

# BUSINESS TRANSFORMATION AT THE VEGETABLE TRADING POST: FOUNDATIONAL DEVELOPMENT STRATEGY FOR THE FUTURE

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## Abstract

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This study, conducted in Nueva Ecija, Philippines, explores the issue of business transformation at vegetable trading posts, aiming to propose a strategic approach for future development. Grounded in strategic management theory (Porter, 1985) and using a case study methodology, the research scrutinizes the current business operations of trading posts and the dynamic context they operate within. It identifies several challenges trading posts face, including the low bargaining power of farmers, small quantities of produce, and erratic pricing mechanisms. A key finding is the potential benefits of integrating digital technologies to enhance operational efficiency and market reach (Bharadwaj et al., 2013). Furthermore, it emphasizes the importance of establishing more resilient and inclusive supply chains. This research contributes to the ongoing discourse on sustainable agricultural practices and opens avenues for innovative business transformation strategies in the vegetable trading sector. It serves as a key reference for policymakers, stakeholders, and researchers interested in sustainable agricultural practices.

**Keywords:** Agricultural Practices, Business Transformation, Digital Technologies, Strategic Management, Supply Chain, Trading Posts

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## 1. INTRODUCTION

Located in Central Luzon, Nueva Ecija is a key agricultural hub of the Philippines. Often referred to as the "Rice Granary of the Philippines", Nueva Ecija is not just a significant rice producer but also a substantial cultivator of diverse lowland vegetables. The province enjoys a favorable geographical location and a tropical climate that provides conducive conditions for intensive agriculture. It is strategically located in the country's central plains, making it accessible and allowing its produce to reach various parts of the country. The vast, fertile land, coupled with the abundant water resources, underscores Nueva Ecija's agricultural significance. It leverages these natural advantages to contribute substantially to the country's food basket, ensuring regional food security. This agricultural dynamism extends beyond rice cultivation. The province is a major lowland vegetable producer, growing a variety of crops like Jicama, eggplant, and winged bean.

The unique characteristics of Nueva Ecija, such as its agriculturally favorable climate, rich alluvial soil, and the presence of multiple irrigation systems, make it an important region for this study. This combination of factors allows for the extensive cultivation of these crops, playing a pivotal role in the food supply, not only regionally but nationally as well (Dijay, 2021). However, Nueva Ecija's role as a significant food producer also makes it critical to understand and address the challenges that threaten its agricultural productivity. As such, this study focuses on this province to provide insights that could be instrumental in preserving its agricultural robustness and, by extension, the country's food security. However, the Department of Agriculture has identified several challenges which pose a threat to the region's agricultural productivity. An imminent vegetable supply shortage has been predicted, attributed to adversities including typhoons, escalating costs, pest infestations, and climate change. These challenges disrupt supply chains and amplify dependency on middlemen.

This study seeks to address these issues by setting forth two primary objectives. Firstly, we aim to provide a comprehensive analysis of the challenges facing vegetable farming in Nueva Ecija. Secondly, we seek to elucidate the potential role of vegetable trading posts in mitigating these issues, thus bolstering food security and sustainability. These objectives steer our research questions:

*RQ1: What are the critical obstacles vegetable farmers face in Nueva Ecija?*

*RQ2: How can vegetable trading posts be leveraged to enhance sustainability and overcome these challenges?*

The prosperity of agricultural systems is inherently linked to their specific contextual and regional attributes (Darnhofer et al., 2012). Therefore, this study offers an in-depth exploration of vegetable farming in Nueva Ecija, providing a distinctive perspective on the interconnected dynamics of farming practices, supply chains, and trading posts. We investigate these aspects through a theoretical framework encompassing sustainable agriculture and value chain analysis (VCA) principles,

highlighting their role in promoting increased productivity and sustainability (Weis, 2013).

This study holds relevance for multiple stakeholders, including farmers, middlemen, consumers, and government institutions. By revealing the challenges faced by farmers and potential solutions, it can facilitate agricultural advancements and economic stability. Consumers may gain a better understanding of the factors affecting vegetable prices, while middlemen could comprehend their pivotal role within the supply chain and the implications of fair pricing (Stock & Boyer, 2009). Government institutions, particularly the Department of Agriculture, can utilize these insights to enhance their agricultural program's effectiveness. This research methodology incorporates a mixed-methods approach, combining quantitative data from a farmer survey and qualitative data from comprehensive interviews with diverse stakeholders in the vegetable supply chain. This method ensures a robust understanding of Nueva Ecija's vegetable farming sector dynamics (Creswell, 2018). The findings emphasize the critical role of vegetable trading posts in Nueva Ecija's agricultural landscape, revealing key areas for development. It brings to light the challenges encountered by farmers and other stakeholders, providing actionable insights to streamline the supply chain and enhance the profitability of vegetable farming.

The paper follows a structured flow. Section 2 provides a detailed literature review, highlighting the state of the research and identifying gaps. Section 3 explains the research methodology employed. Section 4 presents the primary findings, while Section 5 delves into a detailed discussion of these results. Section 6 concludes the study, offering recommendations for future research.

## 2. LITERATURE REVIEW

### 2.1. The imperative of business transformation in a dynamic world

The ever-changing landscape of global markets demands businesses to adapt and evolve continually. These adaptations can alter a company's structure, operations, and strategies profoundly. Rapid technological advancements, globalization, and shifting consumer needs have all intensified the urgency for business transformation in the contemporary economy (Cesarino et al., 2019). This transformation becomes more critical in sectors like agriculture, where challenges abound. The industry grapples with issues like climate change, resource shortages, and shifting consumer preferences (Giang & Dung, 2021). Particularly in vegetable trading stations, a comprehensive business transformation strategy can help navigate these obstacles, capture new opportunities, and ensure long-term sustainability. Through this transformation, trading stations can align their operations, implement innovative practices, and establish strategies responsive to market demands, setting a course for growth and success in an unpredictable business environment.

## 2.2. The role of vegetable trading posts as vital connectors in agribusiness

The agriculture sector heavily depends on vegetable trading posts, which serve as efficient connectors between farmers and consumers, facilitating the distribution of fresh and high-quality vegetables to the market. As an example, the Nueva Ecija Vegetable Trading Post has a pivotal role in the agricultural sector, functioning as a primary hub for farmers to sell their produce to wholesalers, retailers, and other buyers. This vital infrastructure supports not only the local economy but also addresses the growing demand for fresh vegetables among consumers (Labonté, 2019).

## 2.3. Recognizing and overcoming challenges in vegetable trading post's business model

Several roadblocks undermine the efficiency and profitability of vegetable trading posts. The absence of standardized pricing systems and a robust platform for information exchange result in an opaque and inefficient trading environment. These challenges, along with unfair pricing and information asymmetry, depress farmers' produce prices and obstruct market access for small-scale farmers (Gorissen et al., 2016). Furthermore, the slow adoption of digital tools and technologies in trading stations exacerbates these issues. High reliance on manual and paper-based systems for record-keeping, inventory management, and communication leads to delays, inaccuracies, and inefficiencies (del Mar Alonso-Almeida et al., 2017). The lack of modern logistics and infrastructure exacerbates these challenges. Inadequate storage facilities, transportation systems, and cold chain mechanisms escalate post-harvest losses, degrade quality, and inflate costs (Broekhuizen et al., 2021). To improve their performance and competitiveness, trading stations must adopt transparent pricing and information-sharing systems, leverage digital technologies, and invest in modern logistics and cold chain facilities.

## 2.4. Unearthing opportunities for business transformation in vegetable trading posts

Vegetable trading posts are ripe for business transformation, presenting a host of opportunities. The advent of digital and e-commerce platforms can significantly simplify operations, improve transparency, and provide direct access to buyers, enhancing market reach. Leveraging digital transformation can optimize supply chain processes and provide market intelligence (Shen et al., 2021). Additionally, the adoption of sustainable and circular business models can be a transformative game-changer. Implementing practices that minimize waste, optimize resources, and offer value-added services can bolster the trading post's resilience and competitiveness (Bellis et al., 2022). Strategies focused on composting, recycling, and energy efficiency can reduce environmental impacts while creating new revenue streams. A two-pronged approach that combines digital transformation with sustainability practices can ensure a thriving future for vegetable trading stations.

## 2.5. Assessing the impact of business transformation on stakeholders

Business transformation in vegetable trading will inevitably impact various stakeholders. For farmers, improved market access, fair pricing, and enhanced profitability can be expected. Digital platforms and data-driven market intelligence can provide farmers with real-time market information, enabling them to expand their consumer base and receive more equitable prices (Sebhatu & Enquist, 2022). Consumers stand to benefit from improved supply chain efficiency and transparency, which ensures the availability of fresh, high-quality vegetables at affordable prices (Wecker & Froehlich, 2022). Sustainability practices alleviate customer concerns regarding food safety, environmental impacts, and social responsibility (Aktas et al., 2022). Intermediaries in vegetable trading may also face a mixed bag of challenges and opportunities with business transformation. While some intermediaries may experience disruptions or changes in their roles, others may find new avenues by offering value-added services such as quality assurance, logistics, and market intelligence (Mahdad et al., 2022).

## 2.6. Building strategies for implementing business transformation in vegetable trading posts

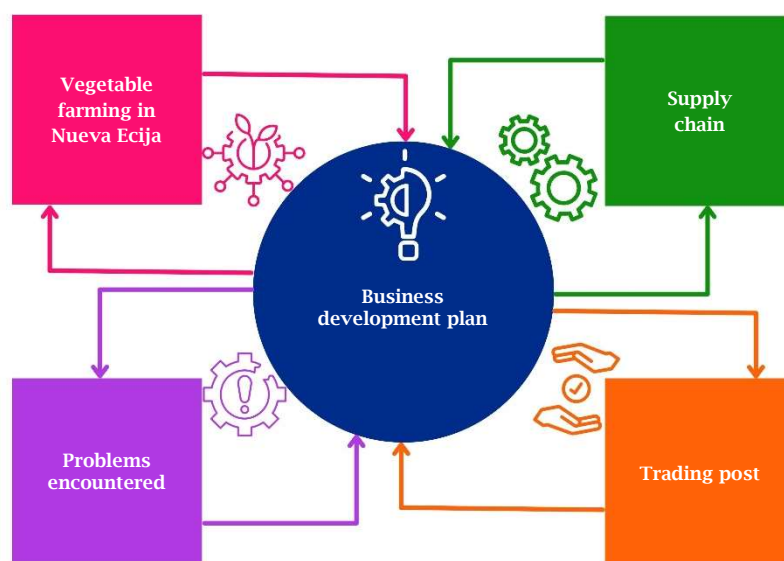
Several best practices can guide the successful implementation of business transformation at vegetable trading posts. First, the development of a strategic plan that includes transformation goals, targets, and action steps is crucial. This plan should address the specific issues and opportunities at the Nueva Ecija Vegetable Trading Post, align with the broader goals of the agricultural sector, and incorporate the principles of good corporate governance. Stakeholder participation and collaboration are essential in this transformation journey. Ensuring that farmers and consumers are actively involved and consulted is crucial.

## 2.7. Theoretical framework

Sustainable agriculture promotes environmentally friendly, commercially viable, and socially just farming. It entails optimizing the use of natural resources, boosting farmer livelihoods, and delivering high-quality, safe food to consumers while minimizing environmental impact (Kloppenborg et al., 1996; Pretty, 2007).

Value chain analysis (VCA) helps companies understand their competitive advantages by identifying opportunities along the value chain, from raw material sourcing to end-user delivery (Porter, 1985). This study applies VCA to understand the inefficiencies, bottlenecks, and inequities in the Nueva Ecija vegetable supply chain and explores the application of technology in vegetable trading posts to improve supply chain efficiency, fairness, and sustainability.

Figure 1. Research paradigm of the study



### 3. METHODOLOGY

The research adopts a mixed-methods approach, intertwining both quantitative and qualitative research methods, to capture a comprehensive understanding of the vegetable production system in Nueva Ecija. The adopted methodology is focused on acquiring a comprehensive understanding of the various roles within the vegetable trading post supply chain and the profile of farmers involved in vegetable production.

The sample consists of diverse participants from different positions within the supply chain, including farmers, *sakadoras*<sup>1</sup>, *viajeros*<sup>2</sup>, and retailers. A purposive sampling strategy was utilized, which permits the selection of individuals who possess extensive knowledge about the phenomena being investigated (Etikan et al., 2015). Members of the Nueva Ecija Trading Post community who were easily accessible and amenable to participating in the study were approached.

Data collection encompassed two primary strategies: quantitative data was obtained through a meticulously designed farmer survey, which collected demographic information and detailed insights about farming practices, challenges, and market dynamics. This data was collected from 47 respondents over two months.

The qualitative component involved conducting semi-structured interviews, providing nuanced insights into the dynamics within the vegetable trading post supply chain. Visits were made to the Nueva Ecija Trading Post centers to interact directly with the participants. All interviews were recorded, transcribed, and thematically analyzed.

The data from both the survey and interviews were subjected to descriptive data analysis. Quantitative data were statistically processed, while qualitative data were analyzed using thematic analysis, a method for identifying, analyzing, and reporting patterns within the data (Braun & Clarke,

2008). This analytical approach was employed to depict a holistic and nuanced image of Nueva Ecija's vegetable production and the critical role of trading posts.

The choice of a mixed-methods approach, blending descriptive research with qualitative insights, was deliberate, aiming to provide a comprehensive and detailed understanding of the vegetable supply chain in Nueva Ecija. Other methodologies, such as case study research, action research, or phenomenological research, were also considered for their potential to enrich the findings.

### 4. RESULTS

#### 4.1. Vegetable farming in Nueva Ecija

##### 4.1.1. Vegetable production in Nueva Ecija

Between 2016 and 2019, only a small fraction of Nueva Ecija's municipalities/cities participated in vegetable farming. In 2019, squash was the top crop due to its year-round demand, while hot pepper production was the lowest, due to spoilage risk in the rainy season and consequent high market prices. Overall vegetable production decreased from 2018 to 2019 due to Typhoon Ursula's devastating effects, though squash and pechay production persisted. This decline underscores crop yield variability year by year and the potential supply inadequacy in the local market, hinting at a need for imports. These findings align with Villareal and Paje (1990), who pinpointed climate, soil and seed conditions, limited credit facilities, and subpar post-harvest practices as production barriers. Nevertheless, Nueva Ecija holds untapped potential for bolstering vegetable production, possibly diversifying from its traditional focus on rice cultivation.

##### 4.1.2. Role of trading post centers

Trading post centers are pivotal in the agricultural supply chain, offering farmers an avenue to sell their produce in bulk. Their success depends on accessibility and sufficient space for smooth

<sup>1</sup> In the Philippines' trading post markets, a "sakadora" sets produce prices with farmers and stores vegetables within the market.

<sup>2</sup> In Nueva Ecija's vegetable trading post markets, "viajeros" connect "sakadoras" or middlemen and retailers. They negotiate exchanges at trading posts, transport vegetables with a t vehicle, and sell to retailers.

operations. Examples like the Baler Market Trading Post Centre have demonstrated the positive impact of these hubs in promoting the wholesale trade of farm goods. Initiatives like Gulayan sa Barangay, Farmers' Market, and Barangay Trading Post provide alternatives to traditional middleman-led sales, particularly benefiting small-scale farmers by allowing direct sales. However, challenges exist, such as lower earnings for farmers supplying Barangay Trading Posts due to funding shortages. To resolve this, government financial aid to these posts is recommended, along with exploring partnerships with supermarkets and non-profit organizations as additional sales channels.

#### 4.1.3. Farmer's profile engagement in vegetable production

From 2016 to 2019, vegetable farming in Nueva Ecija saw an increase, with hot pepper farming witnessing the most substantial growth of 126%, likely driven by soaring prices. Most vegetable farmers owned their land, with only a few farming pawned land due to financial difficulties. Squash, eggplant, and sitao were the most commonly cultivated vegetables, favored for their stable prices and popularity in

Filipino cuisine. Distribution methods varied, with most farmers selling to *sakadoras* at trade posts. Return on investment fluctuated based on the vegetable type and was influenced by production cost, selling price, and yield per hectare. Despite certain challenges, farmers expressed confidence in the profitability of vegetable farming given the appropriate knowledge and experience.

#### 4.2. Supply chain

Table 1 outlines the stages of vegetable production in Nueva Ecija. It details labor activities, material costs, and other inputs involved in growing vegetables. Yields per hectare for various vegetables range from 15,000 kg (for squash) to 45,000 kg (for sitao). Most farmers (93.62%) do not have storage facilities, with 63.83% lacking transport vehicles. Pricing strategies vary, with most farmers' (72.34%) pricing per bundle. Most payments are made on delivery (68.09%), and the majority of produce is sold within Nueva Ecija (80.85%). Supply dynamics fluctuate with season and demand, with certain vegetables grown year-round and others planted in specific months.

**Table 1.** Supply chain production of vegetables

Stage of supply chain	Details
Inputs and growing	<i>Labor activities:</i> Plowing, harrowing, plot construction, planting, fertilizer, and insecticide application, spraying and weeding, irrigation, harvesting, and hauling. <i>Material costs:</i> Seeds, fertilizers, pesticides. <i>Other inputs:</i> Seedling trays, plastic mulch, poles, wood posts, wire, strings, and fuel.
Harvesting	<i>Yield per hectare:</i> 27,000 kg of ampalaya, 36,000 kg of eggplant, 40,000 kg of tomato, 45,000 kg of sitao, 36,000 kg of okra, 30,000 kg of hot pepper, 15,000 kg of squash, 35,000 kg of pechay.
Handling and storage	<i>Storage facility:</i> Not available (93.62% of farmers), available (6.38% of farmers). <i>Storage duration:</i> Generally immediate transport, sometimes few days for better market prices.
Transport vehicle	<i>Vehicle ownership:</i> No vehicle (63.83% of farmers), kolong-kolong (19.15%), tricycles (10.64%), mini-truck (2.13%).
Pricing	<i>Pricing strategies:</i> Per kilo (25.53% of farmers), per bundle (72.34%), "pakyaw" system (2.13%).
Terms/Mode of payment	<i>Modes of payment:</i> Cash on delivery (68.09%), consignment, or other terms (31.91%).
Markets	<i>Markets for selling produce:</i> Within Nueva Ecija (80.85% of farmers), outside Nueva Ecija (19.15%).
Demand-supply	<i>Supply dynamics:</i> Fluctuates depending on season and demand. <i>Planting seasons:</i> Pechay, ampalaya, eggplant (year-round), squash and okra (January, February, April-June).

#### 4.3. Problems encountered

Table 2 outlines the problems faced by farmers in vegetable production in Nueva Ecija. Issues range from high input costs, erratic climate, and poor seed quality, to a lack of sufficient capital, and high-interest rates from lenders. Harvesting issues include poor produce quality and the need for

perfect market timing. Lack of storage facilities, high transportation costs, price manipulation by middlemen, and delays in payment add to the challenges. Lastly, fluctuations in supply and demand, as well as potential price manipulation at trading post centers, further complicate the situation for farmers.

**Table 2.** Problems encountered in vegetable production

Problem area	Specific issues
Inputs and growing	1. High costs of fertilizers and pesticides 2. Erratic climate leading to pest infestations and damaging weather events 3. High labor costs 4. Poor quality and availability of seeds
Financing	1. Lack of sufficient capital 2. High-interest rates from informal lenders 3. Low savings rate among Filipinos
Harvesting	1. Poor quality of produce due to pest infestations and weather events 2. Need for perfect timing to meet market demand and price points
Handling and storage	1. Lack of storage facilities
Transport vehicle	1. High cost of transportation due to vehicle rental charges
Selling practices	1. Price manipulation by middlemen 2. Delays in payment due to the system of payment on consignment
Interplay of demand-supply	1. Oversupply leads to lower prices 2. Shortage of supply leading to higher prices but potentially fewer buyers
Trading post centers	1. Potential for manipulated prices when selling directly to retailers 2. Loss of bargaining power due to urgency to sell crops

#### 4.4. The trading post centers and the role of players in the Nueva Ecija Vegetable Trading Post

The Cabanatuan and Gapan Trading Post Centers in Nueva Ecija play a vital role in fostering interactions between farmers, intermediaries, and merchants. They aid local producers in marketing their harvests, extending their market reach, and increasing their share in the local market. Challenges, such as the relocation during COVID-19 and Typhoon Ambo's destruction, have tested these centers, but they continue to serve as critical trading, income, and networking hubs. Their existence ensures a steady and affordable supply of food, underlining the importance of local governments in establishing more of these centers to support farmers and streamline local produce distribution. The vegetable trading post supply chain consists of various key players with specific roles. Farmers grow the vegetables, setting prices with intermediaries like *sakadoras* (bulk buyers) and middlemen. The chain extends to *viajeros*, who broker deals at the trading posts, and ultimately to retailers who purchase from *sakadoras* and *viajeros* to cater to the end consumers. Any disruption in this chain can impact food sustainability and security on national, regional, and provincial scales, highlighting the significance of each player in ensuring smooth operations and profitability.

#### 4.5. Strategic development plan for vegetable farmers and trading post centers

The strategic development plan for vegetable farmers and trading post centers in Nueva Ecija encompasses several critical domains including marketing, production, financial management, skills enhancement, and infrastructure development. Its purpose is to capitalize on existing strengths such as stable vegetable demand and prices, abundant cultivable land, and accessible trading post centers. The plan will heighten vegetable production and market reach, optimize farmland usage, promote saving habits, and expand trading post infrastructure.

Strategies include leveraging digital marketing, improving seedling production, promoting financial literacy, and adopting advanced farming techniques. The initiative will also aim to address weaknesses like poor quality produce and infrastructure, lack of transport, inadequate farming skills, and limited capital. Solutions include improving produce quality, upgrading infrastructure, offering farming education, and identifying new funding sources.

To mitigate threats like natural calamities, fund shortages, and competition from private trading posts, the plan will promote crop insurance, budget allocation for new trading posts, and equitable pricing systems. Furthermore, the plan incorporates digital transformation as per Bharadwaj's model to ensure future resilience and adaptability. The end goal is a more efficient, productive, and profitable vegetable farming and trading sector in Nueva Ecija.

## 5. DISCUSSION

### 5.1. Vegetable farming in Nueva Ecija

Vegetable production in Nueva Ecija in 2019 was localized to six out of thirty-two municipalities/cities, a pattern which can be attributed to various biophysical, sociocultural, and economic factors including climate, soil condition, access to land, and resources (Villareal & Paje, 1990). Squash was the most prevalent crop due to its constant demand and potential weather resilience in comparison to more sensitive crops like hot pepper. The devastating impact of Typhoon Ursula demonstrates the vulnerability of the agricultural sector to climate change and underlines the importance of implementing climate-resilient farming practices. In the face of climate change and increasing demands, there is a need for strategies that would improve agricultural practices. Implementing Good Agricultural Practices (GAP) could be a viable approach (Bhola & Malhotra, 2014). GAP promotes the use of sustainable methods and technologies to improve the quality of crops and ensure environmental sustainability (Bhola & Malhotra, 2014). Besides, the integration of digital technology in farming could potentially boost agricultural productivity and profitability. Mohsin et al. (2023) discussed the influence of digital financial technologies on the development of entrepreneurship in commercial banks, which could be transposed to the agricultural sector. By equipping farmers with digital financial tools, the agricultural sector could see increased efficiencies and reduced transaction costs.

Moreover, green practices in the agricultural sector can contribute to sustainable development. Vegetable farming in Nueva Ecija could benefit from the adoption of such practices. In light of the increasing importance of ethics in business, vegetable farming in Nueva Ecija must also uphold ethical practices. Upholding ethical values such as honesty, integrity, fairness, and respect could potentially increase the sector's performance and build trust with consumers and other stakeholders.

### 5.2. Supply chain in the production of vegetables

The vegetable supply chain in Nueva Ecija includes various stages starting from inputs and growing to harvesting, storage, transportation, pricing, payment methods, and demand-supply dynamics. A well-understood and efficient supply chain can significantly impact the overall productivity, profitability, and sustainability of agricultural systems (Hobbs, 2020). Vegetable farming is a labor-intensive activity that involves various input requirements and expenses. The specific inputs needed and their quantities depend on the type of vegetable being grown. Land preparation, planting, irrigation, and harvesting make vegetable growing labor-intensive, raising production costs (Charlton & Castillo, 2020). Vegetable yield per hectare varies by type, underscoring the significance of crop-specific management practises to maximise yields. Good farming practises

boost yields and profit margins (Rolo et al., 2016). Labour assistance and mechanisation can reduce vegetable agricultural labour costs. This reduces labour costs, which make up half of the variable production costs (Galinato et al., 2022). Farmers with perishable crops often lack storage facilities. Because most vegetables are perishable, a lack of storage facilities can lead to large post-harvest losses. Post-harvest handling and storage can boost vegetable supply chain profitability and sustainability (Affognon et al., 2015). Vegetable producers face transportation issues that increase post-harvest losses and lower earnings (Shah et al., 2022; Stöber et al., 2021; Rajapaksha et al., 2021; Middendorf et al., 2021; Nedumaran et al., 2020; Workineh, 2021; Adepoju, 2014). Farmers cannot get their produce to markets due to weak road networks and inefficient transportation (Adepoju, 2014). This can cause deterioration and post-harvest losses, especially for vegetables (Middendorf et al., 2021). Depending on local market conditions, vegetables are sold in bundles to facilitate counting, pricing, and transaction costs (Stöber et al., 2021). Crop diversification, financial, marketing, and production concerns also plague farmers (Shah et al., 2022). Improving transportation infrastructure and addressing these issues can reduce post-harvest losses and boost vegetable agricultural profits. Due to the cash-intensive nature of agriculture, most farmers prefer payment upon delivery (Shepherd, 2007). In Nueva Ecija, intermediaries transport vegetables to distant markets (Issa, Munishi, & Hamidu, 2022). Growing certain vegetables year-round helps stabilise supply and reduce price volatility (Brümmer et al., 2015). Mobile phones helped farmers improve sales, get market information, access loans, and contact customers, which increased profits (Mariyono et al., 2021). The government could develop storage centres and teach intermediaries and farmers best marketing practises to strengthen the vegetable supply chain (Issa, Munishi, & Mubarak, 2022). Nueva Ecija farmers can meet local vegetable demand and even expand their market by resolving these obstacles and enhancing supply chain efficiency (Mariyono et al., 2020).

### 5.3. Problems encountered in vegetable production

Nueva Ecija vegetable farmers face a multitude of challenges, including those related to procurement and sales. The recent disruption in the supply chain due to the pandemic has led to an increase in the cost of fertilizers and insecticides. Furthermore, agriculture is being threatened by climate change, leading to significant crop losses (Challinor et al., 2014). Seed market regulations and certifications play a pivotal role as the quality of seeds directly impacts agricultural productivity and produce quality (Tripp & Pal, 2001). Financing has always been a major issue for farmers worldwide. With the lack of established financial institutions, farmers often resort to borrowing from informal lenders at exorbitant rates (Sekabira & Qaim, 2017). A study by Mohsin et al. (2023) highlighted the potential of digital financial technologies in developing entrepreneurship in commercial banks within emerging markets. This technological advancement could provide alternative financing and savings options for farmers, potentially easing the current financial strain they experience. The quality and

price of vegetables are largely dependent on the harvest date. Given the perishability of vegetables, the timely harvesting and delivery of these goods become crucial. The application of good corporate governance within the banking industry, as explored by Faozan et al. (2023), can offer solutions that enhance the financial performance of these industries. The principles therein can be transferred to agricultural practices, potentially moderating issues related to the timely harvesting and delivery of produce. Conclusively, addressing these issues requires a multi-pronged approach that not only focuses on climate adaptation strategies but also leverages technological advancements in financial institutions and adopts principles of good corporate governance.

### 5.4. The trading post centers and the role of players in the Nueva Ecija Vegetable Trading Post

The supply chain relies on Cabanatuan and Gapan Trading Post Centres to connect farmers, intermediaries, and merchants. These commerce hubs attract sellers, buyers, and transport vehicles with a wide range of products (Mohsin et al., 2023). These centres help local farmers advertise their goods by prioritising them. The effective use of performance measurement can lead to value-based intermediation adoption among institutions, which can potentially be applied in these trading centres. These centres also encourage other communities to trade local produce, expanding the local market and increasing farmers' market share. These trading centres are crucial to responding to the post-pandemic economy due to policies rethinking supply chains, affected by border closures. Meanwhile, business ethics practices such as corporate social responsibility could increase their reputational value and, therefore, their attractiveness (Crafo & Reberieux, 2016). This also aligns with the notion that the ethical stance of organizations can be influenced by exposure to unethical behavior (Zheng & Mirshekary, 2014).

### 5.5. Strategic development plan for vegetable farmers and trading post centers

The strategic development plan for vegetable farmers and trading post centers targets marketing, production, and financial aspects. It aims to bolster vegetable production, promote marketing literacy, and utilize digital platforms. The plan includes expanding trading post centers and promoting the one town, one product initiative for wider market reach (Pitaloka et al., 2021). Quality improvements and pest control measures are outlined to address threats of overcrowding and low-quality produce. The strategy emphasizes enhancing production through farmer education, infrastructure improvement, and strategic nurseries, targeting better seeds and higher yields (Śwityk et al., 2021; Liesivaara & Myyrä, 2014). Measures like technical farming management training and crop insurance aim to counter the lack of advanced farming technology and natural calamities (Genkin & Mikheev, 2020; Shrestha & Dhakal, 2020; Fiorini et al., 2019). The financial facet of the plan advocates savings, addresses financial illiteracy, and explores potential financing and subsidies.

It suggests forming cooperatives for agricultural cooperation and procuring loans. The strategy capitalizes on land potential and advances in vegetable farming technology (Lindsay et al., 2013). It underscores production increment, crop quality improvement, and cost reduction. Marketing strategies include broadening market distribution through partnerships and exploring the organic vegetable market. Incentive programs like monetary incentives for fresh produce purchases at farmers' markets are also featured (Franckle et al., 2018). Overall, the strategic development plan seeks to exploit opportunities, mitigate threats, and enhance cooperation and marketing for vegetable farming and trading post centers' growth and sustainability.

## 6. CONCLUSION

In conclusion, this research sheds light on the intricate factors that underpin vegetable production. The respondents identified key elements such as inputs and the growing process (including land preparation, selection of seeds or seedlings, use of fertilizers, pest control measures, and labor), in addition to other crucial stages such as harvesting, storage, transportation, pricing, payment terms, and marketing.

The supply chain emerged as a critical component in ensuring the distribution of vegetables within the marketplace. This dynamic process involved intermediaries at every step, from the farmers to the retailers and between different markets.

A significant number of farmers in Nueva Ecija spread across 32 municipalities or cities, were actively involved in vegetable cultivation, tending to crops that varied by the season and the vegetable calendar. Most of these farmers owned their farmland, inherited through generations, and were passionately dedicated to this lifestyle, with a majority having holdings of three hectares or less.

The farming venture, however, was not devoid of challenges. Farmers contended with escalating costs, unpredictable climate patterns, pests, typhoons, floods, and the prohibitive cost of labor. Further complicating the situation was the lack of financing options, fluctuating quality of produce and seeds, the perishable nature of the vegetables, inadequate storage facilities, manipulated prices, payment uncertainties, and the balance between supply, demand, and pricing.

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The role of trading posts was found to be integral in making goods affordable for retailers and, consequently, consumers, thanks to volume transactions. However, these posts also faced their share of issues such as inconsistent patronage and the diminishing bargaining power of farmers due to limited produce quantities.

Based on these findings, the study recommends several measures. Vegetable farmers should endeavor to understand the factors involved in vegetable production thoroughly. This knowledge will allow them to strategize effectively for subsequent seasons and possibly cut production costs. Farmers should also recognize their indispensable role in the supply chain and the functions of intermediaries in trading posts. This awareness could lead to mutually beneficial agreements on marketing and vegetable pricing.

Farmers could also benefit from honing their financial literacy and marketing skills, which could mitigate issues around cost, pricing, and product distribution. Liaising with authorities like the Department of Agriculture and Local Government Units (LGUs) could help address challenges around supply and demand and the establishment of new trading centers.

The Department of Agriculture could fortify vegetable farming and production in the province by including farmers in various programs and initiatives, providing education, subsidies, and promoting local produce. LGUs can contribute by setting up local trading posts, attracting more traders, and thereby expanding the market.

LGUs might also consider implementing regulations requiring intermediaries like *sakadoras* to secure permits and pay taxes, boosting local government revenue. If funds permit, LGUs could establish more local trading posts, thereby protecting local farmers and strengthening supply chain transactions.

While this study's findings are valuable, it is important to acknowledge the limitations. The study was geographically limited, making the findings potentially non-generalizable to other regions or sectors. It also relied on self-reported data, which could introduce bias. Future research should strive to overcome these limitations, providing more insights into the operations of vegetable trading posts, their economic impact, and their role within the community.



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