

Analysis of Performance of Staple Food Supply Chain in Indonesia and the Philippines

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Abstract – This research aims to analyze existing supply management in Indonesia and the Philippines. In the method used to examine the condition of natural objects, the researcher is the key instrument, the data collection technique is carried out using triangulation, the data analysis is inductive, and the research results maintain significance. The research results show that the supply chain management for raw materials in Indonesia, especially in Madiun Regency, has quite a long chain, not directly from producers to consumers. The supply management flow starts from farmers or breeders, collectors, and processors, and is delivered to distributors, namely through large and small agents. After that, it goes to consumers, starting from restaurants, supermarkets, markets, and regular retail. Likewise, in the Philippines, the flow of supply management starts from producers, collectors, processors, distributors, retailers, and consumers.

Keywords – SCM, staple food.

1. Introduction

Indonesia is experiencing consistent annual growth due to a significant influence on consumption patterns and food requirements. This country is endowed with abundant natural resources, fertile terrain, extensive coastlines, and vast aquatic domains. The valuable assets position Indonesia for the cultivation of essential crops to meet the nutritional needs of its people. However, attaining food self-sufficiency remains elusive due to a persistent reliance on food imports and a prominent instance is the 2016 importation of salt. The challenge of achieving food self-sufficiency can be attributed to several factors, including perpetual population expansion, limited expansion of agricultural land, and the conversion of arable land for non-agricultural purposes. In addition, climatic variables and the suboptimal economic conditions for farmers discourage individuals from pursuing agriculture as a vocation. In pursuit of food self-sufficiency, the Indonesian government has directed its attention to eleven strategic food commodities, including rice, corn, soybeans, beef, sugar, poultry, eggs, chili, onions, and edible oils.

Rice is an indispensable commodity, serving as a staple food for a substantial segment of the population. The consumption increases annually, in line with the growing population. Indonesia is ranked as one of the highest rice-consuming countries and the high dependence on rice can pose a problem when the availability cannot be fulfilled [16]. Another essential commodity is meat, commonly consumed by many people. Based on data from the Directorate General of Livestock and Animal Health (2017), the production of local beef in 2017 was not sufficient to fulfill the national demand. The estimated production in 2017 was 354,770 tons with a demand of 604,968 tons. This shortfall in local beef production led to imports of live cattle and meat.

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Domestic production is unable to fulfill the demand for beef consumption and this gap weakens the supply chain. Even though domestic production continues to increase, consumption needs remain insufficient.

Nutritional requirements are connected to food needs, assuming an important role in safeguarding individuals' well-being. Therefore, there has been a discernible increase in the demand for premium-quality food products. The livestock industry, endowed with the potential to improve food requirements, particularly within the poultry sector, is a valuable resource for the Indonesian population. This increasing demand offers an opportunity for expansion and a means to contribute significantly to the national economic landscape. A method to meet the need for animal protein is through the consumption of eggs, an integral component of the livestock sector. Chicken eggs are esteemed by a broad spectrum of age groups, ranging from the youngest to the most elderly members of society. This popularity is largely attributed to its rich nutritional profile, including proteins, carbohydrates, vitamin A, phosphorus, and healthy fats, as well as its affordability.

Marketing systems play a crucial role in the supply chain from production to consumers and also affect efficiency. A supply chain consists of the upstream and downstream activities and actors included in the flow of products, money, and information [13]. Moreover, the variable comprises various parties within and outside the company. In this context, the challenge in achieving food self-sufficiency is to establish a distribution system fulfilling the quantity and quality of food commodities expected by the population without neglecting their welfare. This requires efforts to plan for demand fulfillment by increasing production, selecting supply chain structures, enhancing distribution mechanisms to reduce costs, as well as considering policies that support the optimization of local food trade and distribution systems.

A supply chain includes a long-term partnership with customers to manage the processes of procurement, storage, and use of goods, aiming to reduce costs in fulfilling the required products. The concept extends beyond sales, constituting collaboration as business partners and offering guidance on inventory management to valued customers. According to [10], it is the planning, design, and control of information and material flows within the supply chain to efficiently fulfill current and future customer needs. Sustainable supply chain management (SCM) encourages predictive commodity procurement mechanisms that consider various production factors to match supply and demand efficiently.

The results of the latest data from the Philippine Statistics Authority showed that the population of the Philippines has exceeded 110 million, making rice the primary staple food for this vast number of individuals. A recent report from the USDA, "Grain: World Markets and Trade," reported that the Philippines imposed sanctions on the import of 3.9 million metric tons (MT) of rice between January 2022 and December 2023, exceeding China's rice imports of 3.5 million MT during the same period. Since 2019, China has consistently ranked among the foremost rice-importing nations, and the supply chain initiated with the Department of Agriculture. This department extends crucial financial assistance and comprehensive support across the entire spectrum of activities, from research and development to the cultivation, harvesting, and distribution of rice. The Philippine Rice Research Institute, or PhilRice, functions as the research arm of the Department of Agriculture and plays a significant role in introducing new technologies as well as diverse rice varieties suitable for various conditions. Across the Philippines, the seven PhilRice Institutes have strategically positioned their efforts to concentrate on the distribution, development, and research of novel rice varieties for distinctive weather patterns. Subsequently, these rice grains are disseminated to a multitude of national seed cooperatives.

Seed growers play a crucial role in the supply chain, being included in the cultivation, planting, and harvesting of seeds available to farmers and Local Government Units (LGUs). Based on an exclusive contract with PhilRice, seeds are directly supplied to farmers. For example, LGU Batangas orders various seed varieties suitable for different types of soil in the province and there is an option to buy directly from seed growers. Seed growers face distinct challenges when prominent business tycoons import hybrid seeds and complementary fertilizers for farmers. This shows an advantage that is not readily available to cooperative seed farmers. However, these hybrid seeds may not universally suit all soil types and weather conditions. These superior hybrid seeds, predominantly shine during the second harvest, which is one of the three rice harvest seasons in the Philippines, occurring in June and July. Farmers usually sell their rice to either the National Food Authority, a government agency, or private traders who purchase milled rice. Traders who frequently engage in competitive bidding are accommodated to secure palay (unhusked rice) or rice from farmers, contributing to the volatility of market prices. Subsequently, these traders channel the rice to national milling facilities, which disseminate well-milled rice to wholesalers, distributors, and retailers before reaching the end consumer.

Based on observations conducted on Filipino students, rice distribution is not equitable. Indonesia and the Philippines share similarities since both are archipelagic countries situated in tropical regions. Based on this background, the research gains a deeper understanding and analysis of SCM.

2. Definition of SCM

Supply Chain is a network of companies working to create and deliver a product to the end-users. These companies typically include suppliers, factories, distributors, and stores or retailers, as well as logistics service providers [4]. According to [5], a supply chain is the integration of a process where multiple entities work to acquire and transform raw materials into finished products before delivering to retailers and customers. This organizational system comprises various activities, including information, funds, and other interconnected resources in the movement of a product or service from suppliers to consumers or end-users [6]. According to [11], a supply chain is the physical network, consisting of all companies included in supplying raw materials, producing goods, and delivering to consumers or end-users. Based on the above opinions, supply Chain is a networked system of work, ranging from supplying raw materials to delivering to customers.

According to Simchi-Levi et al. [8], SCM is a set of methods used to effectively integrate suppliers, manufacturers, warehouses, and stores to produce and distribute inventory in the right quantity, as well as minimize system costs in satisfying demand and service. Ballou [17] stated that SCM was a network of interrelated organizations working together to organize, monitor, and improve the flow of goods and information. Based to [1], the variable is a series of activities needed to plan, control, and execute the flow of products efficiently and cost-effectively.

Based on the above opinions, SCM is a method used to manage, and control the supply chain from procurement, and inventory to product delivery. This is achieved with a focus on timeliness, accuracy in location, minimum cost, and the quantity of products produced.

2.1. Objectives, Benefits, and Functions of SCM

The main objectives of SCM [12] include On-time product delivery to satisfy consumers, Cost reduction, time reduction, the precision of planning and distribution activities. The benefits of SCM [9] are categorized as Tangible Benefits: Tangible benefits such as inventory reduction, productivity improvement, IT cost reduction, marketing management improvement, and revenue enhancement, then Intangible Benefits: Intangible benefits include continuous process improvement, standardization, quick customer response, flexibility, and business performance.

The functions of SCM [9] consist of:

- 1) SCM physically comprises purchasing merchandise and selling to end consumers or customers. This first function is related to physical costs, such as merchandise, storage, and transportation.
- 2) SCM functions as a critical market mediator, ensuring that the supply chain provides products and services in line with the desires and needs of the end customers or consumers. This is related to market survey costs, product planning, and costs resulting from the non-fulfilment of customer aspirations by-products.

2.2. Components of SCM

According to [7], five main components in SCM should be considered:

- 1) Production: Producing market demands, at the right time, with sufficient production volume.
- 2) Inventory: The inventory level acts as a buffer and secures the business from demand uncertainty.
- 3) Location: Decision-making in selecting the optimal location for various facilities, warehouses, and storage.
- 4) Transportation: The need to move inventory from one place to another across the supply chain.
- 5) Information: The decision-making concerning the level of data collection and distribution.

2.3. Distribution Channels

Distribution channels are an aspect of marketing, and these channels can also be understood as activities facilitating the delivery of goods and services from producers to consumers. A person or a company acting as a distributor is an intermediary that delivers products from manufacturers to retailers. After a product is produced by the factory, it is delivered to a distributor, who sells to retailers or customers. A smoothly running and optimal distribution channel enables a company to grow well and quickly as well as adapt to the existing time, distribution processes, and environment [23]. According to [21], the American Marketing Association defines distribution channels as the organizational structure between companies and agents, wholesalers, and retailers, through which commodity products or services are marketed. The channels consist of a group of intermediaries closely related to each other who distribute products to buyers. This aspect of marketing is the efficient and effective transfer of goods from producers to consumers, where the process of delivering comprises collaborations between producers, agents, wholesalers, and retailers.

2.4. Previous Research

Previous research refers to investigations conducted in the past and can be taken from the following scholarly sources:

- 1) According to [3] conducted research is titled *Applicability of Scor-Based Dea Performance Measurement in Small Med-Sizes Enterprises*. This research aims to test the applicability of a SCOR-based DEA benchmarking method for SMEs in Indonesia, due to the increasing call for suitable supply chain performance measurement. The results hinted at a more thorough evaluation of performance, distinct from the conventional measurements commonly favoured by SMEs. The in-depth insights obtained from this analysis could potentially encourage SMEs to adopt a more innovative method. Furthermore, an increased awareness of supply chain metrics is anticipated. The application of SCOR-based DEA presented a novel method with standards for measuring supply chain performance.
- 2) Research by [22] presented the relationship between supply chain collaboration and trust, which are two important concepts in SCM. The transaction costs and stakeholder theories were used as frameworks for analyzing supply chain collaboration and trust. These constructs were developed through a literature review and in consultation with industry experts. Factor analysis was conducted to identify the underlying dimensions of these constructs while correlation analysis was carried out to determine their association. A total of 57 companies from the Philippine manufacturing and service sectors participated in the research. From the factor analyses, two important dimensions were obtained, namely (1) joint planning and decision-making and (2) information sharing. Conversely, the trust construct showed two important perspectives: (1) relational (the long-term relationship of supply chain partners and their familiarity with the respective organizations) and (2) risk perspective (the propensity and willingness to take risks under conditions of uncertainty). Correlation analyses show that information sharing is significantly correlated with the relational perspective of trust. The research contributes to SCM literature by providing comprehensive and pragmatic definitions of supply chain collaboration and trust. Furthermore, this provides practitioners with a listing of SCM strategies used to achieve better collaboration.
- 3) Research by [19] showed an analysis of the supply chain in the management of rice commodities. The data from the supply chain at P.B. Jembar Ati shows that not all parts of the chain are well managed. Farmers, as the primary producers, produce rice, while middlemen organize the harvest, perform sorting and grading, and periodically send the product to processors (rice mills). Middlemen plan harvests to ensure a continuous supply of paddy or rice to processors, which handle post-harvest activities, such as cleaning, packaging, labeling, distribution, and placing orders. Meanwhile, P.B. Jembar Ati has a section to handle production activities. Planning and strategy are needed to support supply chain activities to achieve optimization.
- 4) Research by [2] aimed to understand the supply chain of chicken egg commodities in the Papakelan Village of Minahasa Regency. The research used a descriptive method with qualitative data collection methods such as observation, interviews, and documentation. The results showed that: (1) The supply chain process started with producers/farms - small traders - consumers. (2) The flow of products, finances, and information in the supply chain process of chicken egg commodities was quite good because there was effective interaction and coordination among the stakeholders. (3) The challenges faced included the poor condition of the road from the farms to the main road, which could cause chicken eggs to crack or break.
- 5) According to [18], the existence of SCM in a company enables an increase in the effectiveness and efficiency in the procurement of raw materials, customer order fulfilment, and distribution of finished goods. The application is suitable because the system has advantages in managing the flow of products within the supply chain.
- 6) In a research conducted by [14], performance measurement methods, value-added, and supply chain risks were used to enhance the effectiveness and efficiency of the fruit agro-industry SCM. A search for scholarly articles published from 2005 to 2020 was conducted, resulting in 94 articles classified into five categories, namely Apple SCM, supply chain performance, value-added, supply chain risks, and effectiveness and efficiency. In addition, discussions regarding the improvement of the effectiveness and efficiency of fruit agro-industry SCM were limited. The scholarly articles obtained were examined through various analytical approaches and methods, allowing the development of a model to enhance the effectiveness and efficiency of SCM. The next step comprised the combination of several methods and the implementation of information technology to improve the effectiveness and efficiency of the fruit agro-industry.

- 7) Research conducted by [20] showed that the mechanism of the sago agro-industry supply chain included the creation of collaboration and coordination among supply chain participants from upstream to downstream. The pattern, which includes raw materials, products, financial, and information flow, operates smoothly, and the current state of the art is this.

3. Methodology Section

The method adopted is qualitative research using descriptive analysis to describe facts [15]. Analysis can be accomplished through books and documents as data sources. This is conducted to understand the meaning, position, and relationships between various concepts, activities, and events, with the further goal of determining the benefits, impacts, and outcomes. Furthermore, the research uses purposive sampling based on specific considerations related to the topic. The informants are people from the Madiun region, including chicken farm owners, and agricultural cooperatives (KUD) that produce and sell rice. In the Philippines, the research identified 30 individuals as respondents from various sectors, such as government institutions, seed producers, farmers, traders, processors, wholesalers, and retailers.

Data collection is the first step in obtaining primary data and secondary data. Primary data is obtained from 20 and 30 informants in the Madiun residence and the Philippines, respectively. Meanwhile, secondary data is collected through interviews, observations, and documentation. Interviews are carried out with general questions to understand the informant's views using an unstructured method. Observations are primarily conducted to gather extensive information, with the additional purpose of refining the collected data to uncover behavioral patterns and relationships. The research conducts direct observations by meeting with the informants and observing their activities. Online research is performed by interacting with informants through WhatsApp. Documentation refers to records of past events in the form of written documents, pictures, or previous journals.

The instrument of qualitative analysis has to validate the readiness to conduct the research. The validation includes an understanding of research methods, mastery of the field, as well as academic and logistical preparedness. Qualitative research consists of a comprehensive process that includes defining the focus, selecting informants as primary data sources, collecting data, evaluating data quality, analyzing data, interpreting results, and deriving well-founded conclusions. The focus facilitates comparative analysis through thorough observation and in-depth interviews.

During the data collection phase, various tools, including structured interview questions, are used as guides to acquire pertinent information. Furthermore, the use of modern technological aids, such as smartphones and notebooks, plays an integral role in facilitating and enhancing the data collection process.

Matthew B. Miles & A. Michael Huberman defined qualitative analysis as data in the form of words. Data is collected in various ways, such as observation and interviews, which are processed through note-taking, recording, and typing. Qualitative analysis uses words organized in expanded text form and data analysis is divided into three streams of activities, such as reduction, presentation, and drawing conclusions or verification. Data reduction occurs continuously during the collection process and the process requires intelligence and broad insight. Furthermore, valuable insights are cultivated, thereby enabling the reduction of data with substantial developmental significance throughout the systematic process. In qualitative research, data presentation can take the form of brief descriptions, graphs, relationships between categories, and flowcharts. The presentation of data serves to enhance comprehension of ongoing events and aids in the formulation of strategic plans and activities, which are grounded in the information available. Conclusions have to be relevant to the research focus, objectives, and results that have been interpreted and discussed. The conclusion of qualitative research is not a summary but a new result. These results can be descriptions or descriptions of objects that were previously unknown but have become clear. Moreover, the conclusion validates the data through a triangulation test as a data collection method. The research collects data while simultaneously testing the credibility of data through triangulation.

4. Results

a. SCM of Staple Food in Madiun City and Regency

East Java is known as the largest rice-producing region in Indonesia which ranks first in rice production, with a total production of 9.94 million tons in 2020. In 2022, the region produced 9.69 million tons of dried rice from a harvested area of 1.70 million hectares. Madiun is one of the cities and regencies that produce rice in East Java. Most of the population lives in rural areas and engaged in agriculture, either as landowners or farm laborers. Based on data on food crops, medicinal plants, fruits, and vegetables, the harvested area and production increased in 2019. In particular, rice continues to be the crop with the largest harvested area and production in Madiun Regency.

The available data showed that most types of livestock and poultry increased in numbers. Production of meat, leather, milk, and eggs has also increased compared to the previous period of the Regional Medium-Term Development Plan for the Madiun Regency.

According to data released by the Central Statistics Agency (BPS) in 2022, the harvested area for rice in the same year amounted to 74.14 thousand hectares. The production for 2022 is projected to reach approximately 419.97 thousand tons of paddy, while the estimated rice production intended for direct consumption in 2022 is around 242.5 thousand tons.

A supply chain includes the entire production process, from cultivation, processing, distribution, and marketing to delivering the products to consumers. Supply chain structure describes the relationships between the stakeholders and their roles, as well as the flow of information, products, and money [18].

Based on data obtained from informants regarding the supply management of rice and eggs in Madiun and Ngawi Regencies, there is a fairly long supply chain.

The distribution flow of the supply chain for rice and eggs is shown in the diagram below:

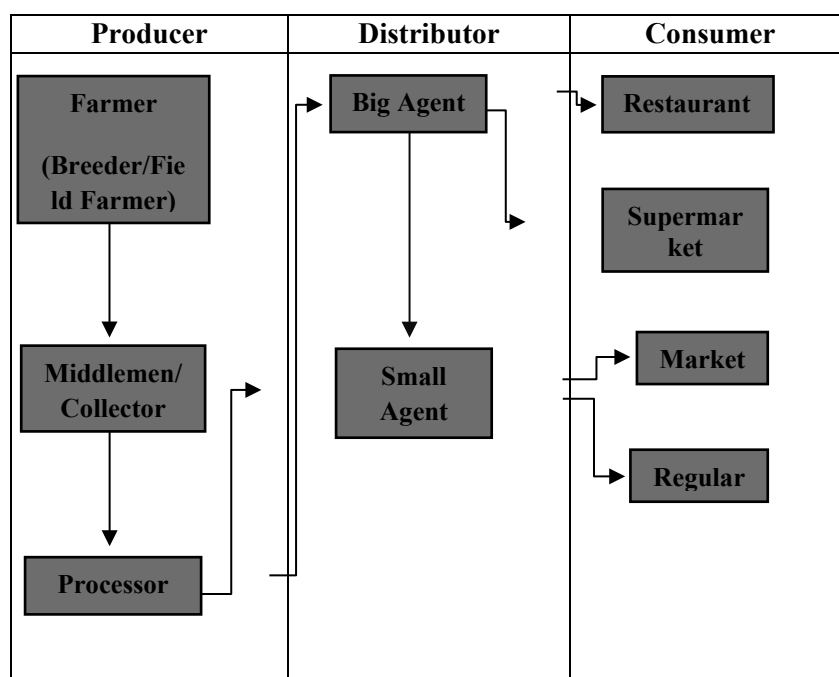


Figure 1. Raw material supply chain distribution flow

Based on the Figure 1, the distribution chain of rice and eggs in Madiun Regency is quite lengthy. The supply chain commences with farmers at the primary level, extending to intermediaries, and processors. Subsequently, the processed goods are distributed to wholesalers, large-scale agents, smaller agents, and end consumers. This is consistent with Sima Anselina (2023), where the supply chain in Kebumen Village, Banyubiru Subdistrict, Semarang Regency follows the pattern of farmer - collector/trader - milling – wholesaler - consumer. Similarly, Chairul Furqon (2014) explained that the strawberry supply chain in Bandung Regency follows a multi-channel category, starting from small and large farmers to suppliers and consumers.

b. SCM of Staple Food in the Philippines

The results of the latest data from the Philippine Statistics Authority showed that the population of the Philippines has exceeded 110 million, making rice the primary staple food for this vast number of individuals.

The latest report from the USDA "Grain: World Markets and Trade" reported that sanctions were imposed on the import of 3.9 million MT of rice between January 2022 and December 2023. This exceeded China's rice imports of 3.5 million MT during the same period. China has consistently been one of the largest rice importers since 2019. The supply chain for this essential commodity begins with the Department of Agriculture, which provides assistance and financial support throughout the process. The Philippine Rice Research Institute or PhilRice plays a crucial role by introducing new technologies and various types of variants suitable for agricultural conditions. The research identified 30 individuals as respondents from various sectors, such as government agencies, seed producers, farmers, traders, processors, wholesalers, and retailers.

Table 1. Product Distribution Process to Distributors

Distribution Process	Methods and Considerations
Inventory Management	Efficient tracking and management of seed and product inventory
Order Placement	Timely and accurate placement of orders to ensure smooth supply
Order Processing	Streamlined processing of orders for effective distribution
Order Fulfillment	Ensuring timely and accurate fulfillment of orders to meet demand
Shipping Arrangements	Organizing efficient shipping arrangements to reach diverse locations
Logistics and Transportation	Implementing robust logistical strategies for smooth transportation
Tracking and Delivery	Use tracking systems to monitor the delivery process accurately
Invoicing and Payment	Efficient invoicing and payment systems for smooth financial transactions
After-Sales Support	Providing necessary support and assistance after product delivery
Relationship Management	Nurturing and managing strong relationships with stakeholders
Distribution Agreements	Establishing clear and effective agreements for distribution processes
Market Analysis	Conducting a thorough analysis of the market for strategic decision-making

Table 1 shows that the Philippines, being an archipelagic country, uses a tracking and shipping system for supply chain distribution. Typically, producers obtain their seed supply from PhilRice and distribute it to LGUs or farmers nationwide through the tracking mechanism. In the marketing channel, the value chain starts from farmers and extends to consumers, including various channels. A commonly used channel is the direct method, where retailers immediately reach out to farmers and sell products directly. The process of distributing the products to distributors includes several stages, such as Inventory Management, Order Placement, Order Processing, Order Fulfillment, Shipment Arrangement, Logistics and Transportation, Tracking and Delivery, Invoice Generation, and Payment, as well as After-Sales Support.

Table 2. Distributor Delivery Schedule

Factors	Implications
Frequency Deliveries	Depending on customer demand and order volume, delivery schedules may vary from daily to weekly, ensuring a timely and regular supply of rice to customers.
Geographical Location	Due to the archipelagic nature of the Philippines, distributors need to plan delivery schedules efficiently to reach various islands, regions, provinces, and remote areas, considering logistical challenges and transportation requirements.
Harvest Season	The consistency of delivery schedules with the rice planting and harvesting seasons is essential to ensure a steady and uninterrupted supply, reflecting the seasonal nature of production.
Storage Capacity and Order Volume	Limited storage capacity may necessitate careful planning of delivery schedules, ensuring adequate space before making deliveries. Additionally, larger orders may require strategic logistical planning to meet specific delivery days and maintain sufficient stock.
Other Factors	Consideration of external factors such as traffic and road conditions, weather constraints, variations in rice varieties, adherence to government regulations, and customer agreements are vital in planning and executing delivery schedules effectively, ensuring smooth and timely distribution of rice to customers.

Table 2 shows that the rice distributor delivery schedule in the Philippines can vary depending on several factors, including specific distributors, location, customer demand, and other logistical considerations. However, there are some common practices and factors that affect the schedule. **Delivery Frequency:** Distributors typically follow regular delivery schedules in line with customer demand.

Daily, weekly, or predetermined delivery schedules may be selected, with the frequency depending on order volume and customer locations.

Geographical Location: Since the Philippines is an archipelagic country consisting of many islands, rice distribution is greatly influenced by geographical factors. Distributors have to carefully plan their delivery schedules to reach various areas, provinces, and remote regions.

Harvest Seasons: Delivery schedules can also be affected by different rice harvesting seasons. Rice distributors often need to be consistent with their schedules following rice planting and harvesting periods to ensure a consistent supply.

Storage Capacity and Order Volume: The storage capacity of distributors may be limited, significantly impacting the delivery schedule. Distributors need to ensure to have adequate storage space before making deliveries. Additionally, the quantity of rice ordered by customers can affect the delivery schedule, with large orders requiring more extensive planning and logistics to necessitate specific delivery dates. Several other factors can affect the delivery schedule, including traffic and road, weather conditions, rice types, government regulations, and customer agreements.

Table 3. SCM within the company

Supply Chain Flow Stage	Farmers (Interpretation)	Seed Growers (Interpretation)	Retailers (Interpretation)	Traders (Interpretation)	Govt Agencies (Interpretation)
Planning and Forecasting	Important	Very Important	Very Important	Important	Important
Sourcing and Procurement	Very Important	Important	Very Important	Important	Important
Production or Manufacturing	Important	Very Important	Important	Very Important	Important
Inventory Management	Very Important	Important	Important	Important	Important
Distribution and Logistics	Important	Important	Very Important	Very Important	Important
Order Fulfillment	Very Important	Important	Very Important	Very Important	Important
Warehousing and Storage	Important	Important	Important	Very Important	Important
Customer Service Support	Important	Important	Very Important	Important	Important
Reverse Logistics	Important	Important	Important	Important	Important
Supply Chain Visibility & Analytics	Important	Very Important	Very Important	Important	Very Important
Continuous Improvement	Important	Very Important	Important	Very Important	Important

Table 3 shows the importance of SCM in each respondent company. Planning and Forecasting, Procurement and Sourcing, Production or Manufacturing, Inventory Management, Distribution and Logistics, Warehousing and Storage, Customer Service Support, Reverse Logistics, and Continuous Improvement are considered essential elements of SCM. Seed producers regard Procurement and Sourcing, Production or Manufacturing, Inventory Management, Distribution and Logistics, Order Fulfillment, as well as Supply Chain Visibility and Analysis as highly important.

Meanwhile, Planning and Forecasting, Production or Manufacturing, Distribution and Logistics, Order Fulfillment, Warehousing, and Storage, as well as Sustainable Improvement are reported to be highly important.

During the survey, no group marked a stage as "Less Important" or "Not Important." This interpretation provides insights into the significance of various stages of SCM in different types of companies. The report shows areas where there is consensus regarding the different importance and priorities. This understanding can help enhance the supply chain process and allocate resources to meet the specific needs and expectations of each group.

5. Discussion

Analysis of SCM of Staple Food in Indonesia and the Philippines

A supply chain is the entire production process from cultivation, processing, distribution, marketing, and delivery of products to consumers. The structure describes the relationships between stakeholders and their roles, as well as the flow of information, products, and money [10]. Based on the explanation, the flow of SCM for staple foods such as rice and eggs in the cities and municipalities of Madiun can be understood. Besides supply chain flow, the problems faced in SMC are as follows:

- 1) High demand at certain times.
- 2) Uncertain raw material stock.
- 3) Communication with distributors.
- 4) Uncertain or rising prices.

The solutions to these problems are:

- 1) Properly anticipate high demand during specific seasons.
- 2) Maintain a large stock of goods.
- 3) Ensure clear communication and shared perception with distributors.
- 4) Adjust prices accordingly.

The issues faced by the respondents related to the existing production processes are as follows:

Table 4. The problems faced by respondents are related to the production process

Problem Area	Farmers	Retailers	Seed Growers	Government Agencies	Traders
Inefficiency in Production	Yes	Yes	Yes	Yes	Yes
Quality Issues	Yes	Yes	Yes	Yes	Yes
Low Productivity	Yes	Yes	Yes	Yes	Yes
Bottleneck and Constraints	Yes	Yes	Yes	Yes	Yes
Obsolete Technology and Equipment	Yes	Yes	Yes	Yes	Yes
Inventory Management Problems	No	Yes	Yes	Yes	Yes
Supplier Reliability	Yes	Yes	Yes	Yes	Yes
Communication and Coordination	Yes	Yes	Yes	Yes	Yes
Safety and Compliance Concerns	No	Yes	Yes	Yes	Yes
High Production Cost	Yes	Yes	Yes	Yes	Yes
Long Lead Times	Yes	Yes	Yes	Yes	Yes
Waste and Scrap	Yes	Yes	Yes	Yes	Yes
Skills Gap	Yes	Yes	Yes	Yes	Yes
Lack of Flexibility	No	Yes	Yes	Yes	Yes
Capacity Issues	Yes	Yes	Yes	Yes	Yes

Table 4 shows that there are many common issues faced by all respondent groups included in the rice supply chain in Ilocos Norte, Philippines. Production inefficiency is a significant issue since inefficient production processes can disrupt the supply chain.

For rice, the harvest takes longer to reach consumers, hence affecting freshness and potentially increasing costs due to spoilage or prolonged storage. Other quality-related issues, such as damaged or substandard rice, can disrupt the supply chain. In this context, retailers may receive low-quality products, leading to customer complaints and returns.

Low productivity among rice farmers can result in lower yields, reducing supply and leading to scarcity and increased prices. Limitations related to storage or transportation capacity can slow down the movement of rice. This can create challenges in keeping supply consistent for retailers and consumers. Outdated technology and equipment can impact production and processing efficiency. This can slow down the supply chain and hinder the ability to fulfill demand. Poor inventory management issues can lead to overstocking or understocking problems.

Retailers may face shortages or excess inventory, thereby affecting their profitability and the inconsistency of supply can disrupt the reliability of the chain.

Communication and coordination issues among stakeholders can lead to delays, misunderstandings, and inefficiencies. Security and compliance issues, such as inadequate food safety measures, can lead to product recalls or legal problems. Meanwhile, retailers may face reputation damage and financial losses. High production costs can lead to price increases and inefficiencies in the supply chain reduce profit margins. Long lead times can also result in delayed deliveries. Difficulty may be experienced in maintaining stable inventory levels. Furthermore, production waste can increase costs and reduce rice supply, affecting profitability. Skill gaps between farmers and workers lead to production issues. A lack of flexibility in the supply chain leads to challenges in market fluctuations, resulting in shortages or an accumulation of excess inventory. Finally, limited capacity also affects the amount of processed and delivered rice. Some challenges are mainly faced by specific groups, such as inventory management issues and Lack of flexibility relevant to retailers and traders. Safety and compliance issues may not be significant for seed farmers but affect retailers and government agencies. Addressing these challenges requires collaborative efforts among all stakeholders to improve efficiency, quality, and sustainability.

a. Efforts by Companies to Address the Issues

The previous analysis does not directly address the specific challenges mentioned. However, considering the supply chain overview, some of the issues could potentially arise in the rice industry's material flow. To effectively address challenges, stakeholders at various stages need to implement targeted strategies and best practices.

Addressing issues such as production inefficiency, low productivity, and high production costs necessitates the adoption of modern and efficient farming practices, substantial investment in advanced technology, and the provision of comprehensive training and support to farmers. In addition, resolving inventory management concerns includes the implementation of robust inventory management systems and practices to maintain optimal stock levels and minimize waste.

Ensuring supplier reliability as well as communication and coordination among all stakeholders are essential. Implementing clear communication channels, maintaining strong relationships, and enhancing collaboration can alleviate these concerns. Furthermore, addressing safety issues requires compliance with industry standards and the strict implementation of safety protocols at all stages of production and distribution.

To address challenges related to outdated technology and equipment, encouraging investment in modern machinery and equipment is crucial. Furthermore, the rectification of constraints necessitates a thorough evaluation of the production process to eliminate inefficiencies affecting the seamless flow of operations. To mitigate prolonged lead times and enhance flexibility, it is important to streamline processes and cultivate the supply chain for responses related to fluctuations in market demand. The reduction of waste and residues can be achieved by implementing sustainable production practices and improving resource use. Meanwhile, addressing skill gaps and capacity issues requires the provision of adequate training and development programs to enhance workforce skills and improve industry capacity. By addressing these challenges, stakeholders in the rice supply chain can work to improve production as well as distribution process efficiency, productivity, and quality.

6. Conclusion

In conclusion, different results were obtained from this research as stated below:

- 1) SCM of raw materials in Indonesia, specifically in the Madiun Regency and City, had a relatively long sequence. Supply management flow included farmers/livestock breeders, collectors, and processors delivered to distributors, through large and small agents, and consumers, starting from restaurants, supermarkets, markets, and regular retailers. Furthermore, the basic commodities analyzed in this research were rice and eggs.
- 2) SCM of raw materials in the Philippines also had a relatively long sequence, not directly from producers to consumers. Supply management flow comprised producers, collectors, processors, distributors, retailers, and consumers, and the basic commodity analyzed was rice.
- 3) Some of the issues encountered were demand at certain times, uncertain raw material stocks, communication with distributors, and fluctuating prices. The solutions included anticipating specific seasons effectively, stockpiling large quantities, ensuring communication and shared perceptions with distributors, and adjusting prices. In addition, the issues experienced in the Philippines were production inefficiency, quality issues, low productivity among rice farmers, bottlenecks and constraints, outdated technology and equipment, inventory management issues, inconsistent supply, communication and coordination disruptions, safety and compliance issues, high production costs, long waiting times in supply chain, production waste, skill gaps between farmers and workers, lack of flexibility. The analysis provided earlier did not directly address the specific challenges mentioned.

However, some of these issues could potentially arise in the flow of rice industry materials. For effective solutions, stakeholders at various stages of the supply chain should implement targeted strategies and best practices.

The limitations of this research include the following:

- 1) This SCM research was conducted in Madiun Regency and the Philippines.
- 2) The staple ingredients referred to in this research in Indonesia are rice and eggs, while in the Philippines white rice.
- 3) This research was conducted in 2023.

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