

Conference Paper

Supply Chain Management Agro-Industry Cassava In Indonesia

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*Corresponding author: E-mail:	ABSTRACT
dona.wahyuning.agribis@upnja- tim.ac.id	Background: The Cassava supply chain starts from raw materials supplied by farmers and then supplied to factories. Given the vast potential of cassava, especially in the processing industry. Aim: Increasing efficiency in the cassava supply chain, industry players actively participate in increasing productivity and reducing problems from upstream to downstream. Setting: Indonesia. Method: Through field survey activities, focus group discussions (FGD), and reviewing various papers and research studies previously published in various journals, books, magazines, and others. Results: The cassava supply chain originates from farmers with several layers of intermediaries. All farmers' supply chains are traded in cassava flour, tapioca flour, or wet cassava, which is the buyer's responsibility starting from pulling, peeling, drying, and packing. Stakeholders generally support the cassava supply chain by ensuring material, information, and cash flow among all stakeholders to maximize profits and involve cassava growers, cassava mills, and distributors. Conclusion: The development of cassava processed food agro-industry is carried out on a home industry scale because it applies simple technology and is carried out by farmer groups and individuals. The cassava supply chain's development will increase added value and increase the income of farmers and the community.
	Keywords: Supply chain, aaroindustry, cassaya

Introduction

A food crop that has significant economic potential for strengthening the rural economy is cassava. Furthermore, cassava gives farmers cash, food, and energy (Nimsai and Thagoon, 2019). According to Xanthavanij and Sataporn (2019), the cassava supply chain begins with raw materials, which can be provided directly to companies by farmers or through intermediaries. Therefore, in both industrialized and developing nations that have long given attention to the resources of the cassava supply chain, agriculture has grown in importance. With 18.3 million, Indonesia is the fifth-largest cassava grower in the world, after Nigeria with 60 million, the Republic of Congo with 41 million, Thailand with 29 million, and Ghana with 21.8 million. Considering cassava's potential in Indonesia as one of the producers and having the opportunity to utilize cassava in the processing industry, it is necessary to have adequate supply chain management (Rahmawati et al., 2021). In addition, the development of the processing industry cannot be separated from large and small industries (Timisela et. al., 2021).

Processing increases cassava productivity, which also reduces poverty, creates jobs, and stimulates the economy—all of which advance national development (Agbaeze et al., 2020). In the cassava supply chain, traders, processors, and livelihoods are all benefited by cassava growing

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(Agbacom et al., 2019). Development should therefore be more sustainable across the board, especially in the agricultural sector. However, because the chain is susceptible to becoming a more sustainable supply chain, improving supply chain openness can help alter the sustainability of commodity production systems (Gardner et al., 2019). Growing cassava will promote the growth of the agro-industry based on cassava as a processing subsystem. As a component of the demandside approach, the processing subsystem keeps up with the main production system. Thus, the connection between suppliers, agro-industrial households, and customers greatly affects supply chain performance (Putri et. al., 2019).

One of the key elements in the agro-industry process is supply chain management, which successfully and efficiently determines a company's performance. According to Ganeshkumar et al. (2017), this covers operations that transform agricultural commodities from their raw state to their consumer stage. The value that is dispersed based on transactions that take place from upstream to downstream of the supply chain is the expected value in the average agro-industry supply, according to the system's structure (Ekawati et al., 2021). The absence of a cooperative framework between vertical and horizontal coordination still places restrictions on the agro-industry supply chain for fresh cassava products (Susanto & Norfaridatul, 2021). Furthermore, the agro-industry supply chain incorporates an uneven profit distribution of profits among stakeholders (Asrol et al., 2020).

Sufficient supply chain performance is required due to the cassava processing industry's continued growth in Indonesia. Furthermore, because consumers are concerned about the safety of their food, the supply chain is a major problem (Chintanapunt & Rath, 2020). According to Xanthavanij and Sataporn (2019), the supply chain's lack of cooperation is the main issue. Upstream suppliers, factories, distributors, and consumers are the points in the supply chain where risk arises (Ummi et al., 2018).

From the standpoint of the supply chain, some examples include raw material shortages, increased raw material prices, machine malfunctions, erratic demand, erroneous projections, order modifications, and transportation mishaps (Tama et al., 2019). The supply of cassava is another issue as a result of farmers' low harvests (Ikuemonisan & Adeyose, 2021). For cassava supply chain management, the institutional setting presents additional difficulties (Nguyen, 2020). particularly market access, where the supply of cassava for the processing industry is still influenced by the characteristics of agricultural goods and supply chain participants (Ye et al., 2018). Therefore, industry participants actively engage in raising productivity and decreasing issues from upstream to downstream to boost the efficiency of the cassava supply chain. Thus, this article's goal is to examine the issues associated with cassava supply chain management in Indonesia and their implications for developing the cassava agro-industry in Indonesia.

Literatur Review

Supply chain management concept

Every firm has one or more suppliers that play certain functions in the supply chain, which consists of the businesses and business activities that are necessary for them to expand or endure (Hugos, 2018). The trade-off between an organization's responsiveness to information resources and its effectiveness in information sharing highlights the importance of relationship development and supply chain performance (Walt et al., 2021). for businesses to efficiently inspect shipments while others handle the necessary tasks (Kitchen and Christopher, 2020). Accordingly, supply chain management is the idea of distributing final goods to customers once they are produced from raw materials (Subramani et al., 2022). Put more succinctly, referred to as a network of distribution alternatives and facilities. The globalization period is marked by intense rivalry and more transparency of the structure of all components is interconnected to meet consumer demand (Baki, 2018). Consumers demand faster delivery, good quality, and a large variety of products (Sutduean et al., 2019). Supply chain management as a philosophy to integrate supply chain

activities and organizations to achieve better performance in a competitive economy has been developed progressively (Jermsittiparsert & Wiroj, 2019).

According to Hugos (2018), supply chain management sees the chain and its structure as a single unit. The production of high-quality food items, ecological sustainability, and an equitable distribution of power and value among partners are objectives that are emphasized by the supply chain. These goals are attained by close coordination among supply chain participants, which results in efficiency benefits (Berti, 2020). Getting the proper product, place, time, price, and cost is the aim of supply chain management to satisfy the final consumer and all supply chain partners. To gain a competitive edge, in addition to guaranteeing the efficacy and efficiency of the supply chain.



Figure 1. Supply chain management (Cestana et al., 2019)

The idea of supply chain management is to efficiently fulfill the demands of the client. Planning, carrying out, and overseeing a company's value creation process along the whole supply chain involves integrating social, environmental, and economic factors into decision-making to lower risk and improve long-term performance (Negri et al., 2021). Strong connections between the economic, environmental, and social facets of the supply chain as a whole must be demonstrated by supply chain management (Birkel & Julian, 2020). As a result, supply chain management needs to be enhanced to adapt to the rapidly changing landscape that every industry will face in the future (Zekhnini et al., 2020).

Supply chain cassava

Cassava has a low final economic value because cassava is not further processed for consumption or animal feed. The cassava supply chain needs to be considered because cassava will be highly valued if it is processed into other products such as tapioca flour, cassava flour, gelatin, and starch. In addition, the harvested cassava is made dry of product, not adversely affecting the quality, which requires a long storage time. This time is a very important factor in managing most of the supply chain's products. Improving the efficiency of the cassava supply chain is important for increasing productivity and reducing problems related to functional units in the supply chain (Chintanapunt & Rath, 2020). The demand for cassava is increasing, but the land use is not suitable for production. Some factors influence, among others, the fluctuating price of cassava, cassava as a cheap commodity, and land competition between other agricultural commodities. So the cassava supply chain in Indonesia has not been optimally used and needs to be improved to meet the processing industry's needs. The purpose of the cassava commodity supply chain can affect the economy of the community concerned (Ariadi et al., 2018; Tambun & Yosef, 2020).

The supply chain is a series of interrelated activities involving coordinating, planning, and controlling cassava products and services between suppliers and customers (Buyukozkan & Fe-thullah, 2018). An effective supply chain tool is to create a market for farmers to sell their cassava

crops and set a minimum price with the government as the final buyer (Otekunrin & Barbara, 2019). The supply chain can be fully realized by improving decision-making, responsiveness, and performance in the cassava raw material supply chain (Negri et al., 2021). Activities carried out throughout the supply chain, from cassava extraction to its transformation, illustrate upstream and downstream involvement, and flow linkages in various processes and activities to generate value in the form of products (Martins & Pato, 2019).

Agro-industry

The development of the cassava agro-industry in supporting the rural economy needs to be recognized (Fitriani et al., 2018). Because opportunities in the development of the cassava agro-industry are still wide open with the increasing demand for processed cassava (Sudarwati et al., 2020), strategies that can be carried out for the development of cassava agro-industry are by developing micro to industrial scale (Sudarwati et al., 2020). Agro-industry with high added value is the key to fixing inequality problems, transforming employment opportunities, generating high growth, and encouraging high-output production (Kumar, 2019). The challenge in the cassava agro-industry is minimizing losses by utilizing cassava processing strategies with value-adding techniques (Gerschenson et al., 2021). In addition, other major challenges are interrelated with issues of quality and safety assurance of agro-industry products (Marfuah & Yuliasih, 2022). Even the medium and low-scale agro-industry sectors are undervalued, and the use of industrial output is isolated and not integrated (Piloto-Rodiguez et al., 2020).

Agro-industry as a component in a complementary development system starting from production planning to marketing. Agro-industry components include raw material procurement, processing, and marketing. Agro-industry is seen as a whole as part of a large business organization environment that depends on the success of a complete multidimensional system. The performance of the agro-industry needs to be considered because the community's support will affect the sustainability of the agro-industry business. In essence, agro-industry changes from traditional agriculture to modern agriculture, adding value so that the development pattern is designed to integrate business organizations' goals, policies, and actions cohesively in creating added value.

Agro-industry cannot be separated from a complete system in the relationship between producers and distributors influenced by economic, technological, social, legal, and environmental factors. These factors will complement each other in creating a supply chain.



Figure 2. Schematic dimensions that affect the supply chain system

The chain's efficiency in terms of costs, benefits, and client orientation is related to the economic dimension. Cooperation about conformance yields a rise in profit efficiency. Concurrently, the ecological aspect of ecologically sustainable production involves repurposing trash generated during the process to create a valuable product. The information and communication technology (ICT) component pertains to enhancing performance. Social norms are those that need to be followed to prevent harm to different parties.

Material and Methods

The research was carried out in the 2021 planting season through field survey activities and group discussions (FGD). Researchers carefully reviewed papers and research studies previously published in various journals, books, magazines, and others. This study also reviews relevant agencies' documents and the local government's Annual Reports. This study reviews the supply chain management systems of several manufacturers and suppliers of cassava products. In addition, this study combines primary data and information from secondary sources.

Results and Discussion

The physical flows in the supply chain are from suppliers to manufacturers in the form of materials and components; from manufacturers to distributors in the form of finished products; from distributors to wholesalers in the form of finished products; from wholesalers to retailers in the form of finished products; and from retailers to end users. If there is damage, such as expiration or failure to meet customer standards, the product flow resumes upstream. After product delivery, there are financial movements related to cash, credit policies, and prices. As for the flow of information needed along the supply chain. The supply chain integrates information, financial, and physical flows in the following ways.



Figure 3. Physical flow, financial flow, and supply chain information flow (Pujawan & Er, 2017)

The cassava supply chain originates from farmers with several layers of intermediaries. All farmers' supply chains are traded in the form of cassava flour, tapioca flour, or wet cassava which is the buyer's responsibility starting from pulling, peeling, drying, and packing. Stakeholders support the cassava supply chain by ensuring material, information, and cash flow among all stakeholders to maximize profits and involve cassava farmers, mills, and distributors (Asrol et al., 2020). However, in reality, cassava sales in Indonesia are still relatively weak in some areas. In addition, a long supply chain will make it difficult for farmers to get more value because most of the value is distributed to other actors (Umaran et al., 2022).



Figure 5. Cassava marketing supply chain

The cassava supply chain consists of farmers selling to mediators and small-scale processors in several villages. The middleman's capacity is around 1 tonne which is traded with urban and

rural small-scale traders in markets and factories. The shape of the cassava supply chain is as follows.

Most cassava supply chain actors sell products in the domestic market because small-scale traders in rural areas each cassava farmers have little land. Traders with large scales located at the sub-district and district levels have large land, so cassava planting is very intensive and produces more production.

Cassava supply chain performance is all activities carried out by farmers to achieve the ultimate goal. In addition, the distribution process of cassava production is inseparable from the supply chain. Each cassava product in a supply chain has its characteristics. The cassava supply chain is processed by various derivative products such as cassava chips, cassava, and tapioca flour. Cassava as a raw material occupies the upstream part of the supply chain with certain characteristics that distinguish it from other commodities. Indonesia's cassava supply chain, in general, is as follows.



Figure 6. Supply chain cassava

Conclusion

Rich in carbohydrates, cassava is utilized as a raw material in the production of tapioca flour, cassava flour, and other products. Cassava has a lot of potential for development into semi-finished goods and completed materials, where its plentiful supply may help cassava farmers make a living. Due to its low-tech methods and reliance on farmer organizations and individuals, the cassava processed food agro-business is developing on a home industry scale. The growth of the cassava supply chain will raise added value and boost community and farmer income.

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