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Toward resilient agrifood institutions: Evaluating farmer corporations in the context of shallot value chains in Indonesia

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Abstract

Building resilient horticultural systems is critical in the face of climate variability, market instability, and institutional fragmentation. In Indonesia, farmer corporations have emerged as institutional arrangements intended to strengthen coordination among smallholder farmers and improve agribusiness development. However, limited attention has been given to how farmer corporations operate within the horticultural value chain and contribute to local resilience. This study examines the role of farmer corporations in strengthening the shallot value chain in Majalengka Regency, West Java, Indonesia. This analysis focused on institutional coordination, governance mechanisms, and development priorities within the shallot value chain. The evidence shows that farmer corporations can strengthen resilience by enhancing institutional coordination, collective bargaining, market access,

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production support, and adaptive capacity in the face of climate and market uncertainty. Institutional integration among farmer groups, farmer group associations, cooperatives, government agencies, and private-sector actors was found to be important for strengthening shallot agribusiness governance and promoting long-term horticultural development. This study contributes to the literature by positioning farmer corporations as farmer-based institutional integration mechanisms, rather than conventional investor-driven corporations. Our results emphasize the need for institutional governance customized to local conditions and collaborative value chain coordination in developing resilient horticultural systems in Indonesia and other agribusiness settings.

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Keywords
farmer corporations, institutional integration, collective action, shallot value chains, agrifood resilience, Indonesia

Introduction and Literature Review

Building resilient agribusiness systems is becoming increasingly critical in the face of climate variability, market instability, and stress on rural livelihoods (Béné et al., 2016). Resilient agribusiness systems are expected to strengthen local communities' adaptation capacity in the face of economic and environmental uncertainty, rather than just maintaining

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food production and distribution (Hinrichs, 2014; Tendall et al., 2015). Horticultural systems face unique resilience problems because the output is heavily reliant on seasonal variables, input availability, market fluctuations, and postharvest management. Consequently, strengthening institutional coordination among farmers and other stakeholders is crucial for the long-term development of the horticulture sector.

Farmer organizations play an important role in improving coordination across the agricultural value chains. Previous studies have demonstrated that farmer groups, cooperatives, and collective institutions can increase access to agricultural inputs, extension services, financing, and markets while boosting bargaining power and lowering transaction costs (Rout et al., 2023). Institutional collaboration also promotes information sharing, technological adoption, and collective responses to production and market risks (Folke, 2016; Pani et al., 2022). Thorsøe et al. (2020) emphasized the importance of institutional integration in horticultural systems, where farmers often operate on a small scale and experience substantial price fluctuations.

In Indonesia, institutional strengthening in agriculture is increasingly centered on forming farmer corporations. A farmer corporation differs from the conventional definition of a corporation, which is an investor-driven agribusiness. According to Indonesian agricultural policy, a farmer corporation is a legally incorporated collective business entity formed by combining farmer groups, farmer group associations, cooperatives, and other local agribusiness actors to improve value addition, competitiveness, and farmer welfare (Anggreany, 2025; Suharti et al., 2025). These institutions are intended to manage production, finance, input distribution, processing, and marketing operations within a farmer-centered governance structure (Safitri et al., 2024; Susanti, 2024). This system is intended to increase smallholder farmers' collective negotiating power, operational efficiency, and involvement in larger agricultural markets (Jamaludin et al., 2025).

In practice, farmer groups serve as local production units that facilitate extension operations, irrigation coordination, and communication among farmers. Farmer group associations organize activities among farmer groups at the village or subdistrict level, acting as liaisons between farmers and government initiatives. Cooperatives provide a wider range of economic services, such as financing, input procurement, and group marketing. Farmer corporations broaden these functions by incorporating upstream and downstream agricultural operations into larger-scale institutional and market coordination systems (Suharti et al., 2025). Farmer corporations do not replace current farmer organizations; rather, they serve as institutional integration mechanisms that connect various farmer-based organizations within a coordinated value chain framework (Anggreany et al., 2026). The operational structure of farmer corporations in Indonesia's horticultural system is illustrated in Figure 1.

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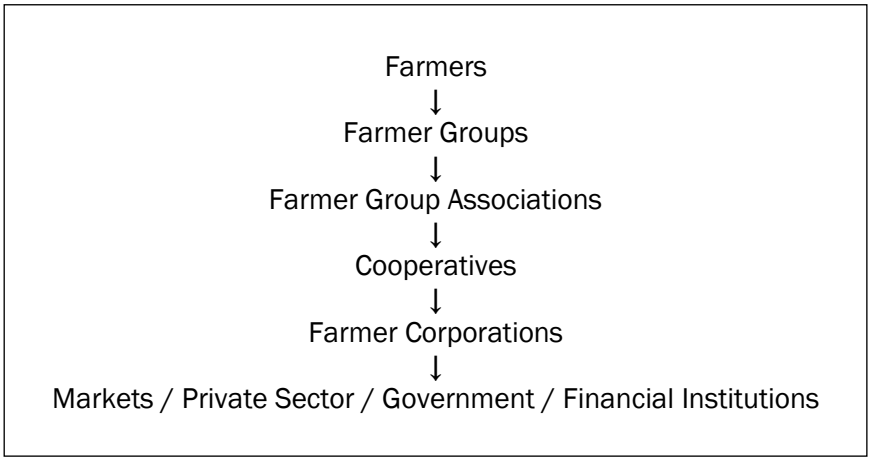
Figure 1. Operational Structure of Farmer Corporations in the Indonesian Horticultural System



Although policy support for farmer corporations in Indonesia is growing, empirical studies examining the contribution of institutional arrangements to resilient horticultural systems are limited. Existing studies have largely focused on cooperatives, farmer participation, or technical aspects of agricultural production (Azka et al., 2019; Adinugraha et al., 2025; Usna et al., 2025; Alatas et al., 2026), while insufficient attention has been paid to operational integration among farmer institutions and their role in strengthening adaptive capacity within the horticultural value chain. Consequently, evidence remains limited regarding how farmer corporations function as institutional integration mechanisms that enhance resilience within horticultural value chains. In particular, studies examining how farmer corporations function as governance mechanisms embedded in local contexts that link farmer organizations, market coordination, and institutional support under conditions of climate and market uncertainty are limited.

The shallot value chain serves as an ideal case study for examining these issues. Shallots are one of Indonesia's strategic horticultural commodities and make a significant contribution to rural income and the regional food system. However, the shallot value chain remains highly vulnerable to price fluctuations, pest and disease outbreaks, climate variability, limited access to quality inputs, and a fragmented marketing system (Nisa & Amirah, 2025; Cahyani et al., 2026). These conditions require stronger institutional coordination to support production stability, market access, and risk management. In Majalengka Regency, West Java, the shallot value chain increasingly involves farmer-based institutional collaboration through farmer groups, cooperatives, and emerging farmer corporations.

This study examines the role of farmer corporations as institutional mechanisms for strengthening resilience within the shallot value chain in Majalengka, Indonesia. It analyzes institutional roles, farmer perceptions, and strategic priorities related to the development of the shallot value chain through integrated farmer-based institutions. By positioning farmer corporations as a model of institutional integration rooted in the local context rather than as conventional commercial corporations, this study contributes to the broader literature on resilient agribusiness governance within horticultural systems.

Applied Research Methods

Research Site

The study was conducted in the subdistricts of Argapura and Cingambul, Majalengka Regency, West Java, Indonesia, from June to August of 2024. The study area is among the main shallot-producing regions in Majalengka and represents diverse agroecological conditions and agricultural systems related to the production of shallots. The shallot value chain plays a vital role in the livelihoods of local rural communities and in the development of horticulture at the regional level.

Data Collections

This study combines farmer surveys, stakeholder discussions, institutional interviews, and field observations to examine the institutional conditions and development of farmer-corporation-based shallot value chain. Data were collected from shallot farmers, farmer organizations, government representatives, researchers, and private-sector stake-

holders involved in the development of the shallot value chain in Majalengka. A summary of the respondents and institutional stakeholders is presented in Table 1.

Table 1. Summary of Respondents and Institutional Stakeholders

Stakeholder	Role
Farmers	Production activities
Farmer groups	Local coordination
Farmer group associations	Intergroup coordination
Cooperatives	Financing and marketing
Government agencies	Policy support
Researchers/universities	Technology and extension

The farmer survey was conducted through face-to-face interviews using a structured questionnaire with 127 shallot farmers selected from Argapura and Cingambul. This survey explored farming conditions, institutional participation, production constraints, market conditions, and farmers' perceptions of the role of farmer organizations in the shallot value chain.

Stakeholder discussions and institutional interviews were conducted with representatives of farmer groups, farmer group associations, cooperatives, local government agencies, universities, researchers, and private sector actors in the study area. The discussions focused on institutional coordination, market challenges, policy support, and strategic priorities to strengthen the development of the shallot value chain through the establishment of farmer corporations. Field observations were conducted to understand local agricultural practices, institutional activities, and production conditions.

Data Analysis

The analysis focused on institutional roles, farmer perceptions, and strategic priorities related to developing the shallot value chain. A descriptive analysis was used to examine the farmer characteristics and institutional conditions. Farmers' perceptions of the shallot value chain and institutional performance were evaluated using a response scale and interpreted into general perception categories (Appendix A).

A strategic analysis was conducted using a SWOT framework to identify the institutional strengths, weaknesses, opportunities, and threats related to the development of farmer-corporate-based shallot value chains in the region. This analysis was developed through stakeholder assessments and cross-factor evaluations to formulate institutional development priorities and operational recommendations aimed at strengthening a resilient shallot value chain in Majalengka (Appendix B).

Results and Discussion

This section presents and discusses the institutional conditions of shallot farming, the operational roles of farmer-based institutions, and the role of farmer corporations in strengthening the value chain's resilience. It then considers the strategic priorities for improving institutional integration and supporting resilient shallot value chain development in the study area.

Institutional Conditions in Shallot Farming

The shallot value chain in Majalengka is dominated by small-scale farming systems that remain heavily reliant on family labor, local production networks, and seasonal market conditions (Appendix C). Despite the economic importance of shallot cultivation, farmers continue to face significant production and marketing challenges. Climate variability, pest and disease outbreaks, price fluctuations, limited access to certified seeds, and dependence on local traders are the major obstacles that affect production stability and income security. Similar challenges have been reported across the horticultural value chain in Indonesia, where production risks and a fragmented market structure often limit farmers' ability to respond effectively to market and environmental shocks (Widadie et al., 2021). Dependence on informal marketing arrangements also weakens farmers' bargaining positions because traders often determine prices and control short-term financing mechanisms (Anggreany et al., 2026). These conditions indicate that the development of resilient shallot value chains requires stronger institutional coordination, not merely production activities at the farmer level. Institutional support is needed not only to improve production efficiency, but also to strengthen market coordina-

tion, collective bargaining, access to innovation, and risk management amid climate and market uncertainties. The main challenges in the institutional framework and shallot value chain are summarized in Table 2.

Table 2. Major Institutional and Production Challenges in the Shallot Value Chain

Challenge	Institutional implication
Climate variability	Production instability
Price fluctuation	Weak bargaining power
Limited certified seed	Productivity constraints
Pest and diseases outbreaks	Production risk
Market dependence	Vulnerability to intermediaries

Farmer Institutions and Operational Coordination

Farmer organizations play distinct, yet interrelated, roles in supporting the shallot value chain in Majalengka. Farmer groups primarily function as local production units that facilitate extension activities, irrigation management, communication among farmers, and access to agricultural assistance programs. The associations of farmer groups provide broader coordination among farmer groups and strengthen communication between farmers and government agencies. These organizational forms serve as vital mechanisms for collective action, facilitating information exchange, coordination, and participation in agricultural development programs (Ahmad et al., 2024; Kartika et al., 2026). Cooperatives function as economic institutions that support financing, input procurement, collective marketing, and production. Cooperatives also strengthen collective action by organizing transactions and reducing individual dependence on intermediaries. Previous studies have shown that cooperatives can improve farmers' access to inputs, financing, and markets, while reducing transaction costs through collective organization (Dong et al., 2019; Gava et al., 2021; Qiu et al., 2024; Kale et al., 2025). Farmers' perceptions of farmer organization performance and their preferences regarding institutions in the corporate-based shallot value chain are presented in Appendix D.

Although these institutions contribute to local agribusiness activities, coordination among them remains limited, particularly in technology dissemination, financing access, agricultural insurance, and market integration. A lack of coordination among supporting institutions often hinders innovation diffusion, market integration, and the expansion of collective agribusiness initiatives (Widadie et al., 2022). These challenges limit the effectiveness of local institutions in supporting adaptive and competitive horticultural systems. Figure 2 illustrates the institutional coordination within the shallot value chain.

Our results suggest that institutional differentiation alone is insufficient to strengthen the resilience. The effectiveness of farmers' organizations depends on their ability to coordinate complementary functions in the areas of production, financing,

Figure 2. Institutional Coordination within the Shallot Value Chain

market governance, and institutional support. Therefore, institutional integration is a key requirement for strengthening the adaptive capacity within horticultural value chains.

Farmer Corporations as Institutional Integration Mechanisms

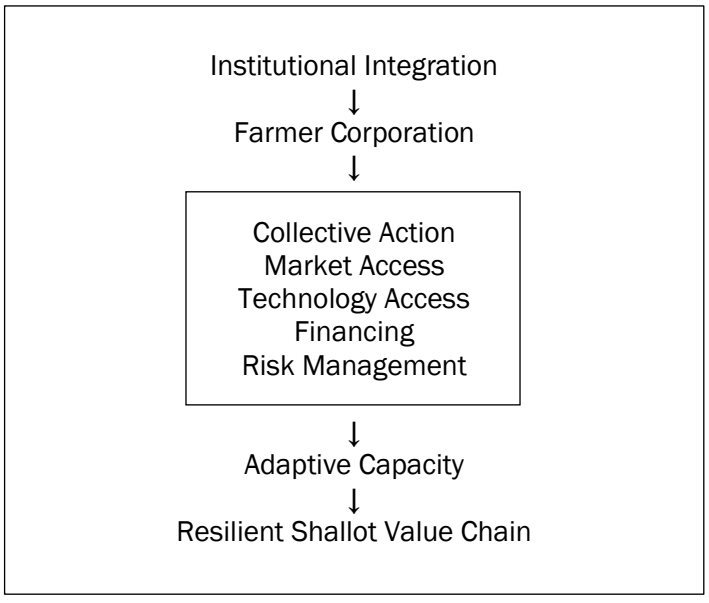
The development of farmer corporations in Majalengka demonstrates an institutional integration approach aimed at strengthening coordination within the shallot value chain (Figure 3). In the Indonesian context, farmer corporations differ from conventional investor-oriented agribusinesses. The farmer corporations in question do not replace existing farmer organizations but rather integrate farmer groups, farmer group associations, cooperatives, and agribusiness services into a coordinated farmer-based governance structure (Jannah et al., 2022).

Operationally, farmer corporations expand the functions of existing farmer organizations by integrating production coordination, financing, input distribution, post-harvest management, and market access into a larger institutional framework. This institutional arrangement enables smallholder farmers to participate collectively in simultaneous value chain activities while maintaining community-based ownership and decision-making processes. A similar institutional integration approach has been linked to closer coordination among production, financing, and marketing functions within smallholder-centered value chains (Widadie et al., 2022).

The results indicate that farmer corporations can strengthen resilience within the shallot value chain through several mechanisms, including collective bargaining, coordinated market access, technological support, financing access, and adaptive responses to climate and market risks. Institutional integration also creates opportunities for stronger partnerships between farmer organizations, government agencies, research institutions, and private sector actors. Such collaboration is essential for increasing technology adoption, strengthening local agribusiness governance, and supporting the long-term sustainability of horticultural systems. Institutional resilience is further strengthened if farmers can collectively coordinate resources, share information, and develop adaptive measures to address environmental and market uncertainties (Folke, 2016; Pani et al., 2022).

Our results suggest that resilience in the shallot value chain is not driven by individual farmer organizations acting independently. Rather, this resilience arises from institutional integration, which enables complementary functions in production, financing, market coordination, innovation support, and risk management. This highlights the importance of farmer corporations as a governance mechanism that connects various stakeholders within coordinated agribusiness systems.

Figure 3. Farmer Corporations as Mechanisms of Resilience



Strategic Priorities for Resilient Shallot Value Chains Development

The strategic assessment highlights that resilient shallot value chains require integrated institutional strategies that combine production support, institutional strengthening, market coordination, and climate adaptation. Although Majalengka benefits from favorable agroecological conditions, institutional support, and expanding market opportunities, farmers continue to face major challenges related to climate variability, unstable prices, pest and disease outbreaks, limited technology adoption, and financing con-

straints. The detailed SWOT results are presented in Appendix E.

Our results indicate that resilient shallot value chains require an integrated institutional strategy that combines production enhancement, institutional strengthening, market coordination, and climate adaptation (Table 3). Strengthening production systems requires land optimization, improved irrigation management, stronger seed systems, and broader access to technological innovations. Productivity gains are often more sustainable when technological advancements are combined with institutional support and management of local resources (Rosenstock et al., 2020; Vishnupriya et al., 2023).

Institutional strengthening is equally important for improving coordination across all agribusiness activities, from upstream to downstream. Farmer cooperatives and corporations can play a strategic role in organizing collective marketing, facilitating access to financing, strengthening farmers' bargaining power, and expanding market networks to achieve this goal. Institutional integration also enables stronger coordination among farmers, government agencies, researchers, and private sector actors to address production and market challenges. Effective value chain governance depends not only on increased production but also on institutional arrangements that facilitate market coordination and collective decision making (Widadie et al., 2022).

Climate adaptation is also a critical strategic priority. Adaptive capacity is increasingly recognized as a vital component of resilient agribusiness systems, particularly in the horticulture sector, which is vulnerable to climate fluctuations (Soesilowati et al., 2026). Increasing climate uncertainty requires adaptive production planning, improved irrigation systems, diversified seed management, and more effective pest and disease management approaches. Community-based institutional coordination can strengthen collective responses to environmental risks and enhance the long-term resilience of horticultural systems (Adegoke et al., 2025).

Table 3. Strategic Priorities for Resilient Shallot Value Chains

Strategic area	Operational focus
Land optimization	Irrigation and cropping management
Institutional strengthening	Cooperative and farmer corporation governance
Technology support	Seed systems and innovation
Climate adaptation	Adaptive farming and risk management
Market integration	Collective marketing and partnerships

Conclusions

This study demonstrates that farmer corporations can serve as an institutional mechanism to strengthen the resilience of the shallot value chain in Indonesia. In the Indonesian context, farmer corporations represent a farmer-based institutional integration model that connects farmer groups, farmer group associations, cooperatives, production coordination, financing, and market governance within a collective agribusiness system, rather than operating as conventional, investor-oriented corporations.

The results indicate that institutional integration strengthens adaptive capacity, enhances collective bargaining power, facilitates market coordination, and supports a more coordinated response to climate and production risks. Therefore, the development of a resilient agribusiness system depends not only on increased production, but also on the capacity of local institutions to collaboratively coordinate upstream and downstream agribusiness activities.

The Majalengka case highlights the importance of institutional governance tailored to local conditions, strengthening farmer-based institutions, and multi-stakeholder collaboration to support sustainable shallot value chains. Policies supporting farmer corporations must focus on institutional capacity, professional management, technological support, access to financing, and long-term coordination among farmers, government agencies, research institutions, and private sector actors.

This study contributes to the broader literature on resilient agribusiness governance by positioning farmer corporations as institutional coordination mechanisms embedded in the local context of smallholder-

based horticultural systems. Our results provide practical and policy insights for other regions seeking to strengthen adaptive and inclusive agribusiness value chains amid economic and environmental uncertainty.

Policy Implications

Our results underscore the importance of institutional governance tailored to local conditions for strengthening resilient horticultural value chains. Policies supporting farmer corporations and related farmer-based institutions should focus on institutional capacity building, professional management, access to financing, technological support, and market integration rather than merely on the formation of organizations. Farmer-led institutional strengthening requires long-term collaboration among local governments, cooperatives, universities, research institutions, and private sector actors. Evidence from smallholder agribusiness systems indicates that institutional strengthening is most effective when governance, financing, technological support, and market coordination are developed simultaneously rather than through separate interventions (Widadie et al., 2022).

In this context, farmer corporations should be understood as institutional coordination mechanisms that strengthen collective agribusiness governance rather than conventional commercial enterprises. The effectiveness of these corporations depends on their ability to integrate local farmer organizations, support collective action, and coordinate value chain activities in the face of economic and environmental uncertainty.

The Majalengka case demonstrates that the development of resilient shallot value chains is closely linked to institutional integration, collaborative governance, and adaptive capacity at the local level. Strengthening these institutional arrangements can support a more inclusive, adaptive, and sustainable horticultural system in Indonesia and other regions facing similar agribusiness challenges.

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Appendix A. Farmers' Perceptions of Shallot Value Chains and the Performance of Farmers' Organizations

Farmers' perception level refers to their comprehension and interpretation of each attribute in the set of questions about shallot value chains and farmer organizations, which is then scored as a subjective view of each attribute. Farmer perceptions were assessed using a five-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Perception scores were divided into three categories of perception level intervals according to the formula by Marcelina et al. (2018):

$$Class\ Interval = \frac{Highest\ Value - Lowest\ Value}{(t2 - t1) Number of\ Class\ Intervals}$$

The perceptual level had the following class interval values: high = 3.68–5.00, medium = 2.34–3.67, and low = 1.00–2.33.

Appendix B. SWOT Analysis

A SWOT analysis was used to create a plan for developing shallots value chains based on farmer corporations in Majalengka. The analysis procedures were performed in accordance with LAN (2008) as follows:

1. Identify the internal and external elements influencing the shallot value chain in Majalengka farmer corporations, including strengths (S), weaknes (W), opportunities (O), and threats (T).
2. Identify three priority internal elements in S and W and three priority external factors in O and T.
3. The urgency value (UV) is determined to determine the factor weights (FW) for internal and external factors. The UV value was calculated by comparing the importance of one element to that of others in the group of internal and external factors. The UV value ranges from 1–5, with a higher value indicating that the relevance between one component and the other is extremely high. The FW value is derived by dividing the sum of each factor's UV by the total value of the internal and external factor groups and then multiplying by 100.
4. The key success factors (KSF) were determined by evaluating the interrelationship between internal and external factors based on their support value (SV), and calculating the support weight value (SWV), average linkage value (ALV), linkage weight value (LWV), and total weight value (TWV). The SV value ranges from 1–5, indicating that the higher the SV value, the more support a factor receives. The relatedness value (RV) is scored on a scale of 1–5, the greater the RV value, the more related the factor. KSF was chosen based on the highest TWV of each factor, S, W, O, and T. The specific calculations for each factor analysis were as follows:

   SWV = FW x SV
   ALV = Total VR/n-1
   LWV = ALV x FW
   TWV = LWV + SWV

5. Create a strength map based on the findings of the internal-external factor relationship assessment. The strength map was generated by comparing the TWV of all S values to all W values and the TWV of all O values to all T values.
6. Create a development strategy utilizing SWOT strategy formulation. The four SWOT quadrants listed in Table 1 can be used to generate four major strategies.
7. Create policy recommendations for important programs and activities using data from observations, in-depth interviews, and direct conversations with respondents.

Table B1. The SWOT Strategy Formulation

Quadrant	Strategy	Description
1	Expansion (S–O)	Utilize S to accomplish O
2	Diversification (S–T)	Use S to decrease T
3	Stability or rationalization (W–O)	Overcoming W by using O
4	Defensive or survival (W–T)	Improve W by decreasing T

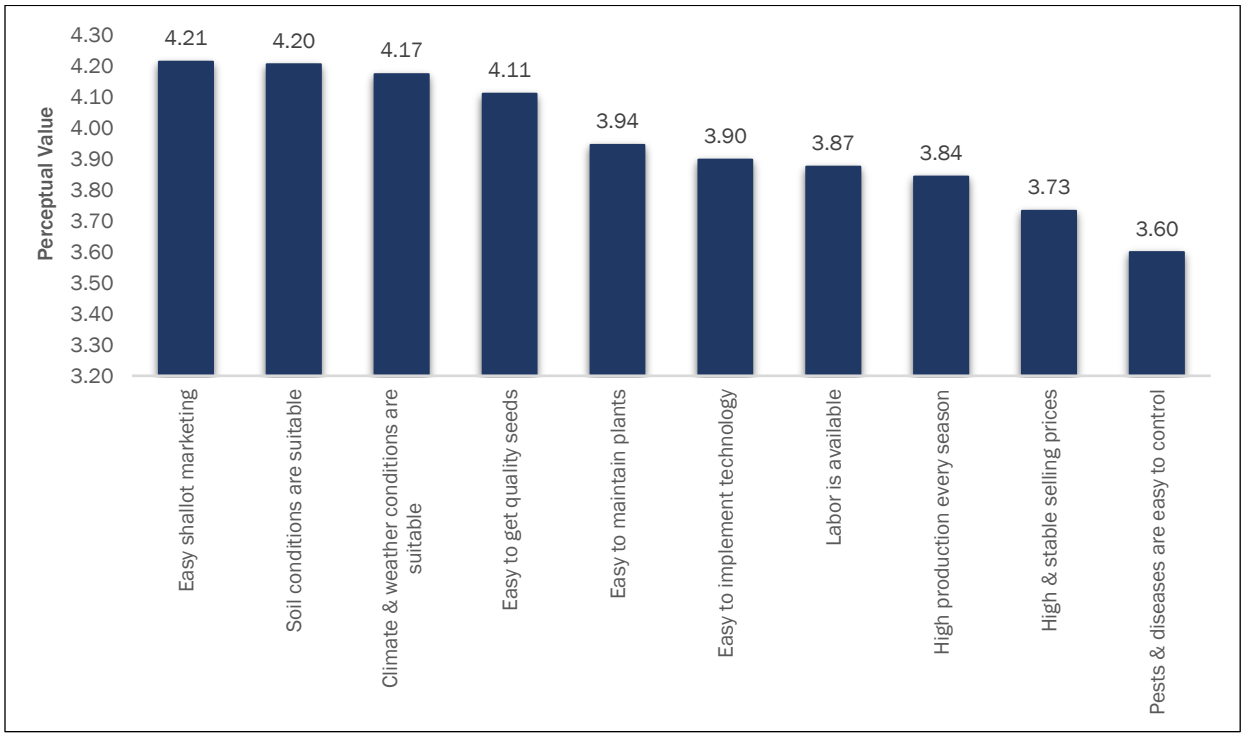
Appendix C. Characteristics of Farmers and their Perceptions of Shallot Value Chains

Table C1. Farmers' Characteristics

Description	Criteria	Amount (%)	Mean	Std.
Age (Years)	≤30	22 (15.75)	43.28	12.05
	31–40	31 (22.05)		
	41–50	43 (30.71)		
	51–60	33 (23.62)		
	≥61	11 (7.87)		
Education (Years)	≤6	52 (37.01)	9.30	3.34
	7-9	37 (26.77)		
	10–12	40 (28.35)		
	≥13	11 (7.87)		
Farming Experience (Years)	≤10	67 (48.03)	14.55	9.92
	11–20	41 (29.13)		
	21–30	25 (18.11)		
	≥31	7 (4.72)		
Number of Family Dependents (People)	≤2	38 (29.920	3.03	1.23
	3–5	86 (67.71)		
	≥6	3 (2.36)		
Cultivated Area (ha)	≤0.25	53 (37.80)	0.55	0.54
	0.26–0.50	40 (28.35)		
	0.51–0.75	11 (7.87)		
	0.76–1.00	20 (14.17)		
	≥1.00	16 (11.81)		
Household Income (USD)	≤ 122.14	34 (24.29)		
	128.24–213.74	53 (37.86)		
	219.85–305.34	28 (20.00)		
	≥ 311.45	25 (17.86)		
Household Expenditure (USD)	≤ 122.14	43 (30.71)		
	128.24–213.74	67 (47.86)		
	219.85–305.34	25 (17.86)		
	≥ 311.45	(3.57)		

Note: 1 USD = IDR 16,375 (Bank Indonesia, 2024)

Figure C1. Farmers' Perceptions of Shallot Value Chains



Appendix D. Farmers' Perceptions of Farmer Organization Performance and their Preferences Regarding Institutions in Corporate-Based Shallot Value Chains

Figure D1. Farmers' Perceptions of Farmer Organizations in Shallot Value Chains

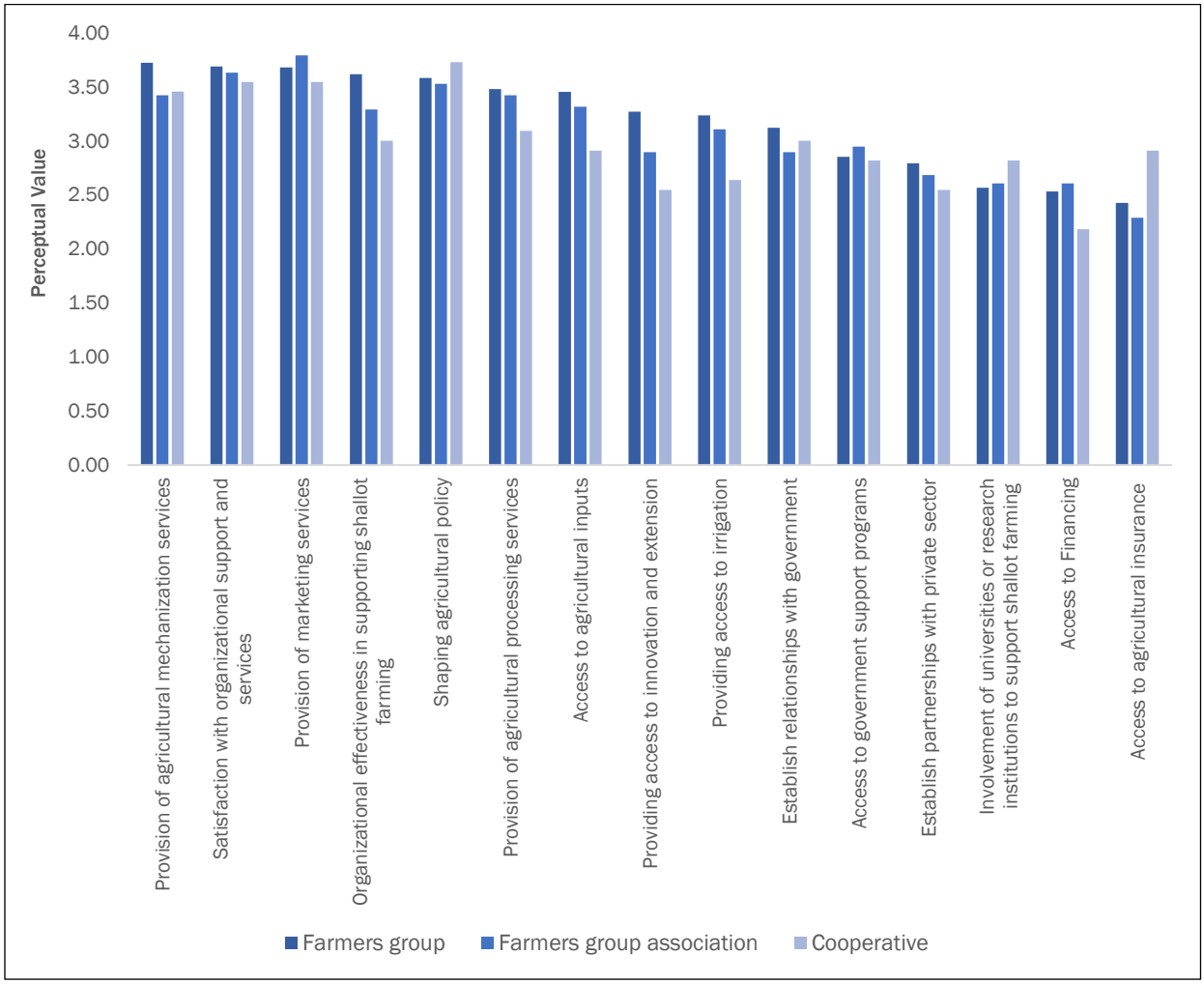
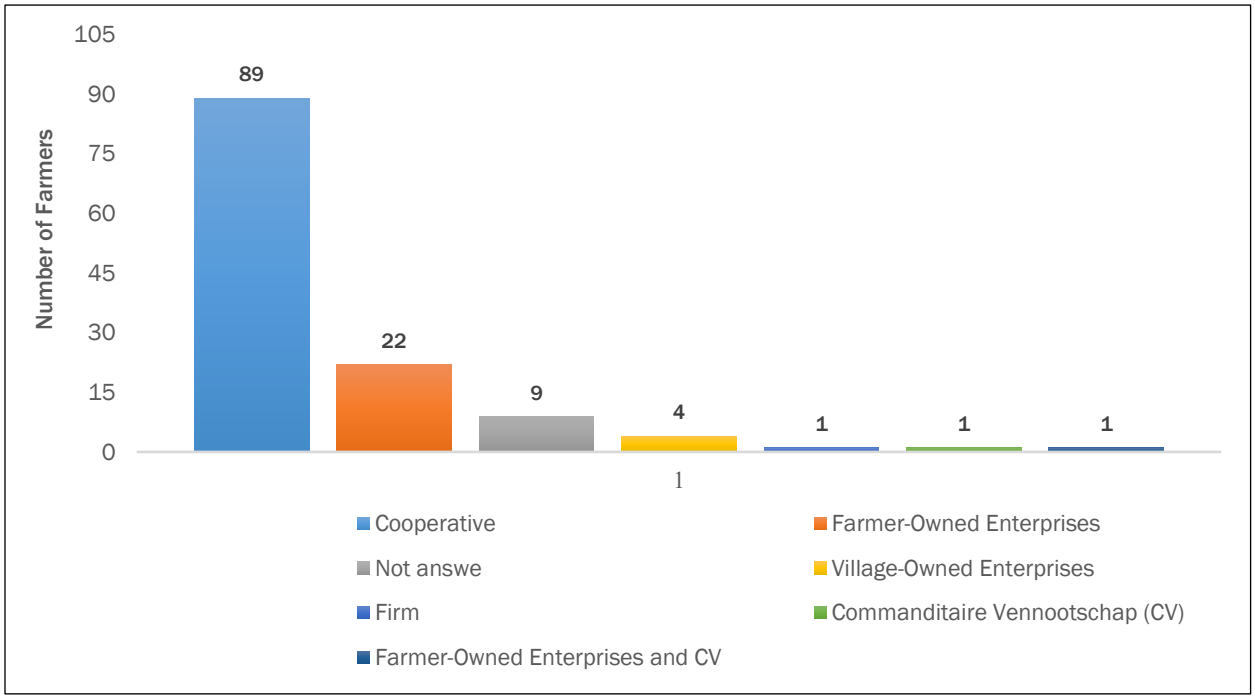


Figure D2. Farmers' Preferences Regarding Institutions Involved in the Development of Farmer Corporation-Based Shallot Value Chains



Appendix E. Results of the Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis

Table E1. Prioritized Internal and External Factors Based on the Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis

Priority	S	W	O	T
1	Land for shallot development (50.00%)	Technology was not deployed, and most farmers did not employ certified seeds (53.33%)	The market remained open (60.00%)	Extreme weather and natural disasters (63.33%)
2	Number of shallot farmers (30.00%)	Infrastructure (cold storage, shortage of seed producers in developing areas, etc.) remained limited (26.67%)	Production can co-fluctuate (30.00%)	Shallot prices often fluctuate (26.67%)
3	Government policy support (20.00%)	Limited capital (20.00%)	Development of independent farmer groups (local champions) as seed breeders (10.00%)	High pests and diseases (10.00%)

Notes: Primary data from 2024. The figures in parentheses show the percentage of participants.

Table E2. Evaluation of Internal and External Factors Based on the Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis

Internal and external factors	FW (%)	SV	SWV	ALV	LWV	TWV	KSF
S						1.39	
Land for shallot production	26.67	5	1.33	2.91	0.78	1.03	1
Number of shallot farmers	20.00	4	0.80	1.91	0.38	0.31	2
Government policy support	6.67	4	0.27	2.64	0.18	0.05	3
W						0.85	
Technology is not used and most farmers do not use certified seeds	20.00	4	0.80	3.18	0.64	0.51	1
Infrastructure (cold storage and scarcity of seed providers in developing areas) remains restricted	20.00	3	0.60	2.64	0.53	0.32	2
Limited capital is available	6.67	3	0.20	2.18	0.15	0.03	3
O						1.08	
The market remains open	26.67	4	1.05	3.09	0.81	0.85	1
Production levels can still be increased	13.33	3	0.40	2.55	0.34	0.14	2
Establishment of independent farmer groups (local champions) as seed breeders	13.33	2	0.27	2.45	0.33	0.09	3
T						0.73	
Extreme weather or natural disasters	26.67	4	1.07	2.09	0.56	0.59	1
Shallot prices fluctuate frequently	13.33	3	0.40	2.36	0.32	0.13	2
Pests with high illness levels	6.67	2	0.13	1.45	0.10	0.02	3

Figure E1. Strength Map of Shallot Value Chains Based on Farmer Corporations

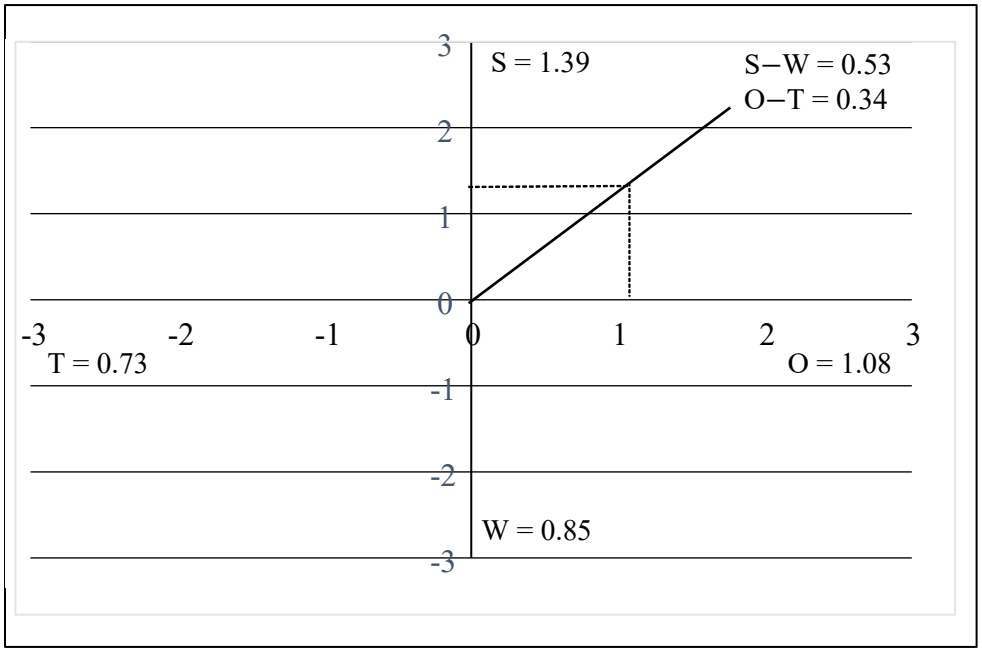


Table E3. SWOT Strategy Formulation for Farmer Corporation-Based Shallot Value Chains

Internal Factors / External Factors	**Strength (S)** Land for shallot development	**Weakness (W)** Inadequate utilization of technology and certified seeds by farmers
Opportunities (O) The marketplace is still open	**S–O** Optimizing land to fulfill open market demand	**W–O** Increased productivity by market-oriented production practices for market expansion
Threats (T) Extreme weather and natural disasters	**S–T** Optimizing land management to improve resilience against climate and environmental risks	**W–T** Improved farming techniques using climate-adaptive technology

Table E4. Operational Recommendations for Programs and Actions on Corporate-Based Shallot Value Chains in Majalengka

No.	Program	Activity
1	Land optimization uses location-specific production enhancement technology to suit the market demand that is still available both nationally and for export.	a. Creating location-specific SOPs for high-production shallot value chains. b. Mapping land availability based on planting time, input readiness and affordability, and output potential per unit area and time. c. Improving land productivity by boosting the cropping index and promoting land improvement and conservation. d. Establishing institutions for producing and marketing shallots. e. Expanding marketing networks nationally and internationally.
2	Increased farmer capacity and competence for increased shallot production.	a. Identifying existing and new technologies as the basis for closing a production increase gap. b. Strengthening research institutions, universities in the region, and government agencies in technology dissemination, as well as assistance and supervision of technology application. c. Accelerating access to technological innovation through various conventional and digital media. d. Building institutions to increase farmers' capacity and competence.
3	Government policy to build shallot upstream-downstream value chain institutions based on the potential resources of the region	a. Strengthening public trust in farmer corporation-based shallot value chain development. b. Strengthening the roles of both formal and informal institutions related to the upstream-downstream value chain of shallots, especially for seed producers and water management. c. Strengthening existing institutions as local champions toward broader institutions, both in terms of business fields and stakeholders involved. d. Developing inclusive upstream-downstream shallot agribusiness institutions involving farmers, government agencies, and private-sector actors.