonaland West Province and location of the study areas

Data source and sampling procedures

Primary data were gathered using a structured survey instrument administered to a cross-section of smallholder vegetable farmers. Of the 200 observations in the targeted sample, only 192 were successfully captured. To determine the ward sample sizes of smallholder horticulture farmers (SHF) to be interviewed, the probability proportional to size sampling method was employed. This method ensures that the ratio of the ward sample size of SHF(C) to the district sample size of SHF(DSS) equals the ratio of the ward population size of SHF(n) to the district population size of SHF(nTOT). This guarantees proportionate representation of ward sample sizes in the district sample. Mathematically, this is expressed as:

$$\frac{C}{DSS} = \frac{n}{nTOT} (1)$$

Rearranging equation (1), we get:

$$C = (\frac{n}{nTOT}) \times DSS (2)$$

However, the district sample size (DSS) is calculated using the formula:

$$DSS = \frac{N}{1 + N(e)^2} (3)$$

Where:

- (N = nTOT) (district population size of SHF)
- (e = 0.05) (level of precision)

Therefore,

$$DSS = \frac{nTOT}{1 + nTOT \times 0.05^2} (4)$$

Substituting equation (4) into equation (2) and simplifying, we get:

$$C = \frac{n}{1 + nTOT \times 0.05^2} (5)$$

Where:

- (C) Is the ward sample size of SHF

- (n) is the ward population size of SHF (to be obtained from the District Agritex Extension Officer and the District Agronomist)
- (nTOT) is the district population size of SHF (to be obtained from the latest published figures for the respective districts)

The sample size of SHF for each ward was determined using equation (5). The sample size for each of the two selected districts was calculated before field data collection began, as it relies on secondary or published data. The numerical sample size for each district is given by equation (4). This formula can be used to determine the theoretical and statistically significant sample size for a district-wide administration of a household questionnaire. This survey required two districts: Hurungwe and Makonde. The Makonde districts have 52,486 households (ZimStats, 2022). Hurungwe have 97726 (ZimStats, 2022). Using e = 0.05 and inserting the figures into the above equation, we obtain the theoretical DSS values for Makonde District (396) and Hurungwe (398). Thus, theoretically determined sample size of resource adequacy, the sample size would consist of 396 households in Makonde district and 398 households in Hurungwe district, However, the sample size arrived at after factoring in other considerations such as accessibility, the need to have a sample size large enough to obtain statistically significant results and the availability of resources was 200 households using the multi-stage sampling. A sample comprising at least 13% of the total number of wards in the district was considered adequate. Therefore, six wards were selected, three in each district.

The fieldwork, executed through face-to-face interviews between August and October 2024**,** was facilitated by rigorously trained agricultural extension officers who served as field enumerators. An expert panel (Agriculture extension officers) reviewed the interview questions to ensure they cover all relevant aspects of the topic and that the wording is unambiguous. Respondent and location selection utilised a systematic multi-stage sampling technique, proceeding hierarchically from districts to wards, and subsequently to the random selection of villages and individual farm households. This technique was considered the most appropriate for this study because district-level sampling frames were unavailable. The first stage involved purposive selection of two districts (Makonde and Hurungwe) from the seven districts in the study area. The selection of these districts was based on the intensity of SHFs' vegetable production. These districts are characterised by intensive vegetable production by SHFs for wholesale marketing. The second stage involved the random selection of three wards in each district where communities are engaged in Horticultural production, for a total of six wards. The selection of these wards was guided by information obtained from agricultural extension workers and Non-Governmental Organisations (NGOs) that were operating in the districts.

Furthermore, the area's accessibility was another criterion considered in identifying these wards. The third stage employed cluster sampling to select six villages (clusters) from each of the six wards. At the household level, cluster sampling with probability proportional to size was used to select households from the sampling frame provided by the local village extension officer. Of the total sample of 200 smallholder horticulture farmers, 192 were ultimately interviewed in both districts. The three wards in each district are: wards 6, 15, and 19 in Makonde District and wards 3 and 23 in Hurungwe District.

Statistical analysis

Following the collection, the raw data were systematically coded and transcribed into a digital format. This dataset was then imported into two dedicated statistical software platforms, SPSS (version 23) and Stata 15/SE, to facilitate rigorous econometric analysis. The initial analytical phase involved computing descriptive statistics. A chi-square of goodness of fit was performed:

Ho 1 was: Linking smallholder horticulture farmers to a market aggregator (cooperative) has no effect on farmers' access to information on produce safety and quality standards required for horticulture high-value markets. Interviewed farmers were asked to respond to the following statement in the questionnaire: The aggregator frequently informs me of the food safety and quality standard requirements of target markets.

A second chi-square of goodness of fit was performed:

Ho 1(b): The integration of smallholder horticulture farmers into an aggregator-mediated supply chain yields no statistically significant effect on the farmers' capacity to access granular and timely information regarding the prevailing price structure and price fluctuations within targeted high-value horticultural markets.

In both cases, data were collected using a four-point Likert scale, where 1 = strongly agree and 4 = strongly disagree.

Results and discussion

Demographic characteristics of farmers

Table 1: Household demographic characteristics of farmers

Variables	District		Total
	Makonde	Hurungwe	
Sample size(N)	**98**	**94**	**192**
Gender of household head (%)			
Males	72%	69%	70.5%
Females	28%	31%	29.5%
Marital Status (%)			
Married	73.3%	77.2%	75.3%
Single	2.1%	3.0%	2.6%
Divorced	2.4%	2.7%	2.6%
Widowed	22.2%	17.1%	19.7%
Educational Levels (%)			
Primary education	40.2%	37.1%	38.7%
Secondary Education	58.1%	61.7%	60%
Tertiary Education	1.7%	1.2%	1.5%

Table 1 summarises the descriptive statistics of the farmers' demographic characteristics in the study area. Provides the household demographic characteristics of farmers from the study areas. A total of 192 respondents were considered for this sample. The majority of households in the study area were male-headed (70.5%), and all household heads in the wards of the two districts had attained some primary education. The three Hurungwe Districts had the highest proportion of farmers with post-primary education (61.7%), followed by the three Makonde (58.1%). However, a small proportion of horticultural farmers in these two districts of Mashonaland West Province had attained some tertiary education (1.5%). According to Musasa et al. (2015), the literacy levels of smallholder farmers and middlemen are critical, as they facilitate the flow of product information and knowledge within the value chain. The majority of interviewed horticulture farmers were married (75.3%). Hurungwe district had most of the household heads being married (77.2%), followed by the three districts in Makonde (73.3%).

Socio-economic characteristics of farmers

Table 2 below summarises the socio-economic characteristics of farmers in the surveyed wards of the two districts. The average age of farmers did not vary significantly across the surveyed districts, with

a mean of 44 years in Makonde District and 44 years in Hurungwe District. The mean age of the two districts combined was 44 years. This figure also corresponds to the average age group sampled in the Zimbabwe Livelihoods Assessment Committee (Zim Lac, 2024). The high concentration of young vegetable farmers in the two Districts may be attributed to the availability of irrigation schemes, which are often lucrative and therefore attractive to young farmers. The average household size was approximately four individuals, and respondents had an average of 13 years of experience in vegetable farming. The mean household size did not vary significantly among the survey districts. Both the Makonde and Hurungwe districts had the same average household size across the surveyed wards. The average household size obtained in the study was the same as that reported in the 2022 census (Zimstat, 2022): 4.1. Hence, this might be attributed to the fact that the period between the census and this survey was only two years; therefore, no significant population growth could have occurred in the districts.

Table 2: Summary statistics of socio-economic characteristics of respondents

Variables	**Districts**				**Overall**
	Makonde		**Hurungwe**		
Sample Size N	98		94		192
Farmer Characteristics					
	Mean	**SD**	**Mean**	**SD**	**Mean**
Age	44	2.5	44	0.5	44
Household Size	4.2	0.21	4.3	0.26	4.3
Sources of Household income					
	Mean	**SD**	**Mean**	**SD**	**Mean**
Crops amount	870.22	320.16	790.72	490.23	830.46
Livestock amount	320.00	414.20	200.00	397.16	260.00
Salary amount	725.25	862.14	625.34	704.17	675.30
Pension amount	0	0	0	0	0
Remittances	400.00	10	326.14	7	363.07

SD= Standard Deviation

Extension Services

The delivery mechanisms of agricultural extension services are diverse, encompassing activities such as farmer training, cooperative formation, commodity-specific interest groups, on-farm demonstrations, competitive events, field days, study tours, and direct farm consultations (Hanyani-Mlambo, 2000). These methodologies can be broadly categorised into three dominant approaches: **(i)** the group-based approach, (ii) the individualistic, one-on-one consultation model, and (iii) indirect methods via mass media (e.g., radio and television). Recognising the need for adaptive information dissemination, extension agents typically adopt a mixed-methods strategy, utilising a combination of these approaches tailored to the specific content being transmitted.

The study analysed the utilisation patterns across five distinct socio-economic farm classifications (peasant classes) and revealed statistically significant disparities in the adoption of these extension modalities. Specifically, farmers categorised as poor and penurious exhibited a disproportionately higher reliance on and frequency of access to group-based extension services. This observed correlation is structurally underpinned by the logistical advantages and cost-effectiveness inherent in aggregating farmers within localised Community Areas (CAs).

Conversely, although no statistically significant variation in access to extension information disseminated through mass media (radio and television) was observed across farm classes, a clear

divergence emerged in individualistic approaches. A significantly greater proportion of middle-rich (77.4%), rich (50%), and middle (54.5%) farmers reported accessing extension services through individual farm visits, with frequencies ranging from 2 to 6 encounters during the 2023/24 agricultural season (Table 3). This heterogeneity suggests a differentiated provision of high-contact extension services, potentially reflecting the ability of extension systems to prioritise individuals or groups based on perceived need, expected return, or logistical efficiency.

According to Table 3, the observed dominance of group-based extension modalities within the lower strata of the agricultural sector carries significant theoretical and empirical implications for this study. A government objective fundamentally drives this prevalence to minimise the marginal cost of delivering extension services per beneficiary.

This resource-allocation rationale mirrors the core economic justification for agricultural cooperatives in both input procurement and output marketing: the imperative to reduce transaction costs by aggregating purchasing and marketing activities. By pooling the demand for extension services, the government achieves scale economies akin to those sought by small-holding horticulture farmers in their commercial operations.

Specifically, the long-standing use of this group extension approach—a method continuously employed by the Government of Tremendous since independence, particularly when targeting smallholder horticulture farmers—is a testament to its perceived cost-effectiveness and administrative efficiency.

Table 3: Frequency of Public Extension services to farmers

	Penury		Poor		Middle		Middle Rich		Rich		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Number of times group extension method was used												
0	1	6.7	25	32.9	15	22.7	0	.0	0	.0	41	21.4
>2	8	53.3	15	19.7	15	22.7	7	22.6	1	25	46	24
2-6	6	40.0	33	43.4	36	54.5	24	77.4	2	50	101	52.6
<6	0	.0	3	3.9	0	.0	0	.0	1	25	4	2.1
Number of times individual extension method approach was used												
0	5	33.3	28	36.8	27	23	23	74.2	3	75	86	44.8
>2	7	46.7	45	59.2	35	7	7	22.6	0	.0	94	4.0
2-6	3	20.0	3	3.9	4	6.1	1	3.2	1	25.0	12	6.3
Number of times mass media extension method was used												
0	15	100	75	98.7	64	97.0	31	100	4	100	189	98.4
>2	0	,0	1	1.3	2	3.0	0	,0	0	0	3	1.6

Source: Survey Data

Chi-square of goodness of fit test results

Farmer access to food safety and control standards

A chi-square of goodness of fit was performed. The Chi-squared Goodness-of-Fit Test is appropriate here because it is specifically designed to assess whether the observed frequency distribution of a single categorical variable differs significantly from a hypothesised or expected distribution. The **Ho 1** was: Linking smallholder horticulture farmers to a market aggregator (cooperative) does not affect enhancing farmers' access to information on produce safety and quality standards required for horticulture high-value markets. Interviewed farmers were asked to respond to the following statement in the questionnaire: The aggregator frequently informs me of the food safety and quality standard requirements of target markets. The test statistics (Table 4) present the actual goodness-of-

fit chi-square statistic. Data was collected using a four-point Likert scale where one was equal to strongly agree, and four was strongly disagree.

Table 4: Farmer access to food safety and control standards

	Observed N	Expected N	Residual
Strongly agreed	114	48,0	65.78
Agree	36	48,0	-12.44
Disagree	14	48.0	-33.78
Strongly Disagree	28	48.0	-19.56
Total	192		
Test Statistics			
Chi -Square 125.112			
Df 3			
Asymp Sig << ,001			

Source: Survey Data

The empirical analysis yields a statistically significant association between smallholder farmers' linkage to an aggregator (cooperative) and the effective dissemination of information on food safety and quality (FSQ) standards required by contemporary horticultural value chains. The Chi-square test results ($\chi 2$ (3) = 125.112, $p < 0.001$) decisively warrant rejection of the null hypothesis of independence, confirming a non-random relationship.

A substantial majority of surveyed farmers (78%; n=150) agreed or strongly agreed that the aggregator served as a critical conduit for FSQ requirements information. This transfer mechanism primarily operates through two channels:

Formal and Technical Capacity-Building**:** Farmers reported participation in training sessions or receiving technical visits from Extension Officers/Lead Farmers associated with the cooperative. The curriculum focused on enhancing productive and post-harvest compliance, including: Market-driven varietal selection for horticultural crops. Structured farm production planning, crop scheduling, and rotation. Best practices for the handling, application, and disposal of agrochemicals, fertilisers and crop protection chemicals.

Post-harvest management protocols, specifically contamination prevention, sanitation and appropriate storage/transport. Farm-level record keeping. Cost management for enhanced enterprise profitability.

Market-Driven Feedback Loop**:** Farmers also received information directly from the aggregator's buying officer during the grading/sorting process at the point of delivery. Rejection or downgrading of produce triggered an immediate feedback mechanism, in which the purchasing officer justified their decision by citing violations of the standards.

While the grading process serves as a crucial point of standards enforcement and information reinforcement, it was also identified as a significant source of tension between the aggregator and its suppliers.

A compelling finding is the inverse relationship between the frequency of produce rejection and the farmer's level of trust in the aggregator. Specifically, all smallholder farmers whose trust score in the cooperative was 5 points or below (on a 10-point scale) reported rejection of their produce on multiple occasions due to disputes over quality standards.

This empirical observation aligns with the established literature, particularly Muradian's (2013) argument, which posits that the imposition of stringent market standards inherently generates internal conflicts with members who struggle to achieve consistent compliance. The resulting

exclusionary grading practices or perceived unfairness erode farmer-aggregator trust, leading to lower group identification and commitment, which ultimately constitute significant governance frictions and impediments to the cooperative's overall business performance.

Farmer information on produce prices

A chi-square of goodness of fit was performed. **Ho 1(b):** The integration of smallholder horticulture farmers into an aggregator-mediated supply chain yields no statistically significant effect on the farmers' capacity to access granular and timely information regarding the prevailing price structure and price fluctuations within targeted high-value horticultural markets, according to Table 5 below.

The empirical analysis, leveraging a cross-sectional survey instrument, utilised a chi-square test of independence (or goodness-of-fit, depending on the exact specification) to evaluate farmers' perceptions of the aggregator's frequency of disseminating market price information.

- Test Statistic: $chi^2(3) = 78.76$
- Significance Level p: $p < 0.001$

Given that the resultant p-value (0.011) falls below the conventional alpha = 0.05 threshold, the null hypothesis is decisively rejected.

The observed heterogeneity between the expected and actual farmer perceptions regarding information access is statistically significant. This compelling evidence supports the conclusion that the institutional linkage between small-scale commercial horticultural producers and a market aggregator significantly and positively enhances farmers' access to critical price information for high-value market channels.

This finding aligns with previous literature on market organisation—specifically, the observations of Ampaire et al. (2013)—which demonstrate that organised rural producer entities frequently mitigate information asymmetry by effectively providing members with essential market intelligence, thereby facilitating more informed resource allocation and market participation decisions. In this context, the aggregator functions as a mechanism to reduce transaction costs associated with information search.

Table 5: Farmers' information on produce prices

	Observed	Expected	Residual
Strongly Agree	99.56	48.00	51.56
Agree	28.44	48.00	-19.56
Disagree	21.33	48.00	-26.67
Strongly disagree	42.67	48.00	-5.33
Total	192		
Test Statistic Chi-Square = 78.76 Df= 3 Asmp significant < 0.001			

Source: Survey Data

Primary data analysis indicates that the interviewed producers relied on direct interaction with the cooperative's aggregator as the primary conduit for price discovery. This mechanism, embedded within the existing vertical coordination structure, mitigated typical search costs. Specifically, price signalling typically occurred either contemporaneously with the weekly spot market transaction (produce delivery) or via pre-delivery inquiry (telephone consultation), thereby reducing information asymmetry before transaction commitment.

Conclusions

The analysis decisively demonstrates that the institutional innovation of market aggregators (cooperatives) is a statistically significant and highly effective mechanism for mitigating critical informational and structural transaction costs faced by smallholder horticultural farmers (SHFs) in Mashonaland West Province, Zimbabwe. The findings provide empirical validation for the aggregator model as a vital component of an enabling environment essential for integrating SHFs into modern, high-value, and vertically coordinated agri-food value chains.

Enhanced Access to Quality and Safety Information: The chi-square test ($chi^2(3) = 125.112$ ($p < 0.001$) strongly rejects the null hypothesis, confirming that aggregator linkage significantly enhances farmers' access to Food Safety and Quality (FSQ) standards. The aggregator functions as a critical conduit for technical capacity building, providing market-driven varietal selection, production planning, post-harvest protocols, and training in agrochemical management, thereby bridging the compliance gap.

Mitigation of Price Asymmetry: Similarly, the chi-square test ($chi^2(3) = 78.76$, $p < 0.001$) rejects the null hypothesis regarding price information. The aggregator-mediated supply chain significantly improves price discovery and access to timely price intelligence, thereby reducing the information search transaction costs typically borne by individual SHFs and enabling more informed resource allocation and marketing decisions.

Governance Frictions and Trust Erosion: A critical counter-finding is the observation that the stringent application of FSQ standards—while necessary for market access—is a significant source of governance friction. Frequent produce rejections erode farmers' trust in the aggregator, potentially reducing commitment and undermining the cooperative's long-term business performance. This highlights the delicate balance between market performance (compliance) and social performance (inclusivity and trust) in vertical coordination.

Differentiated Extension Access: The study confirms a heterogeneous pattern in extension service delivery, with resource-poor farmers disproportionately relying on cost-effective, group-based methods, while wealthier farmers benefit more from high-contact, individualistic farm visits. This suggests a socio-economic bias in the distribution of high-value technical information, which aggregators must actively address to ensure inclusive growth.

These conclusions point to the following strategic policy and research imperatives and recommendations:

-Mandate for Institutionalising Feedback Mechanisms: Policymakers and donor agencies should incentivise and potentially mandate that market aggregators implement transparent, evidence-based, and auditable grading and rejection protocols. This should include a formalised appeals/dispute resolution mechanism. The rationale is that this moves beyond technical training to address the institutional quality of the contract/relationship. It is essential for managing the trust-compliance trade-off and enhancing the legitimacy and sustainability of the aggregator model, thereby minimising the risk of farmer exit or opportunism.

-Investment in Shared-Use Post-Harvest Infrastructure: Prioritise public and private investment in shared-use post-harvest infrastructure (e.g., cold storage, packhouses, shared logistics) at the community level, strategically co-located with aggregators. The rationale is that most FSQ compliance failures occur during post-harvest handling and transport. This investment would lower the capital cost barrier for smallholders to comply with standards, thereby transforming FSQ from a purely production concern into a shared value-chain responsibility.

-Integrating Information Communication Technology (ICT) for Timely Information: Agricultural extension services and aggregators must move beyond traditional methods by developing ICT-mediated platforms for disseminating real-time, granular price and FSQ updates. Given the high frequency of price fluctuations in horticultural markets and the need for immediate FSQ feedback, timely information is paramount. This would reduce reliance on face-to-face interaction for basic data, freeing Extension Officers for higher-value technical advisory services, particularly for the large number of farmers who rely on group extension.

Subsequent econometric research should utilise a structural equation modelling (SEM) or instrumental variables (IV) approach to formally model the recursive relationship between trust in the aggregator, the frequency of produce rejection (governance friction), and the outcome of market participation intensity (e.g., share of output sold). This would provide a robust, causal understanding of how institutional quality—not just information access—drives commercial success and inform policies aimed at fostering truly inclusive value chains.

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