



RESEARCH PAPER

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Value chain analysis and business model development of the Rizal mango growers agriculture cooperative

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ABSTRACT

Agricultural cooperatives play a critical role in improving the productivity, market access, and economic resilience of smallholder farmers. Despite their importance, many cooperatives continue to experience operational inefficiencies that limit value creation and long-term competitiveness. This study analyzed the value chain of the Rizal Mango Growers Agriculture Cooperative (RMGAC) in Rizal, Cagayan, Philippines, using Porter's Value Chain Analysis and developed a Business Model Canvas to translate operational findings into strategic business interventions. A qualitative descriptive case study was conducted using key informant interviews, field observations, and document review. Data were analyzed through thematic analysis and organized according to Porter's primary and support activities. The findings identified several organizational strengths, including strong institutional partnerships, collective procurement, technical assistance, and active member participation. However, constraints such as inconsistent input availability, limited adoption of recommended orchard management practices, inadequate postharvest facilities, high transportation costs, and limited value-added processing continue to reduce product quality and profitability. Based on these findings, a Business Model Canvas was developed to guide strategic improvements through strengthened partnerships, improved production and postharvest management, market diversification, infrastructure development, and value-added processing. The study demonstrates that integrating Porter's Value Chain Analysis with the Business Model Canvas provides a practical framework for converting operational assessment into strategic business planning. This integrated approach offers a useful decision-support tool for agricultural cooperatives seeking to improve competitiveness, organizational sustainability, and value creation in smallholder farming systems.

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INTRODUCTION

Mango (*Mangifera indica* L.) is one of the most economically important fruit crops in tropical and subtropical regions, contributing significantly to food security, employment, rural livelihoods, and agricultural trade. Global production and consumption of mango continue to increase because of expanding consumer demand for fresh and processed fruit, creating greater market opportunities for producing countries. Despite this growth, improving the efficiency of mango value chains remains a major challenge, particularly in developing countries where production is dominated by smallholder farmers and constrained by production inefficiencies, postharvest losses, and weak market linkages (FAO, 2023; OECD and FAO, 2025).

The Philippines is among the leading mango-producing countries in Southeast Asia, with the Carabao mango recognized internationally for its excellent eating quality and export potential. The industry provides income and employment to thousands of farming households and contributes substantially to the country's agricultural economy. Nevertheless, Philippine mango production continues to face persistent challenges, including increasing production costs, pest and disease incidence, climate variability, inconsistent fruit quality, inadequate postharvest handling, and limited market diversification. These constraints reduce productivity, increase economic losses, and weaken the competitiveness of smallholder producers in both domestic and international markets (Philippine Statistics Authority, 2024; Digal *et al.*, 2024; DA-PCAARRD, 2023).

Agricultural cooperatives play a vital role in strengthening the competitiveness of smallholder farmers by facilitating access to production inputs, technical assistance, financial services, and markets. Through collective action, cooperatives improve bargaining power, reduce transaction costs, encourage technology adoption, and enhance market participation, thereby increasing farmers' income and organizational resilience (Bijman *et al.*, 2016;

Ortmann and King, 2007; ICA, 2023). However, many farmer cooperatives continue to experience operational inefficiencies throughout production, postharvest handling, marketing, and organizational management, limiting their ability to sustain competitive advantage in increasingly dynamic agricultural markets.

Value chain analysis has become an important approach for evaluating the performance of agricultural enterprises by identifying activities that create value and those that constrain productivity and profitability. Porter's Value Chain Analysis remains one of the most widely adopted frameworks for examining how primary and support activities contribute to organizational competitiveness (Porter, 1985). In agriculture, the framework has been applied to identify production bottlenecks, improve coordination among value chain actors, reduce postharvest losses, and strengthen market competitiveness (Kaplinsky and Morris, 2001; FAO, 2023). Although the framework provides a systematic assessment of operational performance, its primary focus is diagnostic and offers limited guidance for translating operational findings into long-term business strategies.

The Business Model Canvas developed by Osterwalder and Pigneur (2010) complements value chain analysis by providing a structured framework for designing and improving business models through nine interconnected components that describe how organizations create, deliver, and capture value. Integrating the Business Model Canvas with Porter's Value Chain Analysis enables organizations to transform operational insights into strategic interventions that improve resource utilization, strengthen customer value propositions, diversify revenue streams, and enhance organizational sustainability. Such integration is increasingly recognized as a practical approach for improving the competitiveness of agricultural enterprises operating in complex and rapidly changing market environments (Joyce and Paquin, 2016; Bocken *et al.*, 2019).

Although numerous studies have examined agricultural value chains and cooperative performance, relatively few have integrated Porter's Value Chain Analysis with the Business Model Canvas to develop strategic business models for agricultural cooperatives in the Philippine mango industry. Existing studies have largely emphasized production efficiency, marketing, or value chain performance without demonstrating how operational findings can be translated into practical business strategies that improve long-term competitiveness and sustainability. Addressing this gap is essential for strengthening farmer cooperatives as market-oriented enterprises capable of creating greater value for their members while responding effectively to evolving market demands.

This study analyzed the value chain of the Rizal Mango Growers Agriculture Cooperative in Rizal, Cagayan, Philippines, using Porter's Value Chain Analysis and developed a Business Model Canvas based on the identified strengths, constraints, and opportunities. Specifically, the study aimed to: analyze the cooperative's primary and support activities using Porter's Value Chain Analysis; identify the strengths, operational constraints, and opportunities across the cooperative's value chain; and develop a Business Model Canvas to enhance value creation, value delivery, and value capture toward improving the cooperative's competitiveness and long-term sustainability. The findings are expected to contribute to the growing literature on agricultural value chains and cooperative development while providing a practical strategic framework for similar farmer organizations seeking sustainable enterprise growth.

MATERIALS AND METHODS

Research design

This study employed a qualitative descriptive case study design to examine the value chain of the Rizal Mango Growers Agriculture Cooperative (RMGAC) in Rizal, Cagayan, Philippines.

A case study approach was selected because it facilitates an in-depth investigation of contemporary phenomena within their real-life context, particularly

when the boundaries between the phenomenon and its setting are not clearly defined (Yin, 2018). The study used Porter's Value Chain Analysis (Porter, 1985) as the primary analytical framework to examine the cooperative's primary and support activities. The findings were subsequently synthesized into a Business Model Canvas (Osterwalder and Pigneur, 2010) to develop strategic recommendations for improving the cooperative's competitiveness and long-term sustainability.

Study area

The study was conducted at the Rizal Mango Growers Agriculture Cooperative (RMGAC) located in the Municipality of Rizal, Province of Cagayan, Philippines. The cooperative is composed of smallholder mango producers engaged primarily in fresh mango production and marketing. It was purposively selected because of its active participation in the local mango industry, established organizational structure, and continuing collaboration with government agencies through technical assistance, production support, and capacity-building programs.

Research participants

Participants were selected through purposive sampling to obtain information-rich cases capable of providing detailed insights into the cooperative's operations and value chain activities (Patton, 2015). The participants included the cooperative chairperson, officers, and experienced members directly involved in production, input procurement, postharvest handling, marketing, and organizational decision-making. A total of 30 participants were interviewed, consisting of cooperative chairperson, officers, and cooperative members.

Participant selection continued until sufficient information was obtained to adequately address the research objectives.

Data collection

Data were collected through key informant interviews, field observations, and document review. A semi-structured interview guide was developed

based on Porter's Value Chain Analysis framework and validated by experts in agricultural extension and agribusiness management before data collection.

The interview questions explored the cooperative's primary activities, namely inbound logistics, operations, outbound logistics, marketing and sales, and service, together with support activities including procurement, technology development, human resource management, and firm infrastructure. Additional questions examined perceived strengths, operational constraints, opportunities, and strategic priorities.

Interviews were conducted face-to-face in locations convenient for the participants and lasted approximately three (3) to four (4) hours. With participants' consent, interviews were audio-recorded and supplemented with field notes to improve data accuracy. Direct field observations documented production practices, postharvest handling, storage facilities, transportation systems, and marketing activities. Relevant cooperative documents were also reviewed to triangulate the interview findings.

Data analysis

Audio-recorded interviews were transcribed verbatim and analyzed using the six-phase thematic analysis procedure described by Braun and Clarke (2006). The analysis involved: (1) familiarization with the data through repeated reading of interview transcripts, (2) generation of initial codes, (3) identification of potential themes, (4) review and refinement of themes, (5) definition and naming of themes, and (6) preparation of the final report.

Emerging themes were organized according to Porter's Value Chain Analysis framework to evaluate the cooperative's primary and support activities. The identified strengths, operational constraints, and improvement opportunities were subsequently synthesized into the nine building blocks of the Business Model Canvas to formulate strategic recommendations for enhancing value creation, value delivery, and value capture.

Trustworthiness of the study

The trustworthiness of the findings was established using the criteria proposed by Lincoln and Guba (1985). Credibility was enhanced through triangulation of interviews, field observations, and document review. Dependability was supported by maintaining a clear documentation of the research procedures and analytical process. Confirmability was strengthened through systematic coding and regular discussions among the researchers to minimize interpretive bias. Transferability was facilitated by providing detailed descriptions of the study context, participants, and research procedures, allowing readers to determine the applicability of the findings to similar settings.

Ethical considerations

Approval to conduct the study was obtained from the officers of the Rizal Mango Growers Agriculture Cooperative before data collection. All participants were informed of the study's objectives, procedures, and voluntary nature before providing informed consent. Participants were assured that they could withdraw from the study at any stage without consequence. Confidentiality and anonymity were maintained by removing personal identifiers from interview transcripts and presenting findings in aggregate form. All research records and audio files were securely stored and used exclusively for academic purposes.

RESULTS AND DISCUSSION

Inbound logistics: Acquisition and distribution of production inputs

The inbound logistics of the Rizal Mango Growers Agriculture Cooperative (RMGAC) primarily involve the acquisition, transportation, storage, and distribution of production inputs required for mango cultivation. The cooperative relies heavily on the Department of Agriculture Regional Field Office II for fertilizers, pesticides, flower inducers, and other production inputs. Collective procurement enables members to obtain agricultural inputs at lower transportation costs while improving access to government assistance. This collaborative arrangement

demonstrates the important role of institutional partnerships in supporting smallholder production. Despite these advantages, the cooperative continues to experience several operational constraints. Government-subsidized inputs are not always sufficient to meet the production requirements of all members, requiring farmers to purchase additional supplies from private agricultural dealers. One cooperative member explained, “Most of our production inputs come from the Department of Agriculture, including fertilizers, flowering inducers, and pesticides. However, the assistance is often not enough, so we still need to purchase additional inputs using our own resources.” Participants also identified increasing input prices and transportation expenses as major factors contributing to higher production costs. In addition, the absence of a permanent storage facility limits the cooperative’s capacity to manage and distribute production inputs efficiently. These findings indicate that the cooperative’s inbound logistics are supported by effective institutional collaboration but remain vulnerable because of dependence on external assistance and limited physical infrastructure. Similar observations have been reported in agricultural cooperatives, where collective procurement improves access to production resources but does not fully address supply instability or rising input costs (Bijman *et al.*, 2016). Efficient procurement systems and coordinated input distribution remain essential for strengthening agricultural value chains and improving organizational competitiveness (Kaplinsky and Morris, 2001).

From a strategic perspective, strengthening partnerships with government agencies, private agricultural suppliers, and financial institutions would improve the reliability of input procurement. Establishing a dedicated storage facility and implementing a systematic inventory management system would further enhance operational efficiency, reduce distribution delays, and lower production costs. Within the Business Model Canvas, these improvements strengthen the cooperative’s Key Partners, Key Resources, and Cost Structure while increasing its capacity to create value for members.

Operations: Production and quality management

Operations encompass the activities involved in mango production, including orchard establishment, crop management, pest and disease control, harvesting, and quality management. These activities determine both the quantity and quality of harvested fruits and, consequently, the cooperative’s ability to meet market requirements and generate higher returns (Porter, 1985). The findings indicate that cooperative members implement standard production practices such as fertilizer application, flower induction, pesticide application, and routine field monitoring to maintain tree health and promote fruit production. Production activities are scheduled according to prevailing weather conditions, while technical training provided by the Department of Agriculture has improved farmers’ knowledge of recommended production practices. These initiatives have strengthened members’ technical capacity and supported the adoption of basic crop management practices. Despite these efforts, several production constraints continue to limit productivity and fruit quality.

Recommended orchard management practices, particularly systematic pruning and fruit bagging, are not consistently adopted because of additional labor requirements, limited technical expertise, and increased production costs. As one participant noted, “Successful mango production depends on proper timing, regular field monitoring, and complete fertilizer application. However, some recommended practices are difficult to sustain because they require additional labor and resources.” Consequently, orchards remain more susceptible to pest and disease infestation, excessive canopy growth, and environmental damage, resulting in lower fruit quality and reduced marketability. Farmers also identified unfavorable weather conditions, rising production costs, and irregular input availability as recurring production challenges. The limited adoption of improved orchard management practices suggests that the cooperative has not fully realized the potential benefits of available production technologies.

Previous studies have shown that regular pruning improves light penetration, air circulation, and canopy structure, while fruit bagging reduces insect damage, disease incidence, and cosmetic defects, leading to higher-quality fruits and improved market value (Galvez *et al.*, 2022; FAO, 2023). Similar studies have likewise demonstrated that adoption of good agricultural practices increases productivity, reduces production risks, and enhances the competitiveness of smallholder farming systems (Davis *et al.*, 2012). Improving operational performance requires more than increasing input use. The cooperative should prioritize the adoption of integrated orchard management practices through continuous technical training, on-farm demonstrations, and closer collaboration with extension personnel. Investments in climate-resilient production technologies and improved pest management strategies would further strengthen production efficiency and reduce quality losses. Within the Business Model Canvas, these interventions enhance the cooperative's Key Activities, Key Resources, and Value Proposition by enabling the consistent production of high-quality mangoes that satisfy market standards and generate greater economic value.

Outbound logistics: Postharvest handling and distribution

Outbound logistics encompasses the activities involved in harvesting, sorting, grading, packaging, storage, transportation, and distribution of mangoes to buyers. Efficient postharvest handling is essential for preserving fruit quality, minimizing losses, and ensuring that products reach the market in acceptable condition. Weaknesses in this stage directly reduce market value and overall profitability (Porter, 1985). The findings indicate that cooperative members manually harvest mature mangoes and transport them in plastic crates to minimize mechanical damage during handling. Harvested fruits are sorted before marketing and temporarily stored until collection by buyers. Because the cooperative does not own delivery vehicles, transportation relies primarily on rented trucks. While these practices facilitate

product distribution, transportation costs remain high and expose fruits to additional handling, increasing the risk of physical damage before reaching the market. A major concern identified during the study was the high proportion of rejected or low-quality fruits. Participants estimated that approximately 40% of harvested mangoes fail to meet market quality standards because of insect and disease damage, mechanical injuries during harvesting and transport, and inadequate orchard management practices. One participant shared, "We carefully harvest and pack the mangoes, but transportation remains a challenge. If fruits are damaged during delivery, buyers may reject the shipment, resulting in financial losses." The absence of dedicated postharvest facilities, limited packaging materials, and inadequate transport infrastructure further contribute to quality deterioration and reduce the marketability of harvested fruits.

These findings highlight the importance of strengthening postharvest management within the cooperative. Previous studies have shown that poor harvesting practices, inadequate packaging, and inefficient transportation are among the leading causes of postharvest losses in horticultural commodities, reducing both product quality and farmers' income (Kitinoja and Kader, 2015; FAO, 2019). Investments in improved postharvest infrastructure, appropriate packaging systems, and efficient transport logistics have consistently been associated with lower postharvest losses and greater value retention across agricultural value chains (Kader, 2005; Arah *et al.*, 2016). Improving outbound logistics should therefore be considered a strategic priority for the cooperative. Establishing a centralized packing and grading facility, investing in appropriate packaging materials, and acquiring or sharing transport facilities through institutional partnerships would reduce postharvest losses and improve product consistency. Strengthening quality standards during harvesting and handling would also increase the proportion of premium-grade fruits and improve buyer confidence. Within the Business Model Canvas, these interventions reinforce the cooperative's Key

Resources, Channels, Value Proposition, and Cost Structure by improving product quality, reducing operational losses, and enhancing the efficiency of product delivery to target markets.

Marketing and sales: Market access and pricing strategies

Marketing and sales involve the activities through which products are promoted, priced, and delivered to target markets. Effective marketing enables agricultural cooperatives to expand market access, strengthen customer relationships, and increase profitability by matching product quality with market demand (Porter, 1985). The findings indicate that the Rizal Mango Growers Agriculture Cooperative markets fresh mangoes through local traders, public markets, institutional buyers, and government-supported marketing initiatives such as KADIWA trade fairs. The cooperative also uses social media to promote its products and communicate with prospective buyers, providing a low-cost platform for market expansion.

Selling prices are primarily determined by prevailing market conditions and are adjusted according to fruit size, quality, and buyer specifications. Despite these marketing efforts, the cooperative remains vulnerable to fluctuations in market prices, particularly during peak harvesting periods when increased supply reduces farm-gate prices. One cooperative member explained, “We try to negotiate fair prices with buyers, but market prices still depend on supply and demand, especially during the peak harvest season.” Participants also reported that a considerable proportion of harvested fruits fail to meet premium quality standards, limiting sales to high-value markets and reducing overall revenue. Furthermore, marketing activities remain heavily dependent on fresh fruit sales, with minimal value addition or product diversification. Another participant remarked, “We want to expand into processed mango products because they would allow us to earn more from fruits that are not suitable for the fresh market.” As a result, lower-grade fruits are often sold at substantially lower prices or generate limited

economic returns. These findings suggest that the cooperative’s marketing strategy is constrained by limited product diversification and dependence on traditional marketing channels. Similar studies have shown that value addition, market diversification, and stronger coordination between producers and buyers improve the competitiveness and profitability of agricultural enterprises by creating additional income opportunities and reducing exposure to market price fluctuations (Kaplinsky and Morris, 2001; FAO, 2023). Product differentiation through processing also enables producers to capture greater value from commodities that would otherwise be sold at discounted prices (Porter, 1985). Expanding the cooperative’s market portfolio should therefore be a strategic priority.

Strengthening relationships with supermarkets, institutional buyers, food processors, and export markets would broaden market opportunities for premium-quality mangoes. At the same time, developing value-added products such as dried mangoes, puree, juice, jam, vinegar, and other processed products would increase the economic value of lower-grade fruits and diversify revenue sources. Digital marketing initiatives and branding strategies could further improve product visibility and customer engagement. Within the Business Model Canvas, these interventions strengthen the cooperative’s Value Proposition, Customer Segments, Channels, and Revenue Streams by creating new market opportunities, increasing product value, and reducing dependence on fresh fruit sales.

Service: Member support and customer relations

Service activities encompass the support provided to cooperative members and buyers after production and marketing. These activities include technical assistance, extension services, capacity-building programs, and customer relationship management. Effective service enhances members’ technical competencies, strengthens buyer confidence, and contributes to the long-term sustainability of agricultural cooperatives by fostering continuous

improvement and stakeholder satisfaction (Porter, 1985). The findings indicate that the Rizal Mango Growers Agriculture Cooperative provides various support services to its members through partnerships with the Department of Agriculture Regional Field Office II and other institutions. These services include technical training, extension activities, and technology demonstrations on mango production, pest and disease management, and recommended agricultural practices. Participants emphasized that field-based demonstrations and hands-on training are more effective than classroom-based lectures because they allow farmers to directly apply newly acquired knowledge under actual farm conditions. One participant commented, "Hands-on demonstrations help us understand new farming practices better because we can immediately apply them in our orchards." The cooperative also facilitates regular communication among members by disseminating information on government assistance, production schedules, and market opportunities while addressing operational concerns as they arise. Despite these initiatives, participants recognized the need for more specialized and continuous capacity-building programs. Additional training on orchard management, postharvest handling, value-added processing, agribusiness management, and digital marketing was identified as essential for improving both production efficiency and enterprise performance. Respondents also emphasized the importance of maintaining strong relationships with buyers by ensuring consistent product quality, responding promptly to customer concerns, and honoring marketing commitments.

These findings underscore the importance of continuous advisory and extension services in strengthening cooperative performance. Previous studies have demonstrated that regular technical assistance and farmer education improve technology adoption, increase productivity, and support organizational development (Anderson and Feder, 2007; Davis *et al.*, 2012). Strong customer relationships have likewise been associated with improved buyer loyalty, greater market stability, and

enhanced competitiveness, particularly among farmer organizations operating in increasingly competitive agricultural markets (Grönroos, 2017). Strengthening service activities should therefore extend beyond technical training to include enterprise development and customer relationship management. Developing structured training programs on value addition, financial management, digital marketing, and cooperative entrepreneurship would broaden members' skills and improve their capacity to respond to changing market demands.

Establishing systematic mechanisms for collecting customer feedback and monitoring buyer satisfaction would further strengthen long-term marketing relationships. Within the Business Model Canvas, these interventions reinforce the cooperative's Key Activities, Customer Relationships, and Value Proposition by enhancing member capabilities, improving service quality, and increasing customer confidence in the cooperative's products.

SUPPORTING ACTIVITIES

Procurement

Procurement supports the cooperative's primary activities by ensuring the timely acquisition of production inputs, equipment, and other essential resources. The findings indicate that RMGAC primarily depends on government assistance for fertilizers, pesticides, flower inducers, and other agricultural inputs, while members purchase additional supplies from private dealers when subsidies are insufficient. Collective procurement reduces transportation costs and improves members' access to production inputs. One participant explained, "The Department of Agriculture has been our primary source of production inputs, and the quality of these materials has greatly supported our farming activities." However, inconsistent availability of subsidized inputs and increasing prices of agricultural supplies continue to increase production costs and constrain farm operations. These findings demonstrate that procurement remains a critical determinant of production efficiency and organizational

competitiveness. Previous studies have shown that collective purchasing enables agricultural cooperatives to reduce transaction costs and improve members' access to quality inputs, although dependence on external support may expose organizations to supply uncertainties (Bijman *et al.*, 2016; Ortmann and King, 2007). Strengthening partnerships with accredited suppliers and establishing long-term procurement agreements would improve supply reliability while reducing production costs. Within the Business Model Canvas, these initiatives reinforce the cooperative's Key Partners, Key Resources, and Cost Structure.

Technology development

Technology development enhances agricultural productivity through the adoption of improved production practices, equipment, and innovations. The cooperative has benefited from technical assistance provided by government agencies through training programs and the introduction of production technologies such as power sprayers, flower inducers, and crop protection practices. Nevertheless, the adoption of advanced orchard management practices, including systematic pruning and fruit bagging, remains limited because of additional labor requirements, production costs, and technical constraints. One participant observed, "Compared with manual spraying in the past, using power sprayers has improved our efficiency and reduced the time required for farm operations." Limited adoption of improved technologies continues to affect fruit quality and production efficiency. Previous research has shown that continuous innovation and the adoption of good agricultural practices improve productivity, reduce postharvest losses, and strengthen the competitiveness of agricultural enterprises (Davis *et al.*, 2012; FAO, 2023). Expanding access to climate-resilient production technologies, improved postharvest equipment, and digital production support systems would strengthen the cooperative's operational performance. These improvements enhance the Business Model Canvas by reinforcing Key Activities, Key Resources, and the Value Proposition.

Human resource management

Human resource management focuses on developing members' knowledge, skills, and leadership capacity. The findings indicate that the cooperative actively encourages members to participate in technical training, seminars, and field demonstrations organized by government agencies and partner institutions. Knowledge sharing among members promotes continuous learning and strengthens collaboration within the organization. As one participant explained, "Members who attend training share what they have learned with the rest of the cooperative, so everyone benefits from the new knowledge." Despite these efforts, participants recognized the need for more specialized training in orchard management, postharvest handling, value addition, agribusiness management, and digital marketing.

Strengthening technical and managerial competencies is essential for improving organizational performance and sustaining innovation. Previous studies have consistently demonstrated that continuous capacity building increases technology adoption, enhances productivity, and strengthens cooperative performance (Anderson and Feder, 2007; Davis *et al.*, 2012). Expanding leadership development and entrepreneurship training would further improve the cooperative's Key Resources and Key Activities while supporting long-term organizational growth.

Firm infrastructure

Firm infrastructure provides the organizational foundation that supports planning, governance, financial management, and institutional coordination. The cooperative benefits from an established organizational structure and strong collaboration with the Department of Agriculture, local government units, and other development partners. One officer remarked, "Support from government agencies keeps us informed about new opportunities and programs that help improve our production and organization." These institutional relationships facilitate access to production inputs, technical assistance, and market opportunities. However, limited financial resources and inadequate physical infrastructure, particularly the

absence of permanent storage and postharvest facilities, constrain the cooperative's capacity to expand its operations and improve service delivery. Similar studies have shown that effective governance, institutional collaboration, and strategic resource mobilization are fundamental to improving cooperative performance and organizational sustainability (Bijman *et al.*, 2016; FAO, 2023). Strengthening governance systems, diversifying institutional partnerships, and investing in essential infrastructure would reinforce the cooperative's Key Partners, Key Resources, and Cost Structure, thereby providing a stronger foundation for long-term competitiveness and enterprise development.

Synthesis of the value chain analysis

The value chain analysis demonstrated that the competitiveness of the Rizal Mango Growers Agriculture Cooperative is influenced by the interaction of its primary and support activities rather than by individual operational components (Fig. 1). While the cooperative benefits from strong institutional partnerships, collective procurement, active member participation, and continuous technical assistance, several interconnected constraints continue to limit its

operational efficiency and overall competitiveness. Across the primary activities, the most significant challenges include inconsistent availability of production inputs, limited adoption of recommended orchard management practices, inadequate postharvest facilities, high transportation costs, and limited product diversification. These constraints collectively reduce fruit quality, increase postharvest losses, and limit the cooperative's capacity to access higher-value markets. The findings also indicate that dependence on fresh fruit marketing exposes the cooperative to seasonal price fluctuations, thereby reducing income stability and overall profitability. The analysis of the support activities further revealed that organizational development depends largely on effective procurement systems, continuous technology adoption, capacity-building initiatives, and strong institutional governance. Although the cooperative has established productive partnerships with government agencies, opportunities remain to strengthen collaboration with private sector organizations, financial institutions, academic partners, and market actors. Expanding these partnerships would improve access to production technologies, infrastructure, investment opportunities, and diversified markets.



Fig. 1. Proposed business model canvas of the rizal mango growers agriculture cooperative

Overall, the findings suggest that improving the cooperative's competitiveness requires an integrated strategy rather than isolated interventions. Investments in orchard management, postharvest infrastructure, value-added processing, organizational capacity, and market diversification are mutually reinforcing and collectively contribute to greater value creation throughout the mango value chain. These findings support the argument that operational improvements should be accompanied by strategic business planning to

ensure that identified opportunities are translated into sustainable organizational outcomes. The synthesis of the value chain analysis provided the foundation for developing the proposed Business Model Canvas. By aligning operational strengths with strategic opportunities while addressing identified constraints, the Business Model Canvas offers a comprehensive framework for improving value creation, value delivery, and value capture, thereby strengthening the cooperative's long-term competitiveness and sustainability.

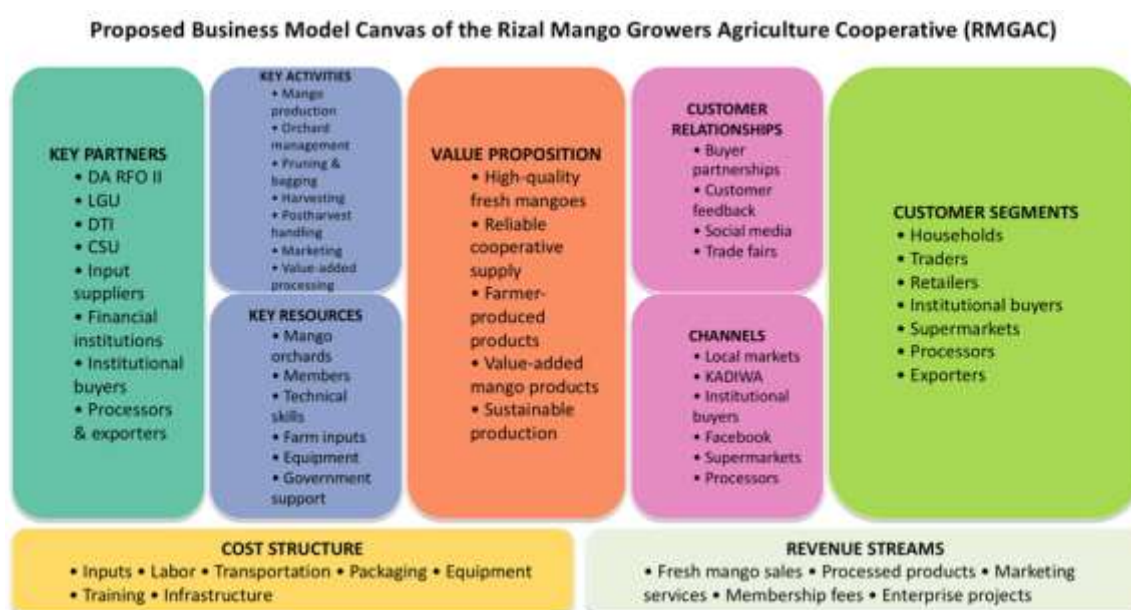


Fig. 2. Proposed business model canvas of the rizal mango growers agriculture cooperative

Proposed business model canvas

The proposed Business Model Canvas was developed by translating the findings of the value chain analysis into a strategic framework for organizational improvement (Fig. 2). The canvas identifies the key elements required to strengthen the cooperative's competitiveness by aligning its resources, activities, partnerships, customer relationships, and revenue-generating strategies. The analysis highlights institutional partnerships as a fundamental organizational strength. Continued collaboration with government agencies, local government units, academic institutions, financial organizations, private agribusiness firms, and market intermediaries will remain essential for improving access to production inputs, technical expertise, infrastructure support, financing, and market opportunities. Expanding these partnerships would

reduce operational constraints while increasing the cooperative's capacity to respond to changing market conditions. The Business Model Canvas also emphasizes the importance of improving key operational activities. Strengthening orchard management through systematic pruning, fruit bagging, integrated pest management, and climate-resilient production practices would improve fruit quality and productivity. Investments in postharvest facilities, grading systems, packaging materials, and transportation infrastructure would reduce postharvest losses and improve product consistency. At the same time, expanding value-added processing would enable the cooperative to generate additional income from fruits that do not meet premium fresh-market standards. Market diversification represents another strategic priority identified through the analysis. Expanding sales to institutional buyers,

supermarkets, food processors, exporters, and digital marketplaces would reduce dependence on traditional trading channels while improving income stability. Developing a recognizable cooperative brand and strengthening digital marketing initiatives would further increase product visibility and customer confidence. The proposed business model also recognizes the importance of continuous capacity building. Regular technical training, leadership development, entrepreneurship education, and digital marketing programs would strengthen members' competencies and improve organizational performance. These investments support innovation, encourage technology adoption, and enhance the cooperative's ability to respond to emerging production and market challenges. Collectively, the proposed Business Model Canvas transforms the operational findings of the value chain analysis into a practical strategic framework. Rather than addressing individual constraints independently, the model integrates production improvement, organizational development, infrastructure investment, market expansion, and institutional collaboration into a coordinated strategy that enhances value creation, value delivery, and value capture. The framework provides a practical guide for strengthening the long-term competitiveness and sustainability of the Rizal Mango Growers Agriculture Cooperative and offers insights that may be adapted by similar agricultural cooperatives operating under comparable conditions.

CONCLUSION

This study analyzed the value chain of the Rizal Mango Growers Agriculture Cooperative using Porter's Value Chain Analysis and developed a Business Model Canvas to strengthen its competitiveness and long-term sustainability. The analysis showed that the cooperative benefits from strong institutional partnerships, collective procurement, technical support, and active member participation. These strengths provide an important foundation for organizational development and continued service to smallholder mango producers. The study also identified several constraints that limit value creation across the cooperative's operations, including inconsistent access to production inputs, limited adoption of recommended orchard management practices, inadequate postharvest infrastructure, high transportation costs, and limited product diversification.

These interconnected challenges reduce fruit quality, increase postharvest losses, and constrain the cooperative's ability to compete in higher-value markets. Integrating Porter's Value Chain Analysis with the Business Model Canvas demonstrated how operational findings may be translated into strategic business actions. The proposed business model highlights the importance of strengthening institutional partnerships, improving production and postharvest management, expanding value-added processing, diversifying markets, and investing in organizational capacity. Rather than addressing operational issues independently, the framework presents a coordinated strategy for improving value creation, value delivery, and value capture. The study contributes to the growing body of knowledge on agricultural cooperative development by demonstrating how value chain analysis and business model innovation may be combined to support strategic planning. The framework developed in this study provides a practical reference for agricultural cooperatives, policymakers, and development organizations seeking to improve organizational performance, strengthen market competitiveness, and promote sustainable rural enterprise development.

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