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Comparative Value Chain Analysis of Coffee, Tofu, and Gethuk Pisang in East Java, Indonesia

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ABSTRAK

Rantai nilai pertanian sangat penting untuk pertumbuhan ekonomi pedesaan karena memiliki kemampuan untuk menghasilkan nilai melalui proses produksi, pengolahan, dan pemasaran. Tetapi hasil ekonomi dari setiap komoditas pertanian atau agro-pangan mungkin akan berbeda karena distribusi rantai nilai, koordinasi pemangku kepentingan, dan struktur tata kelola setiap komoditas berbeda satu sama lain. Studi ini menggunakan observasi lapangan dan wawancara semi-terstruktur untuk menganalisis rantai nilai pada kopi tahu, dan gethuk pisang di Jawa Timur, Indonesia. Selain itu, penelitian ini menyelidiki bagaimana berbagai tindakan, sistem tata kelola, dan pemangku kepentingan dapat meningkatkan nilai bisnis agro-pangan. Tujuan pemetaan pemangku kepentingan dan analisis rantai nilai adalah untuk menemukan perbedaan dan peluang untuk memperbaiki rantai nilai. Berdasarkan hasil studi, rantai nilai gethuk, kopi, dan tahu memiliki konfigurasi pemangku kepentingan dan kerangka tata kelola yang berbeda. Rantai nilai tahu dan gethuk pisang dipengaruhi oleh kondisi dan hubungan di pasar domestik, sementara rantai nilai kopi terdiri dari standar kualitas yang didorong oleh pembeli dan pasar yang berorientasi ekspor. Namun, kekuatan tawar produsen yang terbatas, pembagian nilai yang tidak merata, dan batasan akses ke pasar yang lebih luas adalah masalah yang dihadapi oleh ketiga komoditas ini. Studi ini kemudian menekankan bahwa strategi khusus untuk pengembangan rantai nilai komoditas harus diterapkan untuk meningkatkan daya saing dan keberlanjutan sektor agro-pangan di Jawa Timur melalui peningkatan koordinasi pemangku kepentingan.

Kata kunci: *agribisnis; analisis komparatif; rantai nilai*

ABSTRACT

Agricultural value chains are important to rural economic development because they create value through production, processing and marketing activities. However, differences in stakeholder coordination, governance structures and value distribution are likely to lead to different economic results among agro-food businesses. Despite growing attention to value chain development in Indonesia, comparative evidence across commodities with contrasting market orientations, governance structures, and financial risk exposure within a single region remains limited. This study analyses value chains of coffee, tofu and gethuk pisang in East Java, Indonesia, and explores the roles of different stakeholders, governance systems, and its value-adding activities. In this study, a comparative approach was utilised with field observations and semi-structured interviews. The use of stakeholder mapping and value chain analysis is aimed at finding commonalities and potential improvements in the value chain. The results show that the three value chains have different governance frameworks and stakeholder configurations. Coffee value chain is export-oriented marketplaces and buyer-driven quality criteria, while tofu and gethuk pisang value chains are relationship-based coordination in domestic markets. However, the three value chains face similar issues, such as limited bargaining power of producers, unequal value sharing and market limits. These cross-commodity similarities suggest that producer vulnerability is not solely a function of market orientation, but also of structural weaknesses in coordination and value capture that cut across export- and domestic-oriented chains. The study emphasises the need for commodity-specific value chain development strategies that improve stakeholder coordination, increase value creation, and achieve a more equitable distribution of benefits to improve the competitiveness and sustainability of agro-food industries in East Java. These findings also support practical programs for local agribusiness development, focusing on farmer bargaining power, processing facilitation, and governance interventions tailored to target market structures, rather than informal policy approaches.

Keywords: *agribusiness; comparative analysis; value chain*

Introduction

East Java, Indonesia is characterised by its varied agro-ecological conditions which allow a wide range of commodities, from plantation crops to processed food products, and agribusiness operations are a major contributor to household income and regional growth. Agricultural value chains connect merchants, retailers and consumers. Efficient and equitable value chains can improve rural livelihoods and competitiveness [1], [2] but poor coordination or governance structures that concentrate power in dominant actors can instead reinforce existing inequalities [3], [4].

This issue is most clearly felt in the context of farmer welfare. Farmers, as primary producers, generally receive the least of the ultimate value while incurring the majority of the production risk [3], [5]. This is mostly a consequence of a lack of negotiating power, market information and capacity to do value-adding activities [4], [6]. A structured value chain analysis is needed to map the stakeholder roles, governance mechanisms and distribution of value at each stage of a commodity's journey to understand these dynamics [7]. In East Java specifically, this pattern is visible across commodities with very different market structures, from export-oriented plantation crops to household-scale food processing, yet the extent to which producer vulnerability, including exposure to financial risk from price volatility and production uncertainty, differs across these structures has not been systematically examined.

Despite its significance, a number of issues are still not completely resolved. Value distribution along many Indonesian agricultural chains remains unequal, with intermediaries often capturing more value than producers, and farmers and small-scale processors tend to have weak bargaining power, leaving them unable to negotiate favourable terms and contributing to broader market inefficiencies [8], [9], [10]. Most existing value chain studies in Indonesia, however, focus on a single commodity or a single market orientation (e.g. export-oriented cash crops or domestic staple foods) in isolation, so it remains unclear whether the governance structures, financial risk profiles, and distributional problems identified in one commodity are commodity-specific or reflect a more general pattern within the region [8], [9], [10]. Importantly, there is a lack of comparative studies examining these dynamics across multiple commodities of different structures in the same regional context.

This study fills this gap by conducting a comparative value chain analysis of three structurally different commodities in East Java, includes coffee, tofu (soybean-based products), and gethuk pisang (banana-based products), which represent an export-oriented plantation commodity, an import-dependent staple food industry, and a domestically embedded traditional snack industry, respectively. The novelty of this study lies in placing these three contrasting value chains side by side within the same regional economy, allowing direct comparison of how governance mechanisms, financial risk exposure, and upgrading opportunities vary not only by commodity characteristics but also by market orientation under similar regional conditions. The study focuses on comparing stakeholder structures, comparing value chain flows, comparing governance systems, comparing value distribution from producers to consumers, and identifying commodity-specific upgrade opportunities. Beyond its analytical contribution, this study is intended to inform practical, commodity-specific agribusiness development strategies for East Java, including strengthening coordination among stakeholders, expanding farmer and micro-enterprise access to value-adding activities, and designing more equitable benefit-sharing mechanisms, that can support local governments, cooperatives, and industry associations in improving the competitiveness and sustainability of the region's agro-food sector. Based on a comparative analysis of these aspects, this study produces cross-commodity insights to inform more focused agribusiness development policies in East Java and related agricultural regions of Indonesia.

Research Methods

This study adopted a qualitative comparative case study approach to explore and evaluate the value chains of coffee, tofu and gethuk pisang in East Java, Indonesia. A qualitative method was used because it allows for an in-depth knowledge of the interconnections between stakeholders, governance systems, value-adding activities and product flows as shown in Figure 1.

This study was undertaken as part of the Global Community Outreach (GCO) Programme held by Institut Teknologi Sepuluh Nopember (ITS). The programme was a collaborative field observation between 15 (fifteen) international and 10 (ten) local university students with the supervision of academic facilitators. The study was undertaken in 3 (three) agro-food firms from diverse commodity value chains in East Java. The coffee case was found in Wonosalam, Jombang Regency, which is a well-known coffee-producing location, and the tofu and gethuk pisang cases were carried out in Kediri City, where both items are known as regional speciality foods.

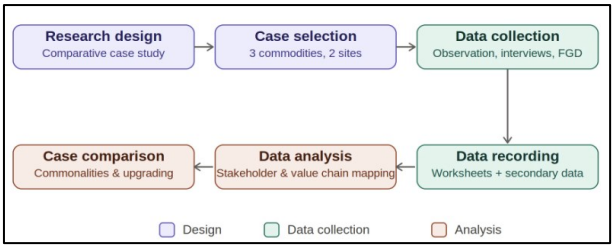

Figure 1. Research Method

The units of analysis were the individual value chains of coffee, tofu and gethuk pisang, including producers, processors, distributors, retailers and supporting actors participating in each chain. The observations were carried out cooperatively by foreign and Indonesian students, which allowed for diverse viewpoints to be incorporated in the documentation and analysis of each value chain. Primary data was acquired through direct field observations, site visits, informal interviews with business owners and workers, group discussions and field recording. During the site visits, participants observed the production process, established linkages among stakeholders, documented the flow of products and discussed operating methods with representatives of the business. The study team created standardised worksheets for recording observation notes and ensuring consistency throughout the three case studies. Secondary data (literature, government papers and enterprise information) were also studied to supplement and validate the field findings.

Agricultural Value Chain

The agricultural value chain is a concept that emphasizes the role of all activities directed to produce an agricultural product. This system includes preparation stage, cultivation process, post-harvest process, and product distribution. The implementation of these activities requires a number of components, such as farmers, traders, distributors, and consumers, as well as supporting actors such as suppliers and government agencies [6], [11]. According to Salman et al. [2], each of these stakeholders has a different function, so coordination is an important factor in increasing the efficiency and competitiveness of products circulating in the system. Furthermore, the value chain approach maps not only product flows, as in the supply chain concept, but also relationships between stakeholders, information and cash flows, along with governance mechanisms that influence the performance of an agribusiness system [12]. Therefore, value chain analysis can provide a more comprehensive picture of commodity management while identifying points with the potential to increase added value and system efficiency [13], [14].

In practice, the added value discussed in the value chain approach can be obtained through improving product quality, processing efficiency, technological innovation, and marketing strategies that can increase the economic value of the product itself [6], [15]. Furthermore, value chain analysis can also provide an overview of a number of obstacles that occur at each stage of the activity, such as market instability, increased operational costs, natural factors, and miscommunication in coordination between stakeholders that commonly occur [3], [4]. This is clarified by a study by Suryani et al. [10] which shows that good value chain management can reduce various emerging risks, making the agribusiness system more efficient and sustainable. Similar findings were also conveyed by Salman et al. [2] who stated that good coordination can increase the added value of products while strengthening the bargaining position of producers in the market. Therefore, the agricultural value chain approach can also be directed to become the basis for developing strategies to increase competitiveness, equalize the distribution of benefits, and develop a more sustainable agricultural sector [6], [7], [11], [12].

Stakeholder Mapping

In a system, there are parties who work together to achieve certain goals with roles, interests, levels of influence, and relationships between them. The general method used to identify and understand the responsibilities of each stakeholder is the stakeholder mapping approach. Through this approach, each party or stakeholder can be reviewed for their level of participation in the value movement cycle of a product. Furthermore, the role of each stakeholder can be classified into two major roles: primary stakeholders and supporting stakeholders. Primary stakeholders can consist of farmers as the main producers, traders, distributors, retailers, and consumers, while supporting stakeholders tend to be external parties that support the capabilities within the system [6], [16], [17], [18]. The diversity of stakeholders in this value chain system indirectly demands active cross-functional collaboration with the aim of achieving targets that provide added value and benefits for each component in the system [1], [2].

These stakeholder relationships ultimately become a crucial factor in driving value chain efficiency [19], [20], [21]. However, in its implementation, suboptimality is often encountered, resulting in information gaps, transaction discrepancies, and even inequality in economic welfare along the value chain [3], [6], [22]. Several solutions can be offered to overcome these obstacles, for example, a contract system, as research by Rokhani et

al. [8], which increases market certainty, access to development, and farm productivity when supported by mutually beneficial relationships. This is also supported by evidence of strengthening farmer institutions through cooperatives by Nurliza et al. [9] is considered capable of improving the quality of coordination and collaboration in the realm of agribusiness sustainability. Therefore, a stakeholder mapping approach is needed, which requires special attention, referring to the dynamics occurring within the agribusiness and agricultural systems. This is based on the need to design relevant and targeted strategies for each actor with their respective levels of influence, supported by interrelationships and various opportunities for advanced collaboration. This overall goal is to achieve efficiency, equitable distribution of benefits, and continuously increase the competitiveness of the agricultural sector [1], [2].

Value Chain Governance

Value chain governance is a mechanism for managing relationships, coordination and decision making between stakeholders in the value chain. This management approach can determine which parties are in charge of information, specification standards, quality, and equitable distribution of results along the value chain [4], [14], [23]. Classifications related to value chain governance can be divided into 5 (five) forms, namely market governance, relational governance, modular governance, captive governance, and hierarchical governance.

- Market governance : Simple relationship with market and price mechanism based transactions.
- Relational governance : Long-term relationships based on trust and close cooperation.
- Modular governance : A more flexible relationship with the ability to fulfill product specifications independently by the supplier.
- Captive governance : Relation of dependency from the supplier to the main buyer so that the decision making space becomes more limited.
- Hierarchical governance : More formal relationships through internal management structures in terms of coordination.

Each form of governance reflects variations in the level of coordination, transaction complexity, and balance of influence between stakeholders so that it will produce different benefit distribution patterns [24], [25]. The decision to choose a governance model will affect the performance of the value chain in meeting targeted standards [6], [19], [26]. When monopoly or domination by one party occurs, inequality will arise, leading to limitations in decision-making regarding both pricing and market access [3], [4], [27].

These types of governance are not only coordination mechanisms, but also design the allocation of value, along with the stakeholders. Product specifications determined by a lead firm or buyer, as is common to the modular and captive forms of governance, lead value to concentrate with those that control quality standards and access to market; rather than absorbing compliance costs among its suppliers, production-stage risk is typically pushed downstream on producers. Whereas influence and risk distributes more evenly as a result of trust-based ties in relational governance, the lack of formal standards in this mode also creates challenges for upgrading that require certification or buyer-defined requirements. When a single firm owns multiple nodes in a supply chain, hierarchical governance concentrates value capture and risk-bearing capacity within that firm, thereby minimizing other actors' exposure but also limiting their potential for functional upgrading [14], [23], [24], [25].

Value Distribution

Value distribution describes the distribution of economic value to each stakeholder, in line with their functions in the value-addition process throughout the value chain, from cultivation to marketing [6], [15], [28]. The method for measuring equitable distribution of this value uses a number of general indicators, such as marketing margin, farm-gate price, retail price, and producer share [29], [30], [31]. Analyzing these indicators can help explain the level of efficiency and equity in the distribution of value and benefits within a value chain [7].

A major problem that often occurs in developing countries is the inequitable distribution of benefits indirectly leading to farmers [1], [3], [6]. The main contributing factor is farmers' low bargaining power due to dependence on certain traders. This is further exacerbated by limited access to market information and minimal capabilities to increase product added value [4], [5]. Therefore, in solving this problem, a track record of equitable value distribution is needed as a basis for determining agricultural sector development strategies, marketing efficiency, and equitable distribution of economic benefits in agricultural and rural development [1], [7].

Value Chain Upgrading

Value chain upgrading is an effort to improve the capabilities of stakeholders in the value chain in order to produce more competitive products with added value, thereby supporting sustainable income increases. Humphrey and Schmitz [32] proposed a classification of relevant upgrading forms into 4 (four), including process upgrading, product upgrading, functional upgrading, and market upgrading. These four forms of upgrading complement each other and are important strategies in increasing agribusiness competitiveness amidst changes in market demand and technological developments [6], [24], [25], [33].

In addition to relevant forms of upgrading, information distribution and adaptability are other factors that need to be considered when adapting strategies to market dynamics [2], [8], [9]. The combination of relevant factors and a sound management system will foster a strategic position in attracting consumer interest by adding value and benefits within the value chain [1], [3], [19]. Therefore, value chain upgrading also needs to be considered in the gradual development of a better value chain in the future.

Conceptual Framework

The concept of agricultural value chain performance is the result of interactions between stakeholders, activities, governance, pricing, and value distribution. Generally, stakeholders (both primary and supporting) perform different functions at each stage of the value chain [6], [17], [34]. Relationships emerge between these stakeholders due to the need for cooperation to achieve goals as a system. Furthermore, governance regulations are needed to manage the flow of coordination and the division of roles within the value chain [4], [14], [35]. Thus, the reciprocal relationships that occur between elements in the value chain system are the basis for understanding how a commodity is able to create economic value along the value chain [36]. Therefore, this study views that these multi-element relationships are interrelated components in creating an agribusiness system that is efficient, competitive, and able to support sustainable rural development [35], [37].

Result and Discussion

Overview of the Three Commodity Systems

The three commodities in this study, coffee, tofu and gethuk pisang, have distinct value chain structures, governance systems, and market orientations. Coffee is the most complicated and vertically integrated value chain, with integrated plantation management, various processing steps, contract-processing agreements and export markets. The quality of the product is governed by defined buyer criteria. This governance system is characterized by standard quality requirements.

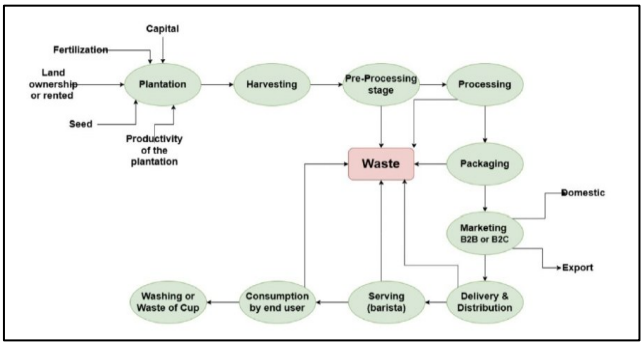

Figure 2. Flow of Wonosalam Coffee

Of the three commodities, the coffee value chain has the most complex process (Figure 2). Production is initiated with a number of resource inputs such as land, capital, seed, fertilization and plantation management followed by harvesting, pre-processing, processing, packing, distribution and marketing. Unlike the other commodities, coffee is promoted through both business to business (B2B) and business to consumer (B2C) channels for domestic and export markets. Another characteristic is that waste is generated along the complete value chain from pre-processing, processing, distribution, cafés operations to post-consumption activities. This means that the resource losses do not only occur in production but also in downstream service activities. This shows that there is a good possibility for circular economy efforts like coffee by-product utilization and trash recovery.

In contrast, the tofu value chain relies on imported soybeans and informal, relational coordination between growers, workers, and retailers. The tofu value chain (Figure 3) is characterized by a generally linear production process, starting with imported soybeans, pre-processing, processing, packaging, distribution, retail and consumption. But unlike the other two commodities, there is a decision point at the retail level in the process. Unsold products are sent to secondary processing to make other tofu products before they are sold. This adaptive mechanism allows companies to decrease losses due to demand changes and extend the use of products.

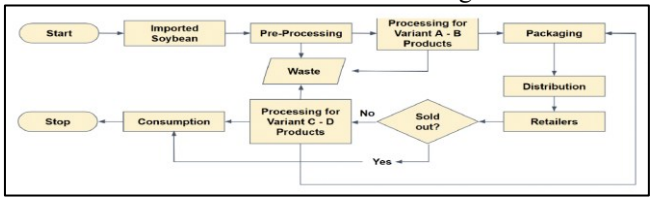

Figure 3. Flow of Wonosalam Coffee

Compared to coffee and tofu, the value chain of gethuk pisang (Figure 4) is the simplest and most linear. The manufacturing process includes plantation, harvesting, ripening, processing, packing, distribution, retail and consumption, with most waste occurring during pre-processing and processing. Unlike the tofu chain, there is no system to take unsold product and reprocess it into other items. Because the stakeholder analysis uses a consignment-based marketing structure and gethuk pisang has a short shelf life, the financial risk of unsold inventory is shouldered by the producers. As a result, unsold products are more likely to be discarded than to generate extra economic value.

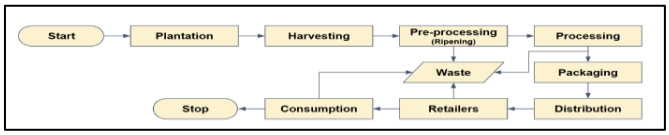

Figure 4. Flow of Wonosalam Coffee

The comparison of these three commodities demonstrates how differences in raw material sources, market orientation and governance frameworks affect cooperation among stakeholders, distribution of value and upgrading potential. In addition to common obstacles such as insufficient coordination and dependence on markets throughout the value chains, each commodity faces distinct limits and opportunities that call for commodity-specific development methods.

Stakeholder Mapping

Stakeholders within the three value chains were classified into primary stakeholders, who are directly involved in the value chain activities of production, processing and marketing and supporting stakeholders, who support the value chain without directly owning or transforming the products [16], [17], [18].

Table 1. Primary and supporting stakeholders by commodity chain

Chain	Primary Stakeholders	Supporting Stakeholders
Coffee	Plantation owners, farmers, primary processors (e.g., Punjere Coffee), secondary processors/roasters (e.g., Pak Bambang's cooperative), export intermediaries, domestic distributors, retailers	Contract-processing service providers, quality/roast-profile specification setters (brand owners/buyers)
Tofu	Producers/processors, workers, retailers	Soybean importers, by-product users
Gethuk pisang	Banana farmers, producers, production workers, retailers/souvenir shops	Packaging suppliers, end-consumer

The stakeholder structure for the coffee, tofu and gethuk pisang value chains are shown in Table 1. The results indicate large disparities in the number and type of stakeholders and their functional specialization among the three commodity systems. The coffee value chain is characterized by the greatest stakeholder differentiation, which includes plantation owners, growers, primary processors, secondary processors, export middlemen, distributors, retailers and contract processing providers as shown in Figure 5. Specialized processing stages and buyer-driven quality standards reflect a more integrated value chain, in which the quality of the product and the requirements of the market are conveyed via the production process. This is reflected in a governance structure that is more functionally specialized and coordinated across actors.

The tofu and gethuk pisang value chains, on the other hand, are relatively tiny and are controlled by micro and small scale firms. Stakeholders supporting the tofu chain are soybean importers and by-product users, which indicates the reliance of the industry on imported input and also reveals the opportunities for circular economy practices through the use of production residues as animal feed and biogas in the tofu chain. Meanwhile, the value chain of gethuk pisang is very dependent on packaging suppliers as supporting stakeholders, which emphasizes the need of product packaging and shelf-life extension to keep the product competitive in the local and regional markets.

Another key discovery is the many actors involved in many functions at the same time, especially in the value chains of tofu and gethuk pisang. Besides production, producers are often involved in processing, packaging and direct marketing. This shows a low degree of functional specialization. This integration, while giving small firms flexibility in their operations, also concentrates manufacturing, marketing, and financial risks on a single player. Similar patterns are found in agrifood value chains dominated by small and medium enterprises where overlapping stakeholder roles often weaken bargaining power and limit access to market information and value upgrading opportunities [1], [3], [5]. These results show that better stakeholder coordination and a more balanced

distribution of roles among actors can increase efficiency and a more equitable distribution of wealth in the three commodities systems.

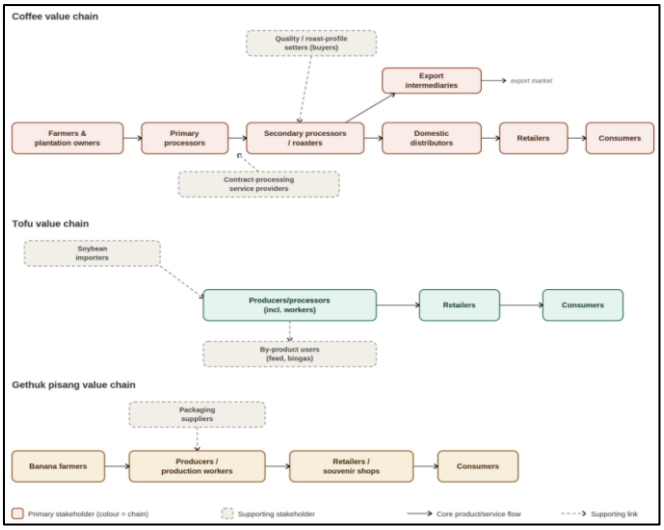

Figure 5. Value Chain of Coffee, Tofu, and Gethuk Pisang Commodities

Comparative Value Chain Structure

Table 2 shows the structural characteristics of the coffee, tofu, and gethuk pisang value chains, including raw material sources, market orientation, product flow, allocation of financial risk, information exchange, governance characteristics, and upgrading potential. While all three commodities belong to the agro-food industry in East Java, the comparison shows important disparities in the organization and coordination of the value chains.

Table 2. Comparative structure of the three value chains

Dimension	Coffee	Tofu	Gethuk Pisang
Raw material origin	Domestic	Imported (soybean, mainly US)	Domestic
Market orientation	Domestic + export	Domestic only	Domestic / regional souvenir
Chain length (functional stages)	Longest - farming, primary processing, secondary processing/roasting, export/distribution, retail	Short - production/processing, retail	Short - farming, production, retail
Financial risk allocation	Shared/contracted via maklon; brand owner retains product ownership during processing	Producer bears input-price/exchange-rate exposure; largely cash-based downstream transactions	Producer bears unsold-inventory risk via consignment (titip jual)
Information flow	Relatively codified - buyer-specified roast profiles and quality standards	Informal - sensory quality judgment (color, firmness)	Informal - personal relationships, retailer demand signals
Indicative governance orientation	Leaning toward modular/relational (specification-driven, but coordinated through service contracting rather than ownership control)	Market/relational (price- and trust-based, low specification)	Market/relational, with pronounced producer-side risk bearing

Dimension	Coffee	Tofu	Gethuk Pisang
Distinct upgrading signal	Functional specialization (contract processing, roast differentiation)	By-product valorization (feed, biogas)	Packaging/shelf-life innovation

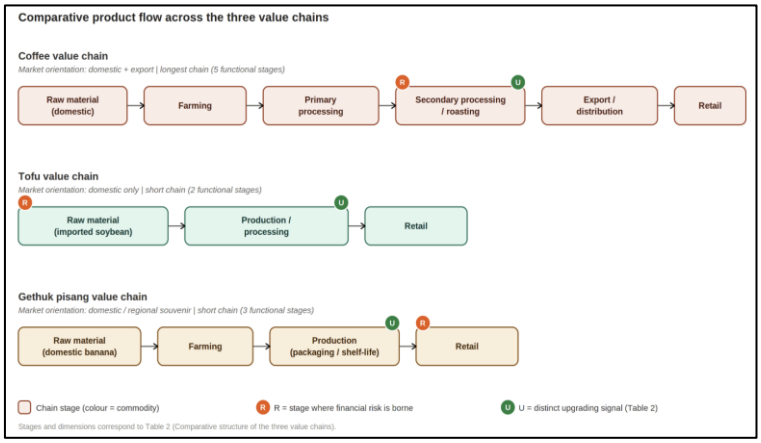

Figure 6. Comparative Flow of the Coffee, Tofu, and Gethuk Pisang Value Chains

Figure 6 illustrates these structural differences, highlighting variation in chain length, the stage at which financial risk is concentrated, and the point of upgrading potential for each commodity. Of the three commodities, coffee has the most complicated and vertically diverse value chain. The several functional steps are plantation management, primary processing, secondary processing, roasting, distribution and retail. It caters to both domestic and export markets. This complexity is also accompanied by very formal information exchange through buyer-defined quality criteria, roast profiles and contract-processing (maklon) arrangements. Coordination among stakeholders is therefore more structured, with different actors able to specialize in specific duties while ensuring product uniformity across marketplaces. These results suggest the existence of governance features similar to those of modular and relational value chains, where product standards are clearly defined, but the production activities are divided between independent actors.

In contrast, the tofu and gethuk pisang value chains have simpler organizational structures with fewer processing stages and mostly target domestic markets. Coordination is dependent to a considerable extent on long-term business connections, trust and informal communication rather than on established quality criteria. Product quality is often defined in terms of sensory attributes and consumer preferences rather than formal production requirements. Hence, governance in both chains is less formalized than in the coffee value chain and relies primarily on interpersonal ties between farmers and merchants.

These governance differences translate into concrete disparities in how value, risk and upgrading potential are shared among stakeholders. In the coffee value chain, the modular and relational governance structure, in which buyers define quality and roast-profile specifications, allows secondary processors and exporters who can meet these standards to capture a larger share of value, while plantation owners and primary processors, who have limited influence over specification-setting, tend to receive comparatively lower returns and bear the production-stage risk of non-compliance. In the tofu and gethuk pisang value chains, the informal relational governance distributes decision-making influence more evenly, but leaves financial risk shaped less by contractual standards and more by each actor's position in the transaction. These governance-driven patterns also constrain the type of upgrading each chain can pursue: standard-driven governance in coffee enables functional upgrading through specialized, buyer-approved processing services, whereas the relationship-based governance of tofu and gethuk pisang instead favours process and product upgrading that stakeholders can adopt independently, without requiring buyer approval.

But the sources of financial risk are very different for the two homegrown chains. In the tofu value chain, tofu producers are heavily dependent on the import of soybeans, which makes the production costs sensitive to changes in international commodity prices and exchange rates. However, producers diversify unsold products to alternate tofu variations, minimizing downstream market risk, extending product use and reducing losses. On the other hand, gethuk pisang producers are mostly exposed to downstream commercial risk, as their products are sold on consignment (titip jual). In this case, the producers maintain ownership of the unsold products, therefore they are the ones that bear the losses of the inventories due to limited shelf life and not the merchants.

Another key difference is possible upgrading in the value chain. The functional upgrading in the coffee value chain can be seen in the specialized processing activities such as contract roasting and differentiated roasting

services. The tofu value chain demonstrates process and product upgrading by using production by-products for animal feed and biogas and by transforming unsold items into secondary product variants. On the other hand, upgrading prospects in the gethuk pisang value chain include improvement of packaging technology, shelf life, and development of alternative processed products to reduce post-retail losses.

These upgrading trajectories are not purely conceptual. Comparable practices are increasingly documented in other Indonesian coffee, tofu, and banana-based agro-food chains and offer concrete reference points for the three cases studied. For coffee, functional upgrading through waste utilisation can take the form of converting coffee cherry skin into cascara tea, composting coffee pulp into organic fertiliser, or turning spent coffee grounds into briquettes or growing media for cultivation; each converting a currently discarded waste stream (Figure 2) into an additional revenue source without requiring changes to the core roasting process. For tofu, product upgrading beyond animal feed and biogas can include reprocessing soy pulp into tempeh gembus or snack products, and marketing near-expiry tofu as ready-to-cook variants such as tahu bakso or tahu isi rather than discarding it, extending the adaptive reprocessing mechanism already observed at the retail decision point (Figure 3). For gethuk pisang, packaging upgrading can involve vacuum-sealing or modified-atmosphere packaging to extend shelf life beyond its current short window, together with individually wrapped retail portions or frozen and banana-chip variants that allow producers to reach markets beyond same-day local sale. Adopting even a subset of these interventions would allow each commodity to shift from a reactive stance toward waste and unsold inventory (Table 2) toward a more deliberate upgrading strategy.

The comparative research shows that market orientation, governance structure and allocation of financial risk among stakeholders are major drivers of value chain success. The study found that export-focused value chains such as coffee require more coordination and sharing of standardized information to meet the buyer's requirement while domestically oriented value chains depend more on relational governance and informal coordination. But similar governance frameworks don't necessarily mean similar issues. Both value chains in tofu and gethuk pisang are coordinated through relationships, however the value chain of tofu is restricted mainly by the dependence on upstream inputs, whereas the value chain of gethuk pisang is restricted by downstream marketing risks. The findings point to commodity-specific upgrading initiatives as a means to improve competitiveness rather than a one-size-fits-all solution. The value chain for gethuk pisang needs improved marketing arrangements, packaging and shelf-life extension to improve resilience. Coffee may benefit more from strengthening producer organizations and quality management, while tofu needs to stabilize raw material procurement and expand product diversification.

The comparison findings also lay the foundation for the analysis of value allocation among stakeholders. Different governance systems and risk sharing mechanisms are associated with different commodities and therefore, the share of value gained by producers, processors and retailers is likely to vary throughout the three value chains. Therefore, the following part discusses marketing margins and producer shares to further assess the distribution of economic value within each commodity system.

Conclusion

This study investigated the value chains of coffee, tofu and gethuk pisang in East Java, looking into stakeholder structures, product and process flows, governance mechanisms and potential for value chain upgrading. The three commodities are part of the same regional agro-food system, but they have different organizational structures, coordination mechanisms and ways of allocating risk.

Of the three commodities, coffee has the most complicated and vertically diverse value chain. It is characterized by several stages of processing, contract-processing agreements, and buyer-driven quality criteria that help coordinate across domestic and export markets. Furthermore, trash is produced at every stage of the value chain, from primary processing to post-consumption activities, suggesting considerable prospects for circular economy efforts and resource recovery. The value chain of tofu, on the other hand, is shorter and mainly focused on coordination through relationships. But farmers suffer significant upstream risks from their reliance on imported soybeans and the volatility of international commodity pricing and exchange rates. A key strength of this chain is the practice of reprocessing unsold items into other tofu variations, which is an example of an adaptive kind of process upgrading that decreases product losses. The gethuk pisang value chain is the most straight and basic, having the same informal governance features as the tofu chain, but without methods to minimize market risk. The consignment marketing and limited shelf life of the product leave nearly all the financial responsibility for unsold inventories to producers.

In general the results suggest that unequal distribution of value and low bargaining strength of producers remain prevalent challenges in all three value chains. But the issues are a product of various structural settings. Producers in the coffee chain are bound by quality-driven market needs and downstream cooperation. In the tofu chain vulnerability comes mainly from dependency on imported raw materials whereas in the gethuk pisang chain producers are disadvantaged by downstream marketing arrangements which almost fully shift inventory risk to

them. These results show that increasing value chain performance requires commodity-specific interventions that address the particular governance and risk features of each commodity, rather than a one-size-fits-all development strategy.

Based on the findings, a number of solutions can be proposed to increase competitiveness and sustainability of the three value chains. For the coffee value chain, efforts should be made to upgrade functionally and in quality by building producer groups to boost collective bargaining power especially in contract-processing arrangements, and buyer-contract arrangements. Greater cooperative access to roasting facilities and quality enhancement initiatives would let farmers get more value from downstream processing. In addition, the extensive production of coffee waste along the entire value chain creates opportunity for implementing circular economy initiatives through the use of coffee pulp, husks and spent coffee grounds. The reduction of dependence on imported soybean markets in the tofu value chain through enhancing collective procurement procedures and improving supply chain stability should be a focus. To further formalize the existing processes of transforming unsold tofu into secondary products, product innovation, branding and market development should be introduced. More use of production by-products for animal feed and biogas production would also increase resource efficiency and assist more sustainable agriculture.

Improvement of packing technology and the extension of product shelf life are vital in reducing losses due to unsold inventory in the gethuk pisang value chain. Producers also need to seek product diversification by converting near expiry products into secondary processed products, as is the case with the tofu sector. Existing consignment marketing arrangements should also be reviewed to foster a more fair risk-sharing of the burden between producers and retailers. Boosting the negotiating power of producer organizations, boosting market access and access to price information and better coordination among stakeholders will help to improve the bargaining power and achieve a more fair distribution of value for all three commodities. Therefore, a twin approach of commodity specific technical interventions and cross-cutting institutional capacity building is suggested to improve the resilience and competitiveness of the agro-food sector in East Java.

These cross-cutting recommendations can be operationalised through three concrete mechanisms. First, formal producer cooperatives can be established or strengthened to consolidate input procurement, for example, joint soybean purchasing for tofu producers or shared access to roasting facilities for coffee farmers and to negotiate collectively with buyers, reducing the current reliance on individual and informal transactions. Second, written sale-purchase agreements between producers and downstream buyers, specifying price floors, volume commitments, and quality terms, can replace the largely verbal, trust-based arrangements observed in the tofu and gethuk pisang chains, giving producers greater price certainty while formalising the maklon-style contracting already practiced in parts of the coffee chain. Third, improved access to market information, such as village-level price boards, cooperative-managed market intelligence units, or simple digital platforms disseminating farm-gate and retail price data, would narrow the information asymmetry between producers and intermediaries that currently limits producers' bargaining position across all three value chains. Implementing these mechanisms alongside the commodity-specific technical interventions discussed above offers a more concrete pathway toward the equitable value distribution this study identifies as lacking.

The analysis was narrowed to three commodities (coffee, tofu and gethuk pisang) at a specific moment in two sites within East Java; therefore, it is more helpful to interpret the findings as illustrative of commodity-specific patterns rather than generalizable across the spectrum of agri-food value chains for all types of food in this region. A third limitation of qualitative, cross-sectional designs is that the study registers stakeholder roles, governance arrangements, and upgrading potential at a given point in time (at the time of data collection), without mapping how they potentially evolve across multiple harvest or production cycles. Future work based on this comparative framework could be expanded to a wider range of commodities, such as other plantation, livestock and processed-food value chains in East Java, to determine the extent to which the governance and risk patterns described here hold more broadly. Longitudinal studies that track the same value chains across growing seasons or years would clarify whether the relationship structures and risk allocations seen within or between commodity systems are stable aspects of each case or responses to specific market conditions during study. Finally, complementing the qualitative stakeholder mapping and value chain analysis used here with quantitative data on marketing margins, farm-gate and retail prices and producer profit shares would quantify rather than extrapolate the value distribution patterns described in this study. Third, simulation of the impact of targeted upgrading interventions , for example, cooperative based collective (or joint) bargaining, formal sale-purchase contracts or upgrading packaging and shelf-life, before their large-scale implementation would go a long way to validate the policy recommendations advanced in this report and more precisely indicate its likely price impact on producer income and intermediate products resilience.

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