https://doi.org/10.65166/706a0j51

Journal of Enterprise Strategy & Management Innovation
Volume I, Issue 2, May 2026
ISSN: 3116-4277 (Online)
https://journal.ijhba.com/index.php/jesmi
https://slsipress.com

Cluster Farming as a Collective Marketing Strategy for Organic Products: Evidence from Smallholder Farmer Clusters in CALABARZON

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Abstract

Cluster farming has been promoted as a collective strategy for improving the market participation of smallholder farmers, particularly in contexts where producers face limited bargaining power, fragmented supply, high post-harvest losses, and dependence on intermediaries. The study aimed to assess cluster farming as a marketing strategy for organic products among farmer clusters in CALABARZON. A descriptive-correlational design was used, with 113 cluster farmer members and affiliates selected through purposive sampling. Data were gathered using a three-part questionnaire covering respondent profile, cluster farming characteristics and attributes, and farmer perceptions of financial, production, market, and management outcomes. The instrument reported acceptable reliability across all dimensions. Frequency, percentage, weighted mean, ANOVA, and Pearson correlation were used for data analysis. Results showed that most respondents were regular cluster members with one to three years of membership, primarily engaged in vegetable production, had high school-level educational attainment, earned PHP 5,000-PHP 15,000 monthly, and were familiar with organic farming. Respondents generally agreed that cluster farming characteristics and attributes were present, with stronger perceptions in production and management than in financial and market dimensions. Several perceptions differed significantly by membership affiliation, length of membership, membership position, and nature of farm produce. Cluster farming characteristics and attributes were also significantly related to perceived financial, production, market, and management outcomes. The findings suggest that cluster farming may strengthen smallholder coordination, production capability, and market readiness, although conclusions remain limited by the descriptive-correlational design and purposive sampling.

Keywords: *cluster farming; organic products; smallholder farmers; collective marketing; agricultural marketing; CALABARZON*

Article History: Received: April 3, 2026 | Revised April 30, 2026 | Accepted May 5, 2026

1. Introduction

Agricultural marketing remains a central challenge for smallholder farmers because production capability alone does not guarantee stable income, competitive pricing, or sustained access to buyers. In many developing agricultural economies, small farmers operate within fragmented production systems, limited distribution channels, and weak bargaining arrangements. These conditions often leave producers dependent on intermediaries who consolidate, transport, and resell farm outputs, while farmers absorb production risks and receive only a limited share of final market value. In the case of organic products, the challenge becomes more pronounced because producers must not only grow crops but also maintain product quality, manage post-harvest handling, meet buyer expectations, and communicate the added value of organic production to the market.

Cluster farming has been advanced as one response to these structural constraints. In general, a cluster refers to a geographically concentrated group of interconnected producers, enterprises, and supporting institutions that derive advantages from coordination, shared resources, and collective market positioning (Porter, 1998, as cited in Cooke et al., 2012). In agriculture, clustering allows small producers to coordinate production schedules, consolidate supply, share information, access technical assistance, improve post-harvest practices, and negotiate with buyers more effectively. Rather than operating as isolated farm units, farmers may collectively build production volume, reduce transaction costs, and improve their ability to participate in more formal or higher-value markets.

The relevance of cluster farming is particularly evident in agricultural settings where smallholders face difficulty competing with larger farms and organized suppliers. Small-scale producers are often constrained by limited farm size, inadequate access to technology, insufficient financing, weak transport systems, limited market information, and weak buyer linkages (Montiflor et al., 2008; Montiflor, 2012). These limitations affect not only production but also pricing, delivery, branding, and customer relationship management. In vegetable and organic product markets, farmers must also respond to perishability, quality control, buyer specifications, and post-harvest losses. The literature on agricultural marketing in the Philippines notes that vegetable marketing commonly passes through several layers of traders, wholesalers, retailers, and institutional buyers, making the system costly and complex for small producers (Montiflor, 2012). This structure reinforces the importance of collective arrangements that can improve scale, coordination, and direct market access.

Organic farming adds another layer of strategic importance to cluster-based marketing. Organic products are associated with natural production methods, reduced chemical inputs, soil conservation, and environmentally oriented farming practices. However, organic farmers must still confront the practical demands of the market, including consistency of supply, product reputation, quality assurance, and buyer confidence. Without sufficient organization, smallholder organic producers may struggle to transform the perceived value of organic production into better prices or more reliable market relationships. Cluster farming may therefore serve not only as a production arrangement but also as a marketing mechanism that links farmers to buyers, strengthens group identity, improves post-harvest coordination, and creates opportunities for collective promotion.

Existing discussions on agro-based clusters emphasize the potential of clustering to improve competitiveness, value-chain participation, and rural development, especially when farmers are connected to support institutions, technical experts, buyers, and financing organizations (Gálvez-Nogales, 2010). However, the practical effectiveness of clustering depends on the internal characteristics of the group and the extent to which members perceive benefits from participation. A cluster may be formally organized, but its usefulness depends on whether members understand common objectives, participate in group activities, support quality assurance, coordinate production, and maintain commitment to collective goals. Likewise, the attributes of a cluster - such as access to technical expertise, post-harvest information, supplier support, and product reputation - may influence how farmers view its financial, production, market, and management value.

Within the CALABARZON context, the study of cluster farming among organic product farmers is useful because the region contains diverse agricultural producers and market linkages. Farmers may differ in membership affiliation, length of membership, position in the cluster, type of produce, educational attainment, income, and familiarity with organic farming. These profile differences may shape how farmers describe cluster farming and how they perceive its benefits. For example, cluster leaders may have different access to information and markets compared with regular members, while farmers with longer membership may have deeper exposure to collective production and marketing arrangements. Similarly, producers of different crops may experience different market demands, post-harvest requirements, and income opportunities.

The study aimed to assess cluster farming as a collective marketing strategy for organic products among smallholder farmer clusters in CALABARZON. Specifically, it described the respondents' profile in terms of membership affiliation, length of membership, membership position, nature of farm produce, educational attainment, monthly income, and familiarity with organic farming; described cluster farming in terms of

characteristics and attributes; assessed farmer perceptions of cluster farming in terms of financial, production, market, and management dimensions; determined whether descriptions and perceptions differed when grouped according to respondent profile; examined the relationship between cluster farming characteristics and farmer perceptions; examined the relationship between cluster farming attributes and farmer perceptions; and developed evidence-based marketing strategy inputs for organic products through cluster farming.

2. Review of Literature

2.1 Smallholder Farmers, Market Access, and Intermediary Dependence

Smallholder farmers commonly operate within value chains shaped by collectors, brokers, wholesalers, traders, and other market intermediaries. These actors perform necessary functions in agricultural markets, particularly where farmers are geographically dispersed, transport systems are weak, and producers lack direct access to institutional or urban buyers. Intermediaries may therefore serve as market enablers by aggregating produce, absorbing search costs, providing buyer linkages, and allowing farmers to sell outputs that would otherwise remain localized. For example, studies from Ghana and other contexts suggest that aggregator-type intermediaries may help farmers sell larger quantities and participate more actively in markets where direct selling is difficult (Mzyece et al., 2023; Ibikoule et al., 2024; Chung et al., 2021). The literature therefore does not support a simplistic view that intermediaries are always harmful. Their function is often structurally necessary in weakly developed or fragmented agricultural markets.

However, the same intermediary-dependent systems may also weaken farmers' bargaining position. When farmers have limited alternative buyers, low access to market information, and urgent cash needs after harvest, intermediaries may exert considerable influence over farm-gate prices. Evidence from Benin, Ethiopia, Vietnam, Tanzania, Nepal, and Indonesia indicates that dependence on collectors, wholesalers, or informal traders can limit farmers' capacity to negotiate and may reinforce low margins for producers (Aliyi et al., 2021; Bhandari, 2025; Chung et al., 2021; Ibikoule et al., 2024; Malik et al., 2025; Mussa et al., 2026). This pattern is particularly important in perishable agricultural commodities, where farmers often cannot delay sales without risking spoilage and post-harvest losses.

The market-access problem is thus dual in nature. Intermediaries may connect smallholders to buyers, but they may also restrict the development of alternative, more remunerative channels. Chung et al. (2021), for instance, report collector dominance in a Vietnamese aquaculture value chain, while Ibikoule et al. (2024) show that cooperatives may offer better prices than collectors but that credit ties still keep some farmers dependent on intermediary channels. Similarly, Aliyi et al. (2021) found that vegetable producers received the lowest margins when selling through collectors and higher margins when they accessed consumers directly. These findings suggest that the issue is not merely the presence of middlemen but the absence of farmer-side organization, market information, and viable alternative channels.

Collective and alternative arrangements are therefore frequently proposed as mechanisms for improving farmers' market power. Cooperatives, farmer groups, and collective marketing systems may allow smallholders to aggregate supply, access information, negotiate more effectively, and reduce vulnerability to unilateral price-setting by traders (Donkor et al., 2021; Ibrahim et al., 2025; Jjagwe et al., 2022; Magakwe & Olorunfemi, 2024). Nevertheless, such arrangements are not automatically inclusive or effective. Untari and Vellema (2022) caution that farmer-led trading organizations may fail to alter smallholder inclusion when working capital, risk capacity, and governance are weak. Thus, the central issue is not only whether farmers form groups, but whether such groups create genuine market alternatives and stronger negotiating conditions.

2.2 Cluster Farming as Collective Action and Market Coordination

Cluster farming may be understood as a collective arrangement that seeks to address the disadvantages of isolated smallholder production. Although the terminology differs across studies - cooperatives, producer groups, collective marketing, farmer organizations, and synchronized collective action models - the underlying principle is similar: small producers coordinate production and marketing activities to improve scale, bargaining position, market participation, and access to support services. Recent literature generally supports the proposition that collective models can improve smallholder participation in agricultural markets, especially when groups are properly governed and adequately supported (Magakwe & Olorunfemi, 2024; Nyikahadzoi et al., 2011).

A systematic review by Magakwe and Olorunfemi (2024) found that collective marketing has strong potential to expand both formal and informal market access, improve sales, and create more stable markets for smallholder farmers. Empirical evidence from South Africa, Ethiopia, Zambia, Thailand, and Uganda further suggests that cooperative or group membership is positively associated with market participation, sales volume, and value-chain involvement, including processing, storage, and distribution (Ahmad et al., 2024; Christian et al., 2024; Haile et al., 2022; Hill et al., 2021; Methamontri et al., 2022; Zhu & Wang, 2024). These findings are relevant to cluster farming because market coordination is one of the principal reasons farmers participate in such arrangements.

Collective action strengthens market coordination in several ways. First, it allows farmers to aggregate produce, thereby making supply more attractive to larger buyers that require volume, consistency, and regular delivery. Second, it may reduce transaction costs for both farmers and buyers because negotiation, quality control, and delivery can be organized at the group level. Third, it can improve access to productive services such as inputs, training, credit, and technical information (Kale et al., 2025; Methamontri et al., 2022; Zhang et al., 2024; Zhu & Wang, 2024). Fourth, collective action may broaden farmers' sales channels and reduce information asymmetries. Li et al. (2025), for example, found that organizational participation increased farmers' sales bargaining power in a major kiwifruit-producing region in China by improving market information and expanding channel options.

The evidence also points to the limits of collective marketing. Group formation alone does not guarantee improved outcomes. Benefits depend on governance quality, trust, capitalization, member capacity, and external support (Hintz & Pretzsch, 2023; Hill et al., 2021; Kale et al., 2025; Li et al., 2025; Morakile et al., 2021; Untari & Vellema, 2022). Weakly capitalized farmer groups may still be unable to purchase members' produce, negotiate with formal buyers, provide cash-on-delivery arrangements, or absorb market risk. Likewise, groups with poor internal trust may struggle to sustain collective selling, production planning, or compliance with quality requirements. These limitations suggest that the effectiveness of cluster farming should be assessed not merely through its existence as a structure but through farmers' perceptions of its financial, production, market, and management usefulness.

2.3 Cluster Characteristics, Group Commitment, and Organizational Functioning

The internal characteristics of farmer clusters are critical to their sustainability. Collective farming and marketing systems require more than physical proximity or shared commodity interests; they depend on commitment, participation, trust, leadership, shared objectives, and willingness to comply with group decisions. These dimensions correspond closely with the characteristics measured in the present study, such as personal commitment, active participation, financial support, support for quality assurance, consistent supply, common aims, and understanding of group objectives.

Studies on agricultural cooperatives consistently link member commitment and participation to organizational performance. Awoke (2021) describes member commitment as vital to cooperative survival and performance, while Zeng et al. (2023) note that low or declining commitment restricts sustainable development. Evidence from China and Ethiopia indicates that commitment is associated with the economic viability and sustainable functioning of farmer organizations (Awoke, 2021; Hao et al., 2024; Zeng et al., 2023). This relationship is conceptually important because farmers who do not identify with group goals may continue to act individually even when formally listed as members. Such behavior can weaken supply consistency, collective selling, quality compliance, and buyer trust.

Participation also appears to be a central mechanism through which collective arrangements produce benefits. Yayeh (2025) found that active member participation was a key driver of cooperative performance, while Omar et al. (2022) identified member support, internal commitment, and cooperation as catalysts of performance. These findings suggest that farmer clusters are likely to perform better when members attend meetings, contribute to decisions, follow production plans, and cooperate in marketing arrangements. In contrast, internal disagreement, low participation, and weak member engagement may reduce the ability of the group to function as a coordinated enterprise.

Leadership further shapes the functioning of farmer organizations. Wang and Wang (2023) identify leadership quality as a necessary condition for strong cooperative economic performance, partly because leadership fosters collective action. Hejkrlik et al. (2021) similarly emphasize the role of leaders in building trust, cohesion, and commitment to group success, although they also warn that excessive leader dominance may undermine cooperative principles. This tension is important. Effective cluster leadership can coordinate production, communicate with buyers, organize training, and ensure compliance with standards. However, overly centralized leadership may create dependency, unequal benefits, or weak participation among ordinary members.

The literature therefore suggests that cluster characteristics should be treated as organizational capabilities rather than merely descriptive traits. Commitment, shared objectives, participation, leadership, and group cohesion influence whether cluster farming becomes a functional marketing mechanism or remains a nominal association. For smallholder organic producers, these internal characteristics may be especially important because organic markets require consistency, product quality, reputation, and trust between farmers and buyers. Weak internal functioning can undermine these requirements, even when there is external demand for organic products.

2.4 Cluster Attributes, Post-Harvest Management, and Market Readiness

Beyond internal commitment and leadership, farmer clusters require operational attributes that allow them to meet market expectations. These attributes include access to technical expertise, post-harvest control, product quality management, packaging, branding, certification, supplier linkages, and market information. Such attributes are particularly relevant in organic product marketing because buyers often evaluate not only the crop itself but also the consistency of supply, handling practices, safety, traceability, and perceived product value.

Recent literature consistently links post-harvest management and value addition with access to higher-value markets. Cheruiyot (2024) reports that improved packaging, storage, hygiene, and transport are associated with the growth of horticultural export markets, while poor handling practices constrain competitiveness. Akiri et al. (2024) similarly show that weak post-harvest handling reduces product quality, increases losses, and limits access to formal markets that impose safety and quality standards. In Thailand, Promkhambut et al. (2023) found that post-harvest management, grading, processing, packaging, branding, and certification can help smallholders target more profitable markets aligned with consumer preferences. These findings support the argument that cluster attributes should include both production-side and market-side capabilities.

Technical assistance and training are also repeatedly identified as prerequisites for market readiness. Akiri et al. (2024) note that lack of skills and technical information prevents smallholders from complying with regulatory and market standards, while Kamanda et al. (2023) emphasize the need for training in milling, packaging, and marketing. These findings are relevant to cluster farming because groups often provide a channel through which government agencies, technical experts, financing institutions, and development organizations can deliver support. A farmer operating individually may have limited access to such services, while a cluster may function as an organized platform for capacity building.

Market information is another important attribute. Digital and e-commerce platforms have been associated with improved access to prices, buyers, and market information, with potential benefits for bargaining power, post-harvest loss reduction, and market access (Choruma et al., 2024; Gumbi et al., 2023; Morepje et al., 2024). However, the usefulness of such tools depends on infrastructure, digital literacy, and appropriate business models

(Choruma et al., 2024; Gumbi et al., 2023; Rayhan et al., 2024). This suggests that market information should not be reduced to mere awareness of prices; it must be embedded in systems that farmers can actually use for production planning, selling decisions, and buyer negotiation. Adjacent Philippine SME evidence similarly indicates that the usefulness of information systems depends not only on tool availability but also on technological fit, organizational readiness, implementation cost, security confidence, and environmental pressures (Carandang et al., 2026). Although the SME accounting-software context differs from agricultural clustering, the implication is relevant: information-based market tools become useful only when small organizations possess the internal readiness to absorb and sustain them.

Branding and packaging are more complex. They can help farmers differentiate products, communicate value, and access formal or higher-value buyers. However, branding and packaging require organizational capacity, cost absorption, quality consistency, and buyer recognition. Smallholder groups that sell mostly to local buyers or bulk purchasers may not immediately perceive branding as a priority. The literature suggests that branding becomes more relevant when farmers seek formal, retail, export, or quality-sensitive markets (Akiri et al., 2024; Cheruiyot, 2024; Promkhambut et al., 2023). Comparable evidence from Philippine SME strategy literature also indicates that value innovation, digital engagement, sustainability-oriented differentiation, and customer-centered positioning can help small enterprises move beyond price-based competition when these are supported by feasible operational redesign (Teodosio et al., 2025). Related consumer-centered marketing evidence from the Philippine education sector similarly shows that community discourse can be translated into value themes, consumer triggers, and marketing design responses, suggesting that trust, identity, and credibility also matter when small organizations attempt to move beyond generic product claims (Atento & Espelita, 2025). Thus, cluster attributes may develop progressively: basic market access and post-harvest control may come first, while branding, certification, differentiated positioning, and higher-value market identity may emerge later as the cluster matures.

2.5 Farmer Perceptions of Financial, Production, Market, and Management Outcomes

The perceived benefits of collective arrangements can be grouped into financial, production, market, and management outcomes. These dimensions are appropriate because farmers may evaluate cluster farming not only by direct income but also by whether it improves production efficiency, access to buyers, availability of inputs, knowledge transfer, coordination, and leadership capacity. Recent studies generally report that farmers participating in cooperatives, groups, or collective marketing arrangements achieve or perceive better outcomes than comparable individual farmers, although results vary by commodity, institutional design, and farmer characteristics.

Financial outcomes are among the most commonly reported benefits. Tran et al. (2021) found that vegetable farmers in Vietnam who joined cooperatives had significantly higher incomes than comparable non-members. Kipkogei et al. (2024) reported income increases among Kenyan tea farmers with cooperative membership, while Wu et al. (2023) found that cooperative membership was associated with higher operating income among family farms in China. Similar positive associations were reported among dairy farmers in Indonesia and agricultural marketing cooperative members in Tanzania (Rwela, 2023; Toiba et al., 2024). These studies support the expectation that collective arrangements may improve farmer income through better prices, stronger buyer access, reduced transaction costs, or service support.

The Philippine policy literature also reinforces the need to distinguish between short-term livelihood relief and production-side enterprise support. Atento et al. (2026) argue that household cash transfers and MSME concessional credit serve different crisis-response functions: cash transfers are more appropriate for extremely poor and non-bankable households, while concessional credit better supports viable but financially stressed enterprises under supply-side shocks. Applied cautiously to smallholder clusters, this distinction suggests that cluster farming may improve livelihood resilience when it is linked not only to income support but also to productive financing, working capital, and simplified institutional access.

Production outcomes are also important, although the evidence is more mixed. Ma et al. (2023) report that cooperative membership does not necessarily produce large yield gains on average across developing countries, but

cooperative outsourcing services may improve technical efficiency. Other studies report more direct production gains: Lin et al. (2021) found higher productivity among cooperative rice farmers in China, while Ahado et al. (2021) found higher yields and technical efficiency among potato cooperative members in Mongolia. In the Philippine context, Mina and Cuevas (2022) reported higher technical and marketing efficiency among dairy buffalo cooperative members than non-members. These findings suggest that collective arrangements may affect production through access to inputs, technical support, training, synchronized practices, and efficiency improvements, even when yield effects vary.

Market outcomes are closely tied to the logic of collective marketing. Magakwe and Olorunfemi (2024) report that collective marketing can expand formal and informal market access, improve sales, and reduce transaction costs. Magakwe et al. (2025) further show that smallholders may perceive collective marketing as improving formal market participation, farm income, bargaining power, and transaction costs compared with operating individually. Methamontri et al. (2022), in a study of organic rice farmer groups in Thailand, report economic, social, institutional, and environmental benefits, including better prices, inputs, credit, and knowledge transfer through collective marketing. These findings are directly relevant to organic product clusters because market access depends on buyer confidence, supply consistency, and product credibility.

Broader ASEAN evidence on formal business entry further supports this structural interpretation. Atento (2026b) found that formal entrepreneurial entry across selected ASEAN countries was more strongly associated with structural variables, particularly banking-sector credit depth, GDP per capita, and population density, than with short-run macroeconomic indicators. While this evidence concerns formal business entry rather than farmer clusters, it strengthens the argument that smallholder market participation should be viewed as an ecosystem issue shaped by finance, institutional depth, and market concentration, not merely by individual farmer effort.

Management outcomes are less often measured as standalone variables but are implicit in many studies on cooperative performance. Collective arrangements may improve farmers' exposure to leadership, recordkeeping, planning, decision-making, group negotiation, and organizational discipline. Access to productive services, technical training, and high-quality inputs has been linked to cooperative participation in several studies (Lin et al., 2021; Ma et al., 2023; Wu et al., 2023; Zhang et al., 2024; Zhu & Wang, 2024). These support services can be interpreted as management-related benefits because they improve how farmers organize production, respond to market demand, and coordinate with institutions. Nevertheless, benefits are uneven. Imami et al. (2025) found that average cooperative members in Armenia did not necessarily outperform non-members overall, although vulnerable farmers reported better perceived performance when participating in cooperatives. This suggests that cluster farming may be particularly valuable for farmers with weaker market information, lower financial literacy, or fewer independent market options.

Overall, the literature supports the study's focus on farmer perceptions across financial, production, market, and management dimensions. However, it also cautions against assuming uniformly positive outcomes. Collective arrangements may provide benefits when they are well-managed, market-linked, adequately capitalized, and supported by technical and institutional systems. Without these conditions, they may fail to improve actual farmer welfare or may benefit only certain types of members.

2.6 Synthesis of the Literature

The reviewed literature converges on five major points. First, smallholder farmers often rely on intermediaries because these actors provide market access, but dependence on intermediary-dominated value chains can weaken bargaining power, depress farm-gate prices, and restrict alternative market channels. Second, collective arrangements such as clusters, cooperatives, and producer groups can strengthen market participation by aggregating supply, reducing transaction costs, improving information flows, and expanding access to buyers. Third, the success of collective systems depends heavily on internal organizational characteristics, particularly member commitment, shared objectives, participation, trust, and leadership. Fourth, market readiness requires operational attributes such as post-harvest control, technical assistance, branding, packaging, certification, and market information. Fifth,

farmer participation in collective arrangements is often associated with improved financial, production, market, and management outcomes, although these gains are neither automatic nor uniform.

The literature also reveals an important balance between structure and function. Farmer groups may exist formally, but their effectiveness depends on whether they actually improve supply coordination, market access, production support, and member capability. Similarly, post-harvest practices, branding, and market information are not merely technical add-ons; they are mechanisms through which smallholders may shift from low-value, intermediary-dependent markets toward more organized, quality-sensitive, and potentially higher-value channels. For organic products, this is particularly important because market value depends on both production method and credibility in quality, consistency, and buyer trust. This interpretation is consistent with enterprise strategy scholarship arguing that competitive advantage in emerging-market organizations is built through disciplined implementation, learning-oriented routines, governance capability, and ethically managed innovation (Atento, 2026a). In this sense, cluster farming should be analyzed not only as a production or marketing arrangement but also as an adaptive organizational capability.

A second synthesis point concerns heterogeneity. Studies show that farmers do not benefit equally from collective arrangements. Outcomes vary depending on governance quality, capital, leadership, crop type, member participation, market access, and farmer characteristics. This supports the need to examine whether descriptions and perceptions of cluster farming differ according to profile variables such as membership affiliation, length of membership, position, nature of produce, educational attainment, income, and familiarity with organic farming.

Taken together, the literature suggests that cluster farming should be evaluated through both organizational and market-oriented lenses. Its value does not rest simply on the existence of a farmer group, but on the extent to which that group can coordinate production, strengthen post-harvest systems, access technical and financial support, improve buyer relationships, and develop a credible market identity. These mechanisms are particularly important for smallholder organic producers because organic products require not only production compliance but also trust, consistency, differentiation, and reliable market communication. This also creates a sustainability-management training implication: Philippine HEI evidence suggests that SDG integration in digital management education remains uneven, with weak attention to food security and climate action despite their relevance to local vulnerability (Atento, 2025).

2.7 Research Gaps

Despite strong evidence that collective arrangements can improve smallholder market participation, several gaps remain. First, much of the literature focuses on cooperatives or producer organizations broadly, while fewer studies examine cluster farming specifically as a marketing strategy for organic products. Evidence from Philippine vegetable clusters shows that clustering can generate marketing benefits, but the literature remains limited relative to the broader cooperative and collective-marketing literature (Lamban et al., 2013; Montiflor et al., 2008).

Second, prior studies often emphasize objective outcomes such as income, productivity, technical efficiency, or market participation, while fewer studies examine how farmers themselves perceive cluster farming across multiple dimensions. Broader agricultural research has also noted the need to bridge disciplinary and perception-oriented gaps in evaluating how farmers experience and interpret agricultural interventions (Hermans et al., 2020). The combined assessment of financial, production, market, and management perceptions remains useful because farmer commitment to clustering depends partly on whether members recognize concrete benefits.

Third, the literature indicates that collective arrangements are context-dependent, yet there remains a need for localized evidence from Philippine regional agricultural settings. CALABARZON provides a relevant context because it contains diverse farm products, cluster affiliations, institutional support arrangements, and market linkages. Regional agricultural suitability work and sustainable-market studies support the importance of grounding agricultural development analysis in local production and market conditions (Amongo et al., 2023; Loconto et al., 2016).

Fourth, the role of farmer profile variables remains insufficiently settled. Existing studies suggest that organizational position, participation, vulnerability, crop type, and access to information may shape benefits from collective action (Fischer & Qaim, 2011, 2014), but more localized evidence is needed on whether farmers' descriptions and perceptions differ according to membership affiliation, length of membership, position, produce type, education, income, and organic farming familiarity.

Finally, there is a practical gap in translating cluster farming findings into marketing strategy inputs. The literature supports the importance of technical assistance, market information, collective negotiation, branding, and packaging in strengthening smallholder market positioning (Devaux et al., 2011; Kwaku & Fan, 2020). However, these elements need to be connected to farmer-level perceptions and actual cluster conditions. A further gap concerns the translation of cluster farming into a broader enterprise-readiness model. Existing cluster and cooperative studies often examine market access, income, technical efficiency, or participation, but fewer studies connect farmer perceptions with organizational readiness, financial access, information-system capability, branding maturity, and adaptive governance. This is important because smallholder clusters operate in environments similar to other small enterprises: they must coordinate internal routines, manage costs, access finance, interpret market information, and build buyer trust.

The present study addresses these gaps by examining how farmers describe cluster farming characteristics and attributes, how they perceive its financial, production, market, and management outcomes, and how these dimensions may inform marketing strategy development for organic products. In doing so, the study positions cluster farming not only as a collective production mechanism but also as a potential pathway for strengthening smallholder market readiness, organizational capability, and enterprise-oriented agricultural development.

3. Methodology

3.1 Research Design

The study used a descriptive-correlational research design. The descriptive component was used to present the profile of cluster farmer respondents and to describe cluster farming in terms of characteristics and attributes. It was also used to assess farmer perceptions of cluster farming in relation to financial, production, market, and management dimensions. The correlational component was used to examine the relationship between descriptions of cluster farming and farmer perceptions of its perceived outcomes. The design was appropriate because the study examined existing respondent characteristics, perceptions, and statistical associations without manipulating any variable.

3.2 Setting / Locale

The study was conducted among cluster farmer affiliates and members in the CALABARZON region. The respondents represented different cluster farm affiliations and agricultural production contexts within the region. The locale was relevant because the study focused on cluster farming as a marketing strategy for organic products among smallholder farmers operating within regional agricultural markets.

3.3 Participants and Sampling

The participants were farmers or cluster farmer affiliates and members working in CALABARZON. To qualify for inclusion, respondents were required to have at least six months of experience or practice in cluster farming. The original sample size computation was conducted using G*Power 3.1.9, with an effect size of 0.30 and a stated 95% power size and confidence interval. The computed minimum sample size was 111, while 113 respondents were included in the final analysis.

The study used purposive sampling because respondents had to belong to the specific population of interest: farmers or affiliates involved in cluster farming.

3.4 Measures / Instrumentation

Data were gathered using a structured questionnaire divided into three parts. The first part collected respondent profile information, including membership affiliation, membership position, length of membership, nature of farm produce, educational attainment, average monthly income, and familiarity with organic farming.

The second part measured the description of cluster farming. This section was adapted from Montiflor (2012) and contained 14 items divided into two dimensions: characteristics of cluster farming and attributes of cluster farming. The characteristics dimension included items on personal commitment, participation in group activities, willingness to provide financial support, support for quality assurance, consistent supply of produce, common aims, and understanding of group objectives. The attributes dimension included items on customer focus, long-range planning, access to expertise, corporate branding or packaging, post-harvest control, post-harvest information, and reduced costs from suppliers or agents.

The third part measured farmer perceptions of cluster farming. This section was also adapted from Montiflor (2012) and contained 31 items divided into four dimensions: financial, production, market, and management. The financial dimension assessed perceived income, pricing, livelihood improvement, losses, delivery costs, main source of income, and sufficiency for daily needs. The production dimension assessed learning of farming ideas, farm area utilization, yield, access to inputs, and reduction of rejects. The market dimension assessed access to non-wet-market buyers, marketing networks, supermarkets, delivery frequency, payment collection, buyer access, regular buyers, market assurance, buyer legality, compliance with agreements, crop-market fit, and visibility. The management dimension assessed knowledge-sharing, leadership skills, open discussion, objective-setting, member benefits, commitment, and ease of selling.

The questionnaire was translated into Filipino to make it more accessible to the farmer respondents. Reliability analysis indicated acceptable internal consistency for the study dimensions: characteristics of cluster farming, alpha = 0.81; attributes of cluster farming, alpha = 0.84; financial perception, alpha = 0.89; production perception, alpha = 0.82; market perception, alpha = 0.88; and management perception, alpha = 0.92.

3.5 Data Collection Procedure

The questionnaire was validated through a trained statistician. The researcher then visited cluster farming affiliates and farmers in the CALABARZON region. Permission was sought through a formal request letter addressed to the chairperson or acting head of the association, where applicable. After organizational permission was granted, the researcher also asked permission from individual members before administering the questionnaire.

The questionnaires were distributed directly to the respondents. No time limit was imposed during answering in order to allow respondents to review their responses and provide accurate information. Respondents were also given the opportunity to correct or review their answers before submission.

3.6 Data Analysis

The completed questionnaires were tallied, tabulated, encoded, and analyzed using frequency distribution, percentage frequency, weighted mean, analysis of variance, and Pearson's correlation coefficient. Frequency and percentage were used to describe the respondents' profile. Weighted mean was used to describe cluster farming characteristics and attributes and to assess farmer perceptions of financial, production, market, and management dimensions.

ANOVA was used to determine whether descriptions of cluster farming and perceptions of cluster farming differed significantly when respondents were grouped according to profile variables. Pearson's correlation coefficient was used to determine the relationship between descriptions of cluster farming and perceptions of cluster farming. The interpretation of correlation strength followed the study's stated scale, ranging from no correlation to perfect correlation.

The Likert scale used the following interpretation: 3.50-4.00 as Strongly Agree, 2.50-3.49 as Agree, 1.50-2.49 as Disagree, and 1.00-1.49 as Strongly Disagree.

3.7 Ethical Considerations

The study sought organizational permission from cluster farm association heads or authorized representatives before data gathering. Individual respondents were also asked for permission before they answered the questionnaire. The survey instrument stated that responses would be treated confidentially and used only for the purposes of the study. Participation was therefore based on permission at both the association and individual respondent levels. Ethical review approval or institutional clearance was obtained before the conduct of the study.

4. Results

4.1 Profile of the Respondents

The study included 113 cluster farmer respondents from CALABARZON. The respondents came from several cluster farm affiliations, with Bulajo Bio-Farming Farmers Association Inc. representing the largest single cluster group. Other sizeable groups included San Santiago Natural Farming, Sto. Tomas Organic Practitioners Association, Bulakin Farmers Association, Lalig Farmers Association, and other smaller cluster affiliations.

Most respondents were regular members of their respective clusters. Smaller proportions served as officers, technicians, or cluster leaders. In terms of length of membership, nearly half had been involved in cluster farming for one to three years, indicating that many had relatively recent but sufficient exposure to cluster-based farming arrangements. Respondents were mainly vegetable farmers, although several also produced rice, fruits, root crops, or combinations of these produce categories. Most were high school graduates, and the dominant income bracket was PHP 5,000-PHP 15,000 per month. Most respondents also reported familiarity with organic farming.

Table 1. Profile of Respondents

Profile Variable	Category	n	%
Membership affiliation	San Santiago Natural Farming	16	14.16
	Bulajo Bio-Farming Farmers Association Inc.	17	15.04
	Bagumbayan Farmers Association	10	8.85
	Sto. Tomas Organic Practitioners Association	16	14.16
	Tanauan Farmers Federation	6	5.31
	Bulakin Farmers Association	16	14.16
	Lalig Farmers Association	15	13.27
	Other cluster affiliations	17	15.04
Membership position	Cluster leader	13	11.50
	Officer	20	17.70
	Member	62	54.87
	Technician	18	15.93
Length of membership	1-3 years	55	48.67
	4-7 years	22	19.47
	8-10 years	18	15.93
	11 years and above	18	15.93
Nature of farm produce	Vegetables	31	27.43
	Root crops	4	3.54
	Fruits	8	7.08
	Rice	22	19.47
	All four produce categories	15	13.27
	Three produce categories	16	14.16
	Two produce categories	17	15.04

Profile Variable	Category	n	%
Educational attainment	Elementary school graduate	29	25.66
	High school graduate	57	50.44
	College graduate	27	23.89
	Postgraduate	0	0.00
Average monthly income	PHP 45,000 and above	1	0.88
	PHP 36,000-PHP 45,000	0	0.00
	PHP 26,000-PHP 35,000	4	3.54
	PHP 16,000-PHP 25,000	12	10.62
	PHP 5,000-PHP 15,000	96	84.96
Familiarity with organic farming	Yes	87	76.99
	No	26	23.01

Note. N = 113.

4.2 Description of Cluster Farming Characteristics and Attributes

Respondents generally agreed that the characteristics of cluster farming were present in their groups. The highest-rated characteristic was a clear understanding of the aims of the group. This was followed by support for the group's quality assurance plan and active participation in group activities. These findings suggest that respondents recognized the importance of common goals, product quality, and group participation in cluster farming.

The lowest-rated characteristic was willingness to provide a consistent supply of produce, although it still fell within the agreement range. This indicates that while farmers generally understood the purpose of cluster farming, supply consistency remained a comparatively weaker area. The composite mean for cluster farming characteristics was interpreted as Agree.

Respondents also generally agreed that cluster farming attributes were present. Access to professional expertise, greater post-harvest control, and access to post-harvest information from the marketplace received the strongest ratings. These results indicate that farmers associated cluster farming with technical support and post-harvest improvement. The lowest-rated attribute was the use of corporate brand names, uniform packaging, and related identity mechanisms. Although still positively assessed, this result suggests that branding and packaging were less developed than technical and post-harvest support.

Table 2. Description of Cluster Farming Characteristics and Attributes

Dimension	Indicator	WM	Interpretation	Rank
Characteristics	A good understanding of the aims of the group	3.60	Strongly Agree	1
	Support for group quality assurance plan	3.44	Agree	2
	Active participation in group activities	3.42	Agree	3
	High level of personal commitment	3.27	Agree	4
	Willingness to provide adequate financial support to the group	3.27	Agree	5
	Personal objectives that promote common aims	3.21	Agree	6
	Willingness to provide a consistent supply of produce	3.13	Agree	7
	Composite Mean	3.33	Agree	
Attributes	Access to professional expertise in the area	3.66	Strongly Agree	2
	Greater post-harvest control of produce	3.66	Strongly Agree	2
	More post-harvest information from the marketplace	3.66	Strongly Agree	2
	Reduced costs from suppliers and market agents/brokers	3.44	Agree	4
	Strong focus on the needs of all customers	3.31	Agree	5
	Long-range planning focused on maintaining product reputation	3.23	Agree	6
	Use of corporate brand name, uniform packaging, and	3.00	Agree	7

Dimension	Indicator	WM	Interpretation	Rank
	related identity mechanisms			
	Composite Mean	3.42	Agree	

Note. 3.50-4.00 = Strongly Agree; 2.50-3.49 = Agree; 1.50-2.49 = Disagree; 1.00-1.49 = Strongly Disagree.

4.3 Perceptions of Cluster Farming

Respondents generally perceived cluster farming positively across the financial, production, market, and management dimensions. Production received the highest rating, followed by management, financial outcomes, and market outcomes. The overall perception score fell within the agreement range.

The strongest production-related perception was that cluster farming enabled farmers to learn new farming ideas. Respondents also strongly agreed that cluster farming helped them maximize farm area, obtain more yield, access inputs, and reduce the number of rejects because products were sold shortly after harvest. These results indicate that production benefits were the most visible perceived advantage of cluster farming.

Management was the second strongest dimension. Respondents strongly agreed that cluster farming enabled knowledge-sharing, open discussion of group issues, identification of clear group objectives, recognition of member benefits, and easier selling of products. The use of leadership skills was rated lowest within this dimension, suggesting that leadership opportunities may not have been equally experienced by all members.

Financial perceptions were positive but more restrained. Respondents agreed that cluster farming improved household livelihood, helped them obtain higher prices, and reduced the likelihood of financial loss. However, income sufficiency for daily needs received the lowest rating, indicating that cluster farming was perceived as financially helpful but not necessarily adequate as a complete household income source.

Market perceptions were also positive but ranked lowest among the four dimensions. Respondents agreed that cluster farming provided assurance that crops had their own market, enabled contact with legitimate buyers, and helped farmers identify crops suited to market demand. However, selling to supermarkets received the lowest rating, suggesting that formal retail-market access remained limited.

Table 3. Summary of Farmer Perceptions of Cluster Farming

Dimension	Composite Mean	Interpretation	Rank	Highest-Rated Indicator	Lowest-Rated Indicator
Production	3.68	Strongly Agree	1	Learning new farming ideas	Small number of rejects because products were sold right after harvest
Management	3.56	Strongly Agree	2	Sharing knowledge with other farmers	Use of leadership skills
Financial	3.33	Agree	3	Improvement of household livelihood	Income sufficiency for daily needs
Market	3.27	Agree	4	Assurance that crops have their own market	Selling to supermarkets
Overall Mean	3.46	Agree			

4.4 Differences in Description of Cluster Farming by Respondent Profile

The description of cluster farming characteristics differed significantly according to membership affiliation, membership position, nature of farm produce, average monthly income, and familiarity with organic farming. These results suggest that farmers' views of cluster farming characteristics varied depending on their organizational context, role within the cluster, type of produce, income group, and awareness of organic farming.

Length of membership and educational attainment did not show significant differences in the description of cluster farming characteristics. This indicates that the degree to which respondents recognized cluster farming characteristics was not significantly shaped by years of membership or educational level in the verified output.

For cluster farming attributes, no significant differences were found across all profile variables. This means that respondents generally described cluster farming attributes similarly regardless of affiliation, membership duration, position, produce type, education, income, or familiarity with organic farming. The result suggests a relatively shared perception of cluster attributes such as expertise, post-harvest control, post-harvest information, cost reduction, and branding-related elements.

Table 4. Differences in Description of Cluster Farming by Respondent Profile

Profile Variable	Characteristics F	p-value	Decision	Attributes F	p-value	Decision
Membership affiliation	7.78	<.001	Significant	1.87	.073	Not significant
Length of membership	2.31	.081	Not significant	2.12	.102	Not significant
Membership position	3.27	.024	Significant	2.05	.112	Not significant
Nature of farm produce	6.60	<.001	Significant	1.82	.103	Not significant
Educational attainment	1.54	.218	Not significant	1.22	.301	Not significant
Average monthly income	4.50	.005	Significant	1.35	.262	Not significant
Familiarity with organic farming	5.52	.021	Significant	0.10	.752	Not significant

Note. Significant at $p < .05$.

4.5 Differences in Farmer Perceptions by Respondent Profile

Financial perceptions differed significantly according to membership affiliation, length of membership, membership position, and nature of farm produce. These findings indicate that the perceived financial value of cluster farming was shaped by the cluster to which respondents belonged, their duration of participation, their role in the cluster, and the type of produce cultivated. Educational attainment, average monthly income, and familiarity with organic farming did not show significant differences in financial perceptions under the strict $p < .05$ criterion.

Production perceptions differed significantly only according to length of membership. This suggests that the perceived production benefits of cluster farming were associated with duration of involvement in the cluster. Other profile variables did not significantly differentiate production perceptions.

Market perceptions differed significantly according to membership affiliation and length of membership. This indicates that market-related experiences were shaped by the particular cluster context and by the respondent's duration of exposure to cluster farming. Different clusters may have different buyer arrangements, market networks, and institutional support systems.

Management perceptions differed significantly according to membership affiliation, length of membership, membership position, and nature of farm produce. These findings suggest that organizational context, duration of cluster participation, formal role, and type of production influenced how farmers perceived the management benefits of cluster farming. Educational attainment, average monthly income, and familiarity with organic farming did not significantly differentiate management perceptions.

Table 5. Differences in Farmer Perceptions of Cluster Farming by Respondent Profile

Profile Variable	Financial	Production	Market	Management
Membership affiliation	$F = 4.03$, $p < .001$, Significant	$F = 1.86$, $p = .075$, Not significant	$F = 5.85$, $p < .001$, Significant	$F = 3.91$, $p < .001$, Significant
Length of	$F = 8.34$, $p < .001$,	$F = 4.85$, $p = .003$,	$F = 3.89$, $p = .011$,	$F = 3.63$, $p = .015$,

Profile Variable	Financial	Production	Market	Management
membership	Significant	Significant	Significant	Significant
Membership position	F = 3.38, p = .021, Significant	F = 1.44, p = .234, Not significant	F = 1.10, p = .353, Not significant	F = 6.49, p < .001, Significant
Nature of farm produce	F = 3.60, p = .003, Significant	F = 1.87, p = .093, Not significant	F = 1.17, p = .327, Not significant	F = 2.92, p = .011, Significant
Educational attainment	F = 2.20, p = .116, Not significant	F = 0.19, p = .826, Not significant	F = 2.47, p = .089, Not significant	F = 1.84, p = .164, Not significant
Average monthly income	F = 1.75, p = .161, Not significant	F = 1.00, p = .396, Not significant	F = 2.61, p = .056, Not significant	F = 2.01, p = .117, Not significant
Familiarity with organic farming	F = 3.79, p = .054, Not significant	F = 0.55, p = .462, Not significant	F = 3.13, p = .080, Not significant	F = 3.34, p = .070, Not significant

Note. Significant at $p < .05$. The $p = .054$ result for financial perception by familiarity with organic farming is treated as not significant under the strict $p < .05$ criterion.

4.6 Relationship Between Cluster Farming Description and Farmer Perceptions

Cluster farming characteristics were significantly related to all four perception dimensions: financial, production, market, and management. The strongest relationship was found with management, followed by financial and market perceptions. The relationship with production was moderate but still significant. These results indicate that stronger perceived cluster characteristics were associated with more favorable perceptions of cluster farming outcomes.

Cluster farming attributes were also significantly related to all four perception dimensions. The strongest relationship was found between cluster farming attributes and management perception, followed by production, financial, and market perceptions. These findings suggest that operational attributes such as technical expertise, post-harvest control, market information, cost reduction, and branding-related mechanisms were associated with more favorable farmer perceptions.

Overall, the correlation results indicate that both the internal characteristics and operational attributes of cluster farming were significantly associated with farmer perceptions of financial, production, market, and management outcomes. The findings suggest that cluster farming is not merely a grouping mechanism, but an organizational and market-support structure whose perceived usefulness depends on member commitment, shared objectives, technical support, post-harvest capacity, and market-oriented coordination.

Table 6. Relationship Between Cluster Farming Description and Farmer Perceptions

Cluster Farming Description Dimension	Perception Dimension	r-value	p-value	Interpretation	Decision
Characteristics	Financial	0.68	<.01	Moderately high correlation	Significant
Characteristics	Production	0.56	<.01	Moderate correlation	Significant
Characteristics	Market	0.65	<.01	Moderately high correlation	Significant
Characteristics	Management	0.71	<.01	Moderately high correlation	Significant
Attributes	Financial	0.61	<.01	Moderately high correlation	Significant
Attributes	Production	0.65	<.01	Moderately high correlation	Significant
Attributes	Market	0.58	<.01	Moderate correlation	Significant
Attributes	Management	0.74	<.01	Moderately high correlation	Significant

Note. Significant at $p < .05$.

5. Discussion

The findings indicate that cluster farming was perceived by smallholder organic farmers as a beneficial collective arrangement, particularly in relation to production and management outcomes. Respondents rated

production most strongly, followed by management, financial outcomes, and market outcomes. This pattern suggests that the most immediate and visible benefits of cluster farming were not necessarily monetary gains or access to high-value markets, but practical improvements in farming knowledge, input access, production coordination, knowledge-sharing, and group-level organization. This is consistent with the broader literature showing that collective farmer arrangements often strengthen productive services, technical support, and coordination before more advanced market gains are fully realized (Zhang et al., 2024; Zhu & Wang, 2024).

The strong production-related findings are particularly important. Respondents strongly agreed that cluster farming enabled them to learn new farming ideas, maximize farm areas, increase yield, access inputs, and reduce rejects after harvest. These results suggest that cluster farming functioned as a learning and production-support mechanism. This aligns with studies indicating that cooperatives and farmer groups may improve production efficiency through technical assistance, input access, training, and coordinated production practices (Ahado et al., 2021; Lin et al., 2021; Ma et al., 2023; Mina & Cuevas, 2022). However, the findings should not be interpreted as proof that cluster farming directly caused higher productivity because the design was descriptive-correlational. What can be concluded is that farmers perceived production benefits strongly, and that these perceptions were statistically associated with how they described cluster farming characteristics and attributes.

The management findings reinforce the importance of organizational functioning in cluster farming. Respondents strongly recognized the value of knowledge-sharing, open discussion, identification of group objectives, continuing benefits for members, and personal commitment. These results are consistent with the literature on agricultural cooperatives, which links member commitment, participation, leadership, shared objectives, and internal trust to stronger cooperative performance and sustainability (Awoke, 2021; Hao et al., 2024; Omar et al., 2022; Wang & Wang, 2023; Zeng et al., 2023). In the present study, management also had the strongest correlation with both cluster farming characteristics and attributes. This suggests that when farmers perceive the cluster as organized, technically supported, and goal-directed, they are more likely to view it as a useful management structure.

Financial perceptions were positive but more restrained. Respondents generally agreed that cluster farming improved household livelihood, helped them obtain higher prices, and reduced the likelihood of financial loss. However, the lowest-rated financial item was the sufficiency of cluster farming income for daily needs. This indicates that cluster farming may contribute to livelihood improvement without fully resolving household income inadequacy. This finding is consistent with the literature showing that cooperative participation may improve income, prices, and profitability, but that benefits vary by context, member capacity, market linkage, and organizational effectiveness (Kipkogei et al., 2024; Tran et al., 2021; Wu et al., 2023). It also supports a cautious interpretation: cluster farming may enhance financial resilience, but it should not be treated as a complete solution to smallholder poverty.

Market-related perceptions were also positive but comparatively weaker than production and management perceptions. Farmers agreed that cluster farming gave them greater market assurance, legitimate buyers, and better knowledge of crops suited to demand. Yet selling to supermarkets was the lowest-rated market item. This suggests that cluster farming improved basic market access and buyer certainty, but more formal or higher-value market penetration remained limited. This finding is consistent with studies showing that collective marketing can improve smallholder market participation and bargaining power, but only when farmer organizations possess sufficient governance, capital, quality systems, and buyer linkages (Hill et al., 2021; Magakwe & Olorunfemi, 2024; Untari & Vellema, 2022).

The lower rating for branding and uniform packaging within the cluster attributes dimension also supports this interpretation. Respondents strongly recognized post-harvest control, post-harvest information, and access to expertise, but were less emphatic about corporate branding and uniform packaging. This may indicate that the clusters were stronger in technical and operational support than in formal market positioning. Literature on higher-value agricultural markets suggests that post-harvest handling, grading, packaging, branding, certification, and

market information are often necessary for entry into more demanding buyer channels (Akiri et al., 2024; Cheruiyot, 2024; Promkhambut et al., 2023). Thus, the study's findings imply that CALABARZON cluster farms may already possess some foundations for market readiness but may still need further development in branding, packaging, quality documentation, and formal retail-market compliance.

The significant differences across profile variables further indicate that cluster farming experiences were not uniform. Membership affiliation, length of membership, membership position, and nature of farm produce were repeatedly associated with differences in perceptions, particularly in financial, market, and management dimensions. This is expected because different clusters may have different leaders, buyers, institutional support, production systems, and marketing arrangements. Cluster leaders and officers may also have greater exposure to training, negotiation, planning, and buyer coordination than ordinary members. These results reinforce the literature's caution that collective arrangements are context-dependent and that benefits are shaped by group governance, member participation, capitalization, and external support.

The correlation results provide the most important integrative finding. Both cluster farming characteristics and cluster farming attributes were significantly related to all four perception dimensions. This indicates that farmers who viewed cluster farming as stronger in commitment, participation, shared goals, quality assurance, expertise, post-harvest control, and market information also tended to perceive stronger financial, production, market, and management benefits. Conceptually, this supports the argument that cluster farming is not merely a structural arrangement; it is an organizational capability. Its perceived value depends on how well members understand common aims, participate in group activities, coordinate supply, access technical support, manage post-harvest requirements, and connect production decisions to market expectations.

From a practical standpoint, the findings suggest that cluster farming strategies for organic products should focus on four areas. First, clusters should continue strengthening production learning, technical assistance, and input access, since these were the strongest perceived benefits. Second, cluster leaders should formalize management systems such as meeting schedules, role rotation, recordkeeping, production planning, and internal communication, since management was strongly associated with cluster characteristics and attributes. Third, clusters should deepen market-readiness capabilities, especially branding, packaging, buyer documentation, quality assurance, and supermarket or institutional-buyer requirements. Fourth, financial literacy and livelihood planning should be strengthened because cluster farming was perceived to improve livelihood but not necessarily to provide fully sufficient household income.

The findings also have policy implications. Local governments, agricultural agencies, Landbank-type institutions, and development partners may use cluster farms as delivery platforms for training, post-harvest support, credit access, branding assistance, and buyer linkage programs. However, institutional support should not be limited to production inputs. If the goal is to improve organic product marketing, support must extend to market intelligence, quality standards, packaging systems, certification guidance, and direct buyer negotiations. Otherwise, clusters may remain production-enhancing organizations without fully becoming higher-value marketing platforms.

Several limitations must be recognized. The study used purposive sampling and was limited to cluster farmer respondents in CALABARZON, which restricts generalizability. The descriptive-correlational design allows the identification of associations but does not establish causality. The study also relied on farmer perceptions rather than independently verified income records, yield data, buyer contracts, or market-price comparisons. These limitations do not invalidate the findings, but they require restrained interpretation.

Overall, the study contributes evidence that cluster farming is perceived by smallholder organic farmers as a useful collective marketing and production-support strategy. Its strongest perceived value lies in production learning, technical access, group coordination, and management functioning. Its weaker areas concern full income sufficiency, supermarket access, and formal branding or packaging. The central implication is that cluster farming can support smallholder organic product marketing, but its effectiveness depends on whether clusters mature from basic production groups into organized, market-ready, quality-oriented collective enterprises.

6. Conclusions, Recommendations, and Implications

The study assessed cluster farming as a collective marketing strategy for organic products among smallholder farmer clusters in CALABARZON. Based on the findings, cluster farming was generally perceived by respondents as a beneficial arrangement, particularly in relation to production and management. The respondents recognized cluster farming as a structure that supports learning, access to inputs, post-harvest control, knowledge-sharing, group discussion, and coordination among farmers. These results suggest that cluster farming is not merely a marketing arrangement but also a production-support and organizational development mechanism for smallholder farmers.

The profile of the respondents indicates that the cluster farming participants were mostly regular members, had one to three years of membership, were primarily vegetable farmers, had mostly high school-level educational attainment, belonged largely to the PHP 5,000-PHP 15,000 monthly income group, and were generally familiar with organic farming. This profile is important because it shows that cluster farming was being practiced mainly by low-income smallholder farmers who may benefit from collective arrangements, technical support, and stronger market linkages.

The respondents generally agreed that cluster farming characteristics were present in their groups. The strongest characteristic was a clear understanding of the aims of the group, while the weakest, although still positively rated, was willingness to provide a consistent supply of produce. This suggests that farmers understood the purpose of cluster farming but that supply consistency remained an area for improvement. For cluster attributes, respondents strongly recognized access to expertise, post-harvest control, and post-harvest market information. However, branding and uniform packaging were less developed. This indicates that the clusters were stronger in technical and operational support than in formal market identity and product positioning.

The findings further show that production was the strongest perceived benefit of cluster farming, followed by management, financial outcomes, and market outcomes. Farmers strongly perceived that cluster farming helped them learn new farming ideas, maximize farm areas, increase yield, access inputs, and reduce rejects. Management benefits were also strongly perceived, especially in knowledge-sharing, open discussion, clarification of group objectives, and recognition of member benefits. Financial and market perceptions were positive but comparatively weaker. In particular, income sufficiency for daily needs and selling to supermarkets were the lowest-rated indicators in their respective dimensions. This suggests that cluster farming improved livelihood conditions and market assurance, but it did not fully resolve income adequacy or formal retail-market access.

The difference tests indicate that farmers' descriptions and perceptions of cluster farming were shaped by selected profile variables. Cluster farming characteristics differed significantly according to membership affiliation, membership position, nature of farm produce, income group, and familiarity with organic farming. However, cluster farming attributes did not significantly differ across the profile variables, suggesting a relatively shared view of operational cluster attributes. Farmer perceptions also varied by profile. Financial perceptions differed by membership affiliation, length of membership, position, and produce type. Production perception differed by length of membership. Market perception differed by membership affiliation and length of membership. Management perception differed by membership affiliation, length of membership, membership position, and produce type. These findings suggest that cluster farming experiences are not uniform and are influenced by organizational context, member role, duration of participation, and production type.

The correlation findings provide the strongest evidence for the study's central argument. Both cluster farming characteristics and cluster farming attributes were significantly related to farmer perceptions of financial, production, market, and management outcomes. This means that stronger group characteristics - such as commitment, shared aims, participation, quality assurance, and understanding of objectives - were associated with more favorable perceptions of cluster farming benefits. Similarly, stronger operational attributes - such as access to expertise, post-harvest control, market information, reduced supplier costs, and branding-related mechanisms - were associated with stronger perceived outcomes. These findings support the conclusion that cluster farming becomes more valuable when it functions as an organized, technically supported, and market-oriented collective system.

The practical implication is that cluster farms should strengthen both their internal organization and their external market readiness. Internally, cluster farms should improve member commitment, participation, role clarity, leadership development, production scheduling, and monitoring of supply commitments. Since willingness to provide a consistent supply of produce received the lowest rating among the cluster characteristics, clusters should develop farm master production schedules, crop-cycle planning, supply commitments, and monitoring systems to ensure that members can meet buyer demand consistently.

In terms of market readiness, cluster farms should strengthen branding, packaging, product identity, and formal buyer compliance. Since branding and uniform packaging received the lowest rating among cluster attributes, farmers may need training in brand awareness, packaging standards, product labeling, quality assurance, and buyer documentation. These interventions would help cluster farms move beyond basic production support and toward stronger formal market positioning. Supermarket access should also be treated as a long-term development target rather than an immediate assumption. Before entering supermarket channels, clusters must first assess volume capacity, delivery reliability, product quality, grading requirements, packaging standards, and payment terms.

Financially, cluster farming should be supported by financial literacy, investment planning, and household livelihood management. Although farmers perceived that cluster farming improved livelihood, they were less convinced that cluster farming income alone was sufficient for daily needs. This suggests the need for practical workshops on farm budgeting, cost tracking, savings, debt management, reinvestment, and income diversification. Cluster leaders and partner institutions may also consider simple bookkeeping systems suitable for smallholder farmers.

Production-related recommendations should focus on sustaining the strongest perceived benefit of cluster farming. Since farmers strongly perceived production gains, and recent cluster-farming studies similarly report productivity and livelihood-related benefits under specific support conditions (Degefu et al., 2024; Getahun et al., 2023), clusters should continue providing technical training, organic farming seminars, input access, post-harvest handling support, farm tours, and farmer-to-farmer learning sessions. Post-harvest control should be further strengthened through sorting, grading, cleaning, rejection monitoring, proper storage, and zero-waste or value-added processing where feasible.

Management recommendations should focus on leadership development and participatory governance. Since the use of leadership skills was the lowest-rated management indicator, clusters should provide opportunities for members to practice leadership through committee assignments, rotating responsibilities, peer mentoring, and project-based roles. Leadership should not remain concentrated among presidents, officers, or technicians. Broader participation may improve member ownership and long-term sustainability.

For institutional partners, the findings imply that government agencies, local agricultural offices, Landbank-type institutions, schools, and development organizations should treat cluster farms as strategic platforms for rural enterprise development. Support should not be limited to seeds, equipment, and technical training. It should also include market intelligence, contract negotiation support, branding assistance, packaging development, quality assurance systems, financial literacy, and linkages with institutional buyers. Cluster farming can become more effective when production support is integrated with marketing, management, and enterprise development.

For education and community development, the findings suggest that farming may be presented not only as a livelihood activity but also as a business and social enterprise model. Since many respondents were high school graduates, secondary schools, colleges, and community training institutions may introduce agriculture entrepreneurship, organic farming, cooperative management, and basic agribusiness planning as practical learning areas. This may help younger generations view farming as a viable enterprise rather than merely subsistence work.

For future research, similar studies may be conducted in other regions and with other agricultural commodities to test whether the same patterns hold across different farming systems. Future researchers may also compare cluster members and non-members to determine whether cluster farming produces measurable differences in income, yield,

market access, post-harvest losses, and buyer stability. Longitudinal studies may also be useful to determine whether longer participation in cluster farming leads to stronger production, financial, market, and management outcomes over time. Future studies may also include qualitative interviews with cluster leaders, buyers, government support agencies, and ordinary members to explain why some clusters perform better than others.

Overall, the study concludes that cluster farming has practical value as a collective marketing and production-support strategy for organic products in CALABARZON. Its strongest contribution lies in production learning, access to expertise, post-harvest improvement, group coordination, and management development. Its weaker areas are income sufficiency, supermarket access, supply consistency, branding, and packaging. The study therefore supports cluster farming as a promising but still developing strategy. Its success depends on whether farmer clusters can mature from loosely coordinated production groups into disciplined, market-ready, quality-oriented, and financially capable collective enterprises.

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