VALUE CHAIN AND COMPETITIVENESS OF
MANGLAYANG TIMUR JAVA PREANGER ARABICA COFFEE

(Rantai Nilai dan Daya Saing Kopi Arabika Java Preanger Manglayang Timur)

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Abstrak

Dalam upaya meningkatkan daya saing dan efisiensi usaha Kopi Arabika Java Preanger (KAJP) asal Gunung Manglayang Timur Kabupaten Sumedang, Jawa Barat, diperlukan informasi mengenai aliran produk dari hulu hingga hilir, berikut permasalahan yang dihadapi oleh setiap pelaku dalam rantai pasok, nilai tambah dari pengolahan kopi, dan rencana selanjutnya untuk mengembangkan usaha KAJP Manglayang Timur. Penelitian ini bertujuan untuk menjawab berbagai permasalahan tersebut di atas. Metode penelitian menggunakan metode campuran dengan pendekatan kualitatif deskriptif untuk menggambarkan rantai pasok dan rencana pengembangan usaha, serta metode Hayami digunakan untuk analisis nilai tambah. Penelitian dilaksanakan di Kabupaten Sumedang sebagai sentra produksi KAJP Manglayang Timur. Peneliti mengumpulkan data melalui wawancara, observasi, dan *focus group discussion* dengan narasumber yang dipilih secara *purposive* dan *snowball*. Hasil penelitian menunjukkan terdapat dua pola rantai pasok KAJP berdasarkan orientasi pasarnya, yaitu ekspor dan domestik. Pelaku usaha terdiri dari petani, kelompok tani, pedagang besar, industri pengolahan, kafe atau kedai kopi, dan konsumen rumah tangga. Permasalahan yang dihadapi pelaku usaha adalah keterbatasan agro input dan alat pengolahan, serta minimnya integrasi pemasaran antarpelaku usaha dalam rantai pasok. Kopi spesial yang diolah dari KAJP Manglayang Timur, khususnya yang diproses secara fermentasi, dapat memberikan nilai tambah lebih tinggi dibandingkan dengan proses pengolahan secara kering, basah, dan madu. Kapasitas petani kopi perlu terus ditingkatkan agar menghasilkan kopi spesial yang mampu bersaing di pasar global melalui dukungan regulasi pemerintah dan sinergi antar-pemangku kepentingan dari hulu hingga hilir sehingga KAJP dapat menjadi komoditas unggulan Kabupaten Sumedang.

Kata kunci: rantai pasok, nilai tambah, Kopi Arabika Java Preanger, Gunung Manglayang Timur

Abstract

To improve the competitiveness and business efficiency of Java Preanger Arabica Coffee (JPAC) from Mount Manglayang Timur, Sumedang Regency, West Java, information is needed regarding the coffee products flow from upstream to downstream, along with the problems faced by each component of the supply chains, the added value of coffee processing, and follow-up plan to develop the JPAC Manglayang Timur business. This study aimed to answer those questions. The research used a mixed-method, a descriptive approach to describe the coffee supply chains and developing plans, and the Hayami method to analyze the coffee value-added. This study was conducted in Sumedang Regency, the production center of JPAC Manglayang Timur. The researcher collected data from interviews, observation, and focus group discussions with resource persons selected by purposive and snowball methods. The results showed 2 (two) JPAC supply chain patterns based on market orientation, namely exports and domestics. Business actors consisted of farmers, farmer groups, large traders/wholesalers, processing industries, cafes or coffee shops, and household consumers. The issues faced by the business actors were the limitations of agro-input and processing equipment, and the lack of marketing integration among business actors. Specialty coffee processed from JPAC Manglayang Timur, specifically the wine processed, has higher value-added than natural, fully-washed, and honey processed coffee. The capacity of coffee farmers needs to be improved to produce specialty coffee that can compete globally through the support of government regulations and synergy between stakeholders from upstream to downstream so that JPAC can become a superior commodity for Sumedang Regency.

Keywords: supply chain, value-added, Java Preanger Arabica Coffee, Mountain Manglayang Timur

INTRODUCTION

Sumedang Regency has many superior commodities in the agricultural sector. Moreover, some commodities already have Geographical Indication (GI) certificates, such as Black Tobacco, Mole Tobacco, Cilembu Sweet Potato, Sukatali Sawo, and Priangan or Java Preanger Arabica Coffee (JPAC). Arabica coffee from West Java, especially from Bandung, West Bandung, Garut, and Sumedang Regencies, planted above 1,000 m above sea level, is well known for its good quality, tastes, and well-liked by domestic and foreign consumers (Putra & Ferry, 2015). West Java Regional Economic and Financial Study in 2018 predicted that coffee could be one of West Java's new economic growth sources. The market has a high demand for West Java Coffee, and around 57 percent of the demand is Arabica Coffee. Over the past few years, coffee consumption has increased in the domestic and foreign markets (International Coffee Organization, 2018).

Based on Bank Indonesia West Java Regional (2016) research, in terms of prospects and potential, Priangan Coffee was identified as one of the commodities that have excellent prospects for the MSMEs business in Sumedang Regency, other than Sumedang tofu, tobacco, or Cilembu sweet potatoes. The widely known Priangan Coffee originates from Mountain Manglayang Timur in Sumedang Regency, especially Rancakalong District (Putra & Ferry, 2015).

The JPAC comes from Manglayang Timur Mount was proved superior to flavored coffee. This product had been awarded the bronze medal from the Australian International Coffee Awards for the Espresso-single origin category, especially for the fully-washed and red honey processed (Purnama, 2017). With some advantages possessed by JPAC from Mount Manglayang Timur, the increase in local coffee consumption in Sumedang and other regions raises new hopes for the Sumedang community to get into the coffee commodity businesses, especially those who rely on the agricultural sector as life support. However, according to previous research conducted in Sumedang Regency, some problems still hinder coffee agribusiness.

Anggraeni et al. (2018) conducted a study on coffee produce in five districts in West Java, namely Bandung, West Bandung, Garut, Sumedang, and Bogor. The coffee commodity had a significant role in the income of coffee farmers in Sumedang, with an R/C ratio of 1.4, which was quite profitable. Distribution of marketing with shorter chains would increase farmer share, or the portion obtained by farmers would be generous with the more efficient trading chain. The farmer share of coffee marketing received by farmers in Sumedang Regency ranges from 32 to 35 percent.

Dinas Pertanian dan Ketahanan Pangan Kabupaten Sumedang (2018) stated that the problem faced by some coffee farmers in Sumedang Regency was the production process during the harvest season when most farmers still sell the coffee in the form of cherries or logs to collectors. However, farmers could increase the commodities added and selling values by selling coffee in grain and green beans. Based on the Agriculture Census in 2013, of 134,394 households farmers in the Sumedang Regency, only 11,317 or 8.4 percent were processing agricultural products (BPS-Statistics of Jawa Barat Province, 2013). The plantation area of Arabica Coffee in Sumedang Regency was 1,641 Ha, with a production value of about 1,862.86 tons of cherries/logs and 372.57 tons of green beans. The Robusta Coffee area plantation was 1,009 Ha with a production value of raw materials of 1,257.89 tons of cherries/logs and the value of a processed product of 251.58 tons of green beans. Indicative locations for coffee plant development are spreading in 6 districts Sumedang Regency in Rancakalong District, South Sumedang, Tanjungmedar, Wado, Cisitu, and Sukasari.

Other finding issues were the infrastructure limitation for processing coffee, marketing, and capital. In general, coffee farmers did not have the equipment and facilitation for coffee processing, such as a pulper to process the wet skin and a huller to process its outer skin. Only a few farmer groups have their complete equipment, but mainly they were still using manual pulper. Downstream, there was limited capital for production facilities such as maintenance, fertilization, pruning, harvesting, and collecting products, especially during the main harvest. Coffee marketing still became an issue because the market was not too open and controlled by collectors outside the area.

Several studies related to the coffee supply chain have been carried out. Research by Jaya (2013) was related to risk mitigation analysis of a sustainable Gayo Coffee supply chain, the analytical method used the Autoregressive Integrated Moving Average (ARIMA). Furthermore, Rasyid's (2015) research was a study on the performance of the coffee supply chain in Jember Regency, which used the Supply Chain Operation Reference (SCOR) performance analysis method. Meanwhile, Noviantari et al. (2015) researched the added value and supply chain of civet coffee in Lampung Province using the Hayami method but only calculated the added value in civet coffee in Lampung Province. The distinction between the previous research was that the Hayami method used in this research calculated the added value from the farmer-level process to several stages of the coffee processing process until it is ready to be marketed. The researchers also compared the calculated value for coffee processing processes carried out by farmers, such as fully-washed, honey, natural, and wine. Researchers have not found adequate research related to supply chain, and added value starts from the initial process until they are ready to be marketed and related research that discusses the added value of

JPAC Manglayang Timur. It is then crucial to consider several things described above regarding how farmers could improve the welfare, and welfare of the people of Sumedang Regency. Farmers could add more coffee value by producing green beans rather than selling them in cherries and logs.

Nevertheless, several problems arise from coffee farmers that need attention from stakeholders. The coffee business, especially JPAC Manglayang Timur, the Sumedang Regency flagship, can be more competitive. As a first step to improve JPAC Manglayang Timur's competitiveness and maintain its continuity, more in-depth information is needed about each chain from upstream to downstream and the problems it faces.

The focus of this study is JPAC originating from the eastern Mount Manglayang in Sumedang Regency. The coffee plantation is mainly in the Perhutani area of the Forest Management Units (KPH) Sumedang. This study aims to determine how to solve each stage of the East Manglayang JPAC supply chain problem, calculate the added value of coffee processing carried out by farmers in several processes, and then calculate the added value and recommend follow-up plans for JPAC Manglayang Timur business development.

METHOD

Type and Data Resource

The types of data used were primary and secondary data. Primary data were collected from observations, interviews, and Focus Group Discussions (FGD) with Java Preanger Arabica Coffee stakeholders in Sumedang Regency. Observations and interviews were carried out at plantations, nurseries, and coffee processing locations in Rancakalong, Tanjungsari, and Sukasari Districts with 6 (six) informants as business actors from JPAC Manglayang Timur coffee farmers and processors. Information from Perhutani KPH Sumedang and Agriculture and Food Security Service, coffee farmers in the study area generally planted Arabica coffee in the eastern Manglayang Mountains located within the Perhutani KPH Sumedang area almost the same time as the Community Forest Management program. FGDs were done 3 (three) times; each agenda discussed the initial plan and research preparation, the result of secondary data collection from related agencies and initial observations, and observations and interviews with East Manglayang JPAC coffee entrepreneurs final discussion. FGD participants consist of coffee supply chain stakeholders from upstream to downstream, i.e., representatives of farmers, coffee processors, cafe entrepreneurs, and related coffee agribusiness supporting agencies, namely Regional Research and Development Planning Agency, Agriculture and Food Security Office, Industry and Trade Service, Tourism Office, and Indonesian State Forest Company known as Perhutani (see Table 1). Besides primary data, secondary data were collected from various sources, like the Agriculture and Food Security Agency, the Central Bureau of Statistics, and other related organizations/institutions.

Table 1. JPAC Supply Chain Focus Group Discussion in Sumedang Regency

Date	Participant	Result
May 31st, 2018	1. Regional Research and Development Planning Agency (6 people) 2. Agriculture and Food Security Service (2 people) 3. Industry and Trade Service 4. Tourism Office (1 person) 5. Researcher of Padjadjaran University (1 person) 6. Head of coffee farmer groups (3 people)	Information about: 1. Characteristics and business potential of the Sumedang coffee commodity 2. The existing and necessary supporting institutions 3. Market and marketing overview 4. Other supporting information & data 5. An empirical review of the value chain & direction of research methodology
August 23rd, 2018	1. Regional Research and Development Planning Agency (5 people) 2. Agriculture and Food Security Service (2 people) 3. Industry and Trade Service 4. Tourism Office (2 people) 5. Perhutani (2 people) 6. Head of coffee farmer groups (2 people) 7. Coffee processors and Coffee shop owner (2 people)	Information about: 1. The coverage area of Java Preanger East Manglayang Arabica Coffee 2. Potential land area and regulation of JPAC Manglayang Timur coffee cultivation 3. Problem identification of coffee cultivation (on-farm), post-harvest, and processing (off-farm). 4. Specialty coffee processing types 5. JPAC coffee marketing
November 26th, 2018	1. Regional Research and Development Planning Agency (7 people) 2. Agriculture and Food Security Service (3 people) 3. Industry and Trade Service 4. Tourism Office (2 people) 5. Perhutani (2 people) 6. Head of coffee farmer groups (4 people) 7. Coffee processors and Coffee shop owner (2 people)	Information about: 1. Identification of Business Actors in the Supply Chain of Java Preanger Java Arabica Coffee, East Manglayang 2. Problems in Supply Chain Activities 3. The results of the calculation of added value using the Hayami method 4. Problems intervention for JPAC development

Method Analysis

The study used a mixed-method, where the qualitative descriptive approach describes and explains conditions and problems analytically throughout each actor in the JPAC Manglayang Timur supply chain system. While collecting value-added analysis data using the Hayami method, quantitative methods are used. The research location was determined purposively in the JPAC Manglayang Timur produced region, including Rancakalong, Sukasari, and Tanjungsari Districts in Sumedang Regency. Information and data collection were carried out for 5 (five) months, from May to September 2018.

The informant selection based on the purposive sampling method was chosen based on the type of information or consideration predetermined. Besides that, the informants were also groups of people with specific qualifications related to position, expertise, and experience. The selection of informants based on the purposive sampling method was selected based on the previously determined type of information or considerations. Also, informants are groups or people with specific qualifications related to position, expertise, and experience.

The informants were coffee farmers and processors, coffee shop business actors, and government officials related to the coffee agroindustry in this study. In general, the farmer who became the informant was the head of the farmer group and had a role from coffee seeding and cultivation to coffee processing and marketing. They work together with Perhutani, managing the forest area with a profit-sharing mechanism. Coffee processing was carried out independently by farmer groups, facilitated by coffee processing tools and machines by the Sumedang Regency Government.

However, another resource person was selected based on snowballing techniques by tracing key informants with much information (Nurdiani, 2014). Snowball's method aimed to obtain representative research respondents due to the limited information about JPAC business actors. It started by collecting information from the Agriculture and Food Security Office about JPAC business actors, farmers, and coffee processors. The information should involve as many related parties as possible. Thus, the study continued by obtaining information from coffee shop business actors who bought coffee from farmers or farmer groups. Apart from finding respondents who fully understood JPAC's business conditions, the snowball method is expected to build ideas based on the conventional network sources.

Several methods could be used in estimating the added value of a product, among others are:
1. The Input-Output Table method (Table I-O) is quantitative or statistical in the form of a matrix containing information about transactions of goods and services and the interrelationships between economic activities in an area within a certain period.
    LIPI first developed this method in 1969, and later developed by BPS (Agustina & Lubis, 2019; Badan Pusat Statistik, 2015).
2. M. Dawam Raharjo's method calculates the added value based on the difference between the product's gross value, which consists of the value of the goods produced plus the value of services minus the total (Sukandar, 2000).
3. Supply Chain Operations Reference (SCOR) model is a model that integrates three main components in management, namely business processes, benchmarking, and measurement processes, into a supply chain function framework. SCOR was developed by the SCC (Supply Chain Council) and is widely used in the manufacturing industry (Anwar, 2018; Azmiyati & Hidayat, 2017; Liputra et al., 2018)
4. Bank of Japan method calculates the added value of the sum of profit before tax; costs (personnel, finance, rent, general); taxes, and depreciation. The methods developed by M.R. Lehman and A.W. Rucker from Japan Productivity Center in the book "Fasilitator Produktifitas dalam Gugus Kendali Mutu" (Ridjal, 2020).
5. Hayami method is a value-added calculation model based on the primary raw material unit, which has the advantage of estimating production productivity, estimating remuneration for the owners of production factors, and can be used in subsystems other than processing (Sukandar, 2000).

In this study, coffee supply chain management as an agricultural product differs from supply chain management for manufactured products. There were risks such as that coffee products are easily damaged during transport, and the type of raw material will affect the taste and aroma of the coffee products produced. Moreover, the scale of small business properties also affected the supplied coffee chain management (Jaya et al., 2014; Mardianis & Syaputra, 2020). There are several methods of calculating the added value, such as Table I-O (Badan Pusat Statistik, 2015) and Bank of Japan methods (Ridjal, 2020). However, the Hayami method is the most commonly used method of calculating the added value of agribusiness products.

Supply chain system analysis provided overviews of each supply chain component's actors, activities, and problems. Meanwhile, uncovering the added value obtained from the JPAC process was conducted using the Hayami method (Hayami et al., 1987). Other related studies use the same method to determine a product's added value, namely by calculating based

on the differences in price between unprocessed coffee beans (cherry) and processed green beans after considering other additional cost inputs (Fadhil et al., 2017; Noviantari et al., 2015; Qashiratuttarafi et al., 2018; Rachman et al., 2017; Rasyid, 2015). The study calculated added value from the intermediate input, output, and cost of coffee processing from farmer groups on the small business scale.

coffee per kilogram (kg) at the time of the analysis period (H).
9. Additional costs include raw material cost helper, packaging cost, and depreciation cost (I).
10. The output value is the product's selling value in one period (J).
11. Value-added is the difference in output value with primary raw materials and other inputs (K).

Table 2. Hayami Method Value Added Calculation Procedure

Variable		Score
I.	**Output, input, and price**	
	1. Output (kg/process)	A
	2. Raw material (kg/process)	B
	3. Labor (HOK*/process)	C
	4. Conversion factor	D = A/B
	5. Labor coefficient	E = C/B
	6. Output price (Rp/kg)	F
	7. Average labor wage (Rp/HOK*)	G
II.	**Revenue and profit (Rp/kg)**	
	8. Price of raw materials (Rp/kg)	H
	9. Other input contributions (Rp/kg)	I
	10. Output value	J = D x F
	11. Value-added	K = J - I - H
	Value-added ratio (percent)	L = (K/J) x 100
	12. Labor benefits	M = E x G
	Labor share (percent)	N = (M/K) x 100
	13. Profit	O = K - M
	Profit rate (percent)	P = (O/K) x 100
III.	**Reward factors of production**	
	14. Margin	Q = J – H
	- Profit	R = (O/Q) x 100
	- Labor	S = (M/Q) x 100
	- Other inputs	T = (I/Q) x 100

Note: * HOK = Labor Day.
Source: Hayami et al., 1987; Hidayat et al., 2012.

Modifications to the Hayami Method made by Hidayat et al. (2012) in Table 1 could be explained as follows:
1. The total output of coffee produced (A).
2. Total raw material input is used for the production process (B).
3. The number of workers used in the HOK unit (C) production activities.
4. A conversion factor compares the total output of the primary raw material and the input of the raw material used (D).
5. The labor coefficient indicates the number of laborers required per one kg of the resulting product (E).
6. Product price applicable in one analysis period (F).
7. The average wage of workers in one production cycle is calculated based on wage per HOK (G).
8. The input price of the primary raw material of

The value-added ratio is the output value ratio (L).
12. Labor income is the direct labor income to process a unit of raw materials (M).
    Labor share represents a percentage of the direct labor income compared to the added value earned (N).
13. Profit is an accepted part of the company (O).
    The profit level is a profit percentage with value-added products (P).
14. The margin shows the owner's contribution to production factors other than the production processes of raw materials (Q).
    a. Percentage of the company profit against margin (R).
    b. Percentage of direct labor income to margin (S).
    c. Percentage of other input contributions to margin (T).

RESULT AND ANALYSIS

Business Actors in the JPAC Manglayang Timur Supply Chain

Agroindustry development is an effort to utilize the natural resources and other development resources to be more productive, bring added value, increase foreign exchange earnings, and employ many workers by using comparative advantages and competitive own. This subsector development can create close links between the agricultural and industrial sectors and sustain national economic development (Soekartawi, 2001). The national coffee processing industry structure consists of only 20 percent of processed coffee while 80 percent of coffee beans. The coffee processing industry is still underdeveloped due to various technical, social, and economic factors (Direktorat Jenderal Industri Agro dan Kimia Departemen Perindustrian, 2009).

The supply chain is a series of productive activities from upstream to downstream interconnected between activities and forms a value chain in the industry, consisting of several elements and parties involved directly or indirectly (Boaventura et al., 2018; Noviantari et al., 2015). Supply chain activities are essential in the agro-industrial system; these activities include procuring raw materials, processing, and distribution networks (Jaya, 2013). Nowadays, the specialty coffee industry is the most prospective and significant in the world coffee market. The economic world coffee market has changed significantly due to coffee products, the certification system adoption, and labelling. Thus, it has increased coffee producers' opportunities to produce more certified coffee (Hartatri, 2016). Specialty coffee is an assessment or classification of the coffee with distinctive aroma and flavor with the highest grade. Coffee agro-industrial supply chains in some regions can be very diverse. However, the supply chain generally consists of 5 main elements that play a role in the flow of products, finance, and information, as illustrated in Figure 1 below.

Product flows move from suppliers to consumers, while financial flows move in opposite directions. The flow of information is open and moves in two directions indicating that information is needed from each actor in the supply chain that other members can access. Besides, information imperfections can cause a bullwhip effect that results in shortages or excess inventory. The bullwhip effect is a pattern of inventory variability formed in the stages of the supply chain system. The variability of inventory downstream has implications for more significant variability at the upstream level.

Based on the researchers' interviews with informants, it was found that the actors of the JPAC Manglayang Timur supply chain actors include coffee farmers, farmer groups, large traders, processing industries, and household consumers. Coffee farmers are primary raw materials suppliers, farmer groups as processors, and large traders as processed coffee collectors from farmers or farmer groups. There were also processing industries that produce mass-processed coffee cafes or coffee shops that process coffee specifically, and household consumers as the end of the supply chain. All these actors carried out related operational activities until the coffee was available to consumers.

Farmers begin their activities by preparing land for coffee planting. The land used for cultivation is mainly forest land under the Perhutani KPH Sumedang, and the other is community land. Initially, farmers should make a work contract with the Perhutani KPH Sumedang and agree to around 25 percent production sharing of the coffee obtained at harvest time. After the land was available, farmers planted the coffee seeds among the trees in the Perhutani area, which are generally pine trees. At the time of observation in the coffee plantation, many coffee plants were bearing fruit and had been harvested several times. The length of time for coffee to bear fruit from planting is about two years. The average farmer cultivates around 2 to 4 hectares of land with a productivity range of 0.5-0.7 tones/hectare in the form of cherries. The most critical coffee cultivation activities
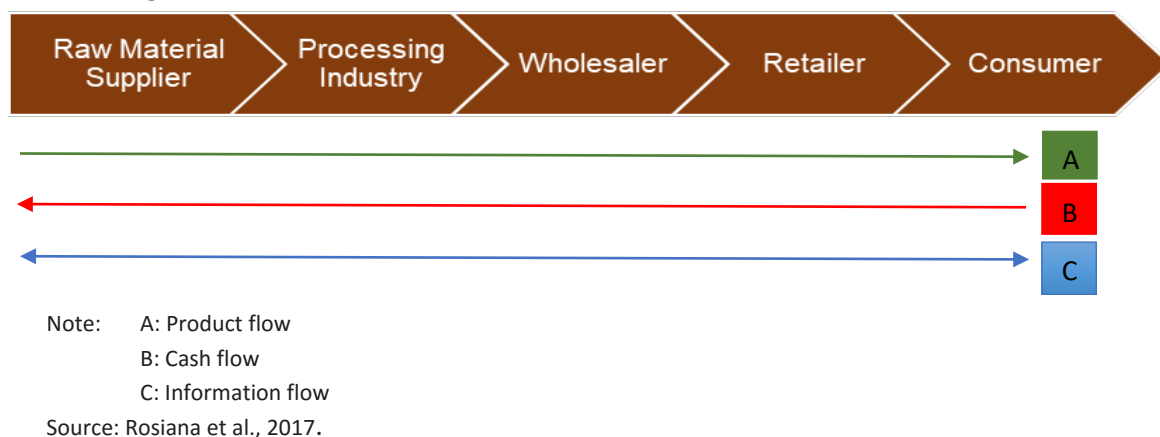

Note: A: Product flow
            B: Cash flow
            C: Information flow
Source: Rosiana et al., 2017.

Figure 1. Supply Chain Structure

in determining crop yields are fertilization and weed cleaning. According to Evizal (2015) research, coffee plants that are sufficiently fertilized and maintained at vegetable plants will look dominant at 2 (two) years of age. At the age of 4, it will begin producing whole fruit called "*ngagun*". However, the maintenance of the planting area and fertilizing experiences problems due to inadequate road access, making it difficult for farmers to bring production facilities and equipment for coffee cultivation. Also, coffee farmers purchasing power to meet the needs for production facilities is still limited, so the production input used is still not optimal.

The next actor is farmer groups; they significantly increased the added value of coffee through processing. In this study, 5 (five) farmer groups were observed with similar characteristics of the type of coffee cultivated in the mountainous region of East Manglayang and business scales based on information from the Department of Agriculture and Food Security of Sumedang Regency. The 5 (five) farmer groups are Maju Mekar and Paniis in the Rancakalong sub-district, Bubuay Jayagiri and Mekarjaya in the Sukasari sub-district, and Mekar Arum in the Tanjungsari sub-district. The number of group members ranges from 12 to 20 people. Farmer's groups collect coffee yields from farmers and then process the coffee in various types according to market demand and the availability of processing equipment. Nowadays, there are 5 (five) types of yield processing carried out by farmer groups: wet processing includes full-washed and semi-washed, and dry processing consists of natural, honey, and wine.

However, not every farmer group will do all the coffee processing types; they adjust to meet the targeted market. Export-oriented farmer groups mostly choose the semi-washed process with the final output of grain to green bean coffee. These are also supported by research from Mardianis & Syaputra (2020), which explained that Kerinci Arabica coffee in the form of beans was mainly prepared for export purposes, while the needs of local consumers were more dominant in powder form. The export demand usually determines the roast bean level because importing countries can process beans by their preferences and culture, in line with the statement of Novita et al. (2010) in their research. While farmer groups with an orientation towards the domestic market usually process the coffee into specialty coffee with natural, honey, and wine processes, also regular coffee is produced through the fully-washed process. Limited coffee processing equipment still becomes an obstacle to farmers' groups who process specialty coffee.

Large traders accommodate coffee sales from farmers in cherries and coffee beans that have been processed. However, some large traders in the JPAC Manglayang Timur supply chain preferred to receive more coffee beans in the form of cherries because they can ensure the coffee quality. The maturity of coffee beans that farmers have picked would greatly determine the quality and taste. Therefore, some large traders also have a double role as coffee processors.

The processing industry is the actor who receives the supply of coffee beans in the JPAC Manglayang Timur supply chain and processes them into instant coffee that is ready to consume. The processing industry does not usually have high coffee quality requirements because it will generally be mass-produced and sold at affordable prices. These terms are different from coffee connoisseurs and consumers who expect high-flavored coffee, even if they have to pay a higher price. Therefore, the processing industry does not become the target of promotion that appeals to JPAC Manglayang Timur. However, it provides economic benefits to the price signals of coffee production deemed underqualified for specialty coffee among particular coffee lovers.

The café/coffee shop is an actor in the JPAC Manglayang Timur supply chain that demands high-quality coffee. The increased number of cafes or coffee shops serving and processing the coffee directly from roasted coffee beans became an effective promotion to introduce JPAC Manglayang Timur as one Indonesian coffee variant. JPAC is ready to compete with other specialty coffee, known by the wider community, such as Gayo Coffee, Toraja Coffee, Kintamani Bali Coffee, and others. Nowadays, many cafe owners are interested in serving JPAC, including JPAC Manglayang Timur, with unique tastes. These have been proven with awards earned by JPAC Manglayang Timur from several international coffee events that make JPAC Manglayang Timur widely known in various regions (Adijaya et al., 2020).

Some of the processed coffee from farmer groups sell through e-commerce retailers, cafés, or coffee shops. JPAC Manglayang Timur sells in various brands from different producer farmer groups, viz Tani Paniis Farmers Group in Rancakalong sells their products under the Kopi Prabu brand, Maju Mekar Farmers Group in Rancakalong with the Kopi Boehoen Nagarawangi brand, and Tanjungsari Farmer Female Group use the Kofie Tanjoeng brand. All of these brands sell coffee in roast beans and ground coffee.

The consumer is the last actor in the JPAC supply chain, divided into regular and specialty coffee consumers. Regular coffee consumers tend to get coffee from the processing industry, such as instant in a sachet and ground coffee in pouch packing. This segment is numerous and widely spread from the middle to lower-income households. Middle to high-income consumers prefer specialty coffee at a higher price than regular coffee in coffee shops with a contemporary atmosphere influenced by lifestyle (Taufani, 2020).

In today's society, coffee consumption has become a lifestyle; consumer preference shifted from buying ready brewed coffee powder to drink at home or workplace to roasted coffee beans. The roasted coffee needs to be grounded and brewed with various brewing techniques, such as V-60, Vietnamese Drip, French Press, Siphon, and other techniques. Umam (2017), in his research, found that different brewing and roasting treatments will produce a unique coffee flavor character. The trend is also to enjoy coffee directly at the cafes or coffee shops offering higher-priced coffee. The atmosphere and facilities provided by the cafe or coffee shops make the coffee lovers willing to pay more to enjoy a cup of specialty coffee. Nowadays, household consumers also like to visit the coffee processing center that farmer groups manage. They even further satisfy their curiosities by digging up information about the coffee, observing, and feeling various coffee processing atmospheres. The more diverse coffee processing provides more choices for consumers. Direct purchases of consumers to farmer groups that process coffee make the JPAC Manglayang Timur supply chain more efficient, especially specialty coffee. The direct purchase makes the supply chain shorter; therefore, the consumers get lower prices. The same happened with other commodities, such as chilies (Ongirwalu et al., 2015). Based on information from the business operators that have been explained previously, the JPAC Manglayang Timur supply chain is described in the following chart (Figure 2):

The farmer usually sells their crops as part of farmer groups. However, many others sell the crops directly to traders who process semi-wash green bean coffee and then distribute them to exporters outside Sumedang Regency, such as Garut and Medan, before exporting to foreign countries. China is one of the trading partners and export destination countries for coffee commodities from Indonesia (Neilson & Wang, 2019). Most merchants will distribute processed coffee, especially specialty coffee, to the processing industry, cafes, and coffee shops. Farmer groups have a strategic role in this matter because this is where coffee processing takes place. The processing results will be distributed to traders, processing industries, cafes, and retailers or even directly to the consumers in the domestic area, especially for local coffee lovers in Sumedang.

Problems with the JPAC Manglayang Timur Supply Chain

The problem faced by farmers is limited cultivation land for growing coffee plants, especially Arabica Coffee, which ideally is grown 1,000 meters above sea level. Most of the land above 1,000 meters is state-owned as conservation land. The solution is to utilize land area owned by Perhutani KPH Sumedang to overcome the limitations of land owned by farmers. Farmers have been giving compensation to the Perhutani KPH Sumedang with shares of 25 percent of the cherry
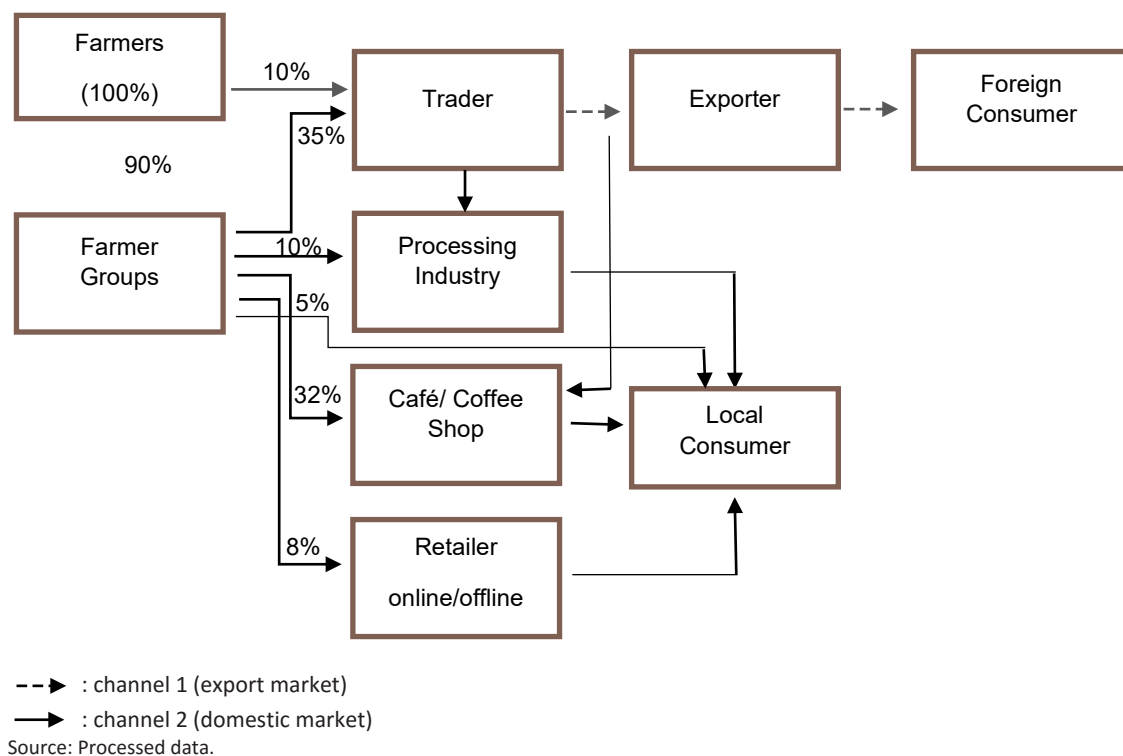

Figure 2. JPAC Manglayang Timur Supply Chain Flow Pattern

coffee yields. Received shares to pay taxes and other administrative costs by Perhutani KPH Sumedang.

Although the cultivation land is still available, it has not fully answered the farmer's problems to increase the JPAC Manglayang Timur's competitiveness, especially in productivity. Several conditions have caused low productivity due to limited land and agro-inputs. *First*, coffee cultivation land had been planted with hard plants that affected plant spaces. Ideally, coffee tree populations per hectare range from 1,500 to 1,600 trees. However, the coffee tree populations are less than 1,000 on average because of the hard plants. *Second*, most of the existing tree types are pine trees. Coffee trees can be planted between pine trees, but pine trees are not an ideal protective tree, according to research in Selo Sabrang Village, Bejen Subdistrict, Temanggung Regency. The research proved that coffee productivity under pine stands was about three times lower than coffee under the stands of mahogany trees (Setyawan, 2016). *Third*, agro-input provisions are still limited to agricultural equipment, machinery, and production facilities of high-quality fertilizers and seeds. *Fourth*, inadequate facilitation for motor vehicles.

Some of the obstacles faced by farmer groups as processors are the processing facilities. Some equipment does not meet hygiene standards, which concerns processed coffee safety, affecting consumer confidence. Also, the performance of pulper and huller machines owned by farmer groups is less than optimal in terms of capacity. Not all farmer groups JPAC Manglayang Timur have complete processing equipment ranging from pulper, huller, roaster, and product processing unit. Another constraint is the drying process, which needs an adequate drying floor, which is still lacking due to limited land, so production capacity is still low.

The obstacle faced in marketing is that Sumedang does not yet have a one-stop coffee sales center integrated with coffee producers. Marketing tends to be done by each coffee trader both for the export and domestic market. Another obstacle is the unstable and fluctuating production capacity depending on the harvest period. It is necessary to regulate cropping patterns and adequate storage facilities to maintain the JPAC Manglayang Timur product continuity.

Value Added from the Processing of JPAC Manglayang Timur

The research focused on the added value of processing JPAC Manglayang Timur specialty coffee to make this type of coffee well known in the domestic market. Specialty coffee needs a longer process than other coffee destined for export markets. Coffee demand for export markets is usually in green beans form. For example, the same conditions with the Gayo Coffee supply chain, which the product is coffee beans or green beans. Gayo Coffee is Arabica Coffee, which has a unique taste (specialty), a taste originating from the coffee and roasting processing technique. Some importer countries have their uniqueness in the coffee process, which produces its flavor according to consumer preferences in each country. For example, Italians prefer dark coffee beans (dark roast), French prefer light roast, and Austrians tends between dark and light roast called Viena roast (Mulato & Suharyanto, 2006 in Jaya et al., 2014).

Coffee products are highly dependent on the taste resulting from processing the coffee itself, based on Jaya et al. (2014) and Purnama's (2017) research. Here are some coffee processing methods from post-harvest to ready product, carried out by farmers JPAC East Manglayang. In fully-washed processes, ripe cherries are first immersed in water, where any floating cherries will be removed as it is considered defective. The cherries' skin and pulp were then removed using a pulper machine. The peeled seeds are put back into the container that has been filled with water to loosen the remaining pulp and dissolve the mucilage; this process takes around 48 hours. The peeled seeds were then sun-dried to reduce the coffee beans moisture content to 10-12 percent. The taste of fully-washed coffee has crisp acidity, clear and refined flavor, robust aroma, lighter body, and more impressive aftertaste.

The honey process is also called the semi-washed process or wet milling method. The semi-washed process is the most common method coffee farmers use because it is easy and fast, so farmers can immediately profit from selling the coffee product. The ripe cherries are peeled with a pulper tool; the peeled seeds are then left aside to start the fermentation process for about one night to remove the mucilage. The beans are then washed to remove the remaining mucilage and sun-dried until half dry. After that, the parchments are removed using the huller machine, then become green beans. Half dry green beans from the hulling process, then sun-dried until the moisture content reaches 10-12 percent. This semi-wash process will produce coffee with a thick body character, an intense sweetness, and light acidity.

The natural process is a term for natural coffee processing or a process using an ancient method. The use of this method is known to be the simplest and cheapest. The ripe cherries are sorted and immediately sun-dried and left to ferment and dried for 5-6 weeks; the beans are then frequently inverted during the drying process, and after it is dried, the coffee beans are then grounded. The process is carried out manually and takes a long time, making it less favourite among farmers because it means a longer time before the farmers could gain profits. Natural processed coffee is rarely available on the market, so the price is higher than other processed products.

The winey process is a natural process with a longer duration of fermentation. It is carried out by selecting red ripe coffee beans, and then placing the coffee beans into a covered place like a plastic bag for fermentation. Some farmers fermented the coffee beans for 30-60 days; the longer the fermentation periods will give the better results. After fermentation is complete, beans are sun-dried. The coffee will then be ground to remove the bean's hardened shell, dried once more, and then go to the roasting process.

The duration process differences give the fully-washed process the most significant advantage at 67.58 percent. Honey processing offers the highest reward for labor because it requires more effort for workers. Wine processing provides the highest added value at 38.56 percent on average. Likewise, the enormous profit margins obtained up to Rp8,500 per kg due to the selling price of wine processed coffee valued higher than the others, an average of Rp150,000 per kg. The value-added results are intended to encourage the

Table 3. Calculation of Added Value Processing of JPAC Manglayang Timur using Hayami Method

		Variable	Fully washed	Honey	Natural	Wine
I.		**Output, input, and price**				
	1.	Output (kg/process)	16.00	12.00	12.00	12.00
	2.	Raw materials (kg/process)	100.00	100.00	100.00	100.00
	3.	Labor (HOK/process)	2.75	6.50	4.31	4.81
	4.	Conversion factor	0.16	0.12	0.12	0.12
	5.	Labor coefficient	0.03	0.07	0.04	0.05
	6.	Output price (Rp/kg)	90,000.00	120,000.00	140,000.00	150,000.00
	7.	Average labor wage (Rp/HOK)	60,000.00	60,000.00	60,000.00	60,000.00
II.		**Revenue and profit (Rp/kg)**				
	8.	Price of raw materials (Rp/kg)	8,500.00	9,000.00	9,500.00	9,500.00
	9.	Other input contributions (Rp/kg)	810.00	825.00	850.00	1,560.00
	10.	Output value (Rp/kg)	14,400.00	14,400.00	16,800.00	18,000.00
	11.	Value-added (Rp/kg)	5,090.00	4,575.00	6,450.00	6,940.00
		Value-added ratio (percent)	35.35	31.77	38.39	38.56
	12.	Labor benefits (Rp/kg)	1,650.00	3,900.00	2,588.00	2,888.00
		Labor share (percent)	32.42	85.25	40.12	41.61
	13	Profit (Rp/kg)	3,440	675.00	3,863.00	4,053.00
		Profit rate (percent)	67.58	14.75	59.88	58.39
III.		**Reward factors of production**				
	14.	Margin (Rp/kg)	5,900.00	5,400.00	7,300.00	8,500.00
		Profit (percent)	58.31	12.50	52.91	47.68
		Labor (percent)	27.97	72.22	35.45	33.97
		Other inputs (percent)	13.72	15.28	11.64	18.35

Source: Processed data.

Based on the value-added calculation (Table 3), the JPAC Manglayang Timur process is profitable and feasible to develop. In general, the coffee process yield is 12 percent, and the fully-washed coffee process yield reaches 16 percent. The difference is due to the fully-washed process, which can produce coffee by regular processed and selling at a lower price, an averagely Rp60,000 per kg. In contrast, specialty quality coffee is sold on an average of Rp100,000 per kg. The other difference is the length of working time for labor on the drying process, the fully-washed process requires an average of 12 days, and the wine process requires a drying time of an average of 29 days. However, the longest working time is in the honey process due to a longer reversal process because coffee beans are glued.

coffee processing business at the farmer groups level and increase more attention of stakeholders, especially the Sumedang Regency Government technical offices, to contribute more to the specialty coffee business ecosystem. The results of this study were different from the results of the processing carried out by coffee farmers in Situbondo district, where the level of farmers' profits was higher through fully washed processing than natural washed (Puryantoro, 2021).

Action Plan for the Development of JPAC Manglayang Timur Business

Based on its advantages and potential, JPAC Manglayang Timur needs to be established as a superior commodity in The Sumedang Regency, which is developed through a synergy of policies and

programs among stakeholders. The Sumedang Regency Government needs to determine superior commodity in regional medium-term development planning, supported by all regional instruments and stakeholders, including academics, business, community, and media. Sumedang is considered to have many leading commodities that have geographical indications. However, none can be developed into an agribusiness scale, lifting the regional economy and social welfare. Based on its potential and prospects, JPAC Manglayang Timur is expected to compete in the global/regional coffee market, improve the community's economy, and be named eligible as a priority leading commodity.

Many works need to be done by coffee stakeholders to increase the productivity of the JPAC Manglayang Timur. *First*, map and delineate forest areas that are ideal and suitable for growing Arabica coffee. It is necessary to consider the population of trees or existing stands so that coffee plants can reach 1,500 trees per Ha. Also, in the delineation of the area, it is necessary to identify the distribution of tree species that will become coffee protection plants to provide complete information to support coffee productivity. *Second*, improving road conditions requires more intensive plant area maintenance and fertilization. Synergies in road development planning should be done with the coffee production center to improve transportation. *Third*, facilitate the distribution of superior seeds of green and brown shoots proved to increase productivity five times greater than the coffee commonly grown by farmers and have excellent taste (specialty). *Fourth*, to provide facilitation of agricultural tools, machinery, and appropriate technology to support cultivation activities. Also, we need to increase the capacity of farmers and farmer groups. Farmers and farmers groups, as the primary actors in JPAC Manglayang Timur development, should continuously improve their cultivation and processing capabilities to produce more sustainable quality coffee. Sustainable quality coffee could also be produced by integrating the tourism program with the recent trends of enjoying coffee.

Another trend that can influence consumer preferences in enjoying coffee is developing coffee agro-tourism. In coffee agro-tourism, the consumers enjoy specialty coffee on a coffee plantation. They also can feel the panoramic view of natural beauty and the atmosphere of a coffee plantation. Coffee agro-tourism needs further support such as infrastructure, tourism facilities, and fostering coffee entrepreneur human resources. The Baristas in the coffee shop are required further training to serve JPAC Manglayang Timur with unique presentations. The trend of emerging coffee artists is boosting coffee

tourism attractiveness. Socializing the seven pillars of beautiful tourism and fostering a tourism-conscious society around coffee plantations developed into tourism areas are vital for tourists.

Coffee agro-tourism can boost the economic multiplier effects for coffee farmers and the business community around the agro-tourism area. The "relationship coffee" model approach can develop value chains to encourage economic activity and provide opportunities for improving welfare for local communities in rural areas (Vicol et al., 2018). Coffee agro-tourism could also improve Sumedang Regency regional revenue from the tourism sub-sector, following West Java Provincial Development Planning on promoting Sumedang Regency as one of the West Java Leading Destinations. Sumedang Regency has historical strength and cultural uniqueness as Sundanese Cultural Center. The integrated tourism concept of coffee agro-tourism and historical-cultural tourism will be adding tourist attractions to Sumedang Regency.

The Sumedang Regency Government needs to work together with research institutions and academics to educate farmers and farmer groups, bridging research findings and results to improve cultivation, yield processing, and marketing of the JPAC Manglayang Timur products. Sumedang Regency government also needs to synergize the program between local officials and other stakeholders, such as academics, farmers, coffee farmer groups, coffee traders, entrepreneurs associations, and other communities related to the coffee industry. It is also important to build commitment and cooperation with Perhutani KPH Sumedang, managing forestry land used for coffee cultivation.

CONCLUSION

The JPAC Manglayang Timur supply chain is divided into two main channels based on the market orientation: the export and domestic market. The parties related to the supply chain consist of farmers, farmer groups, large traders, processing industries, cafes or coffee shops, and household consumers. The business actors still face many obstacles at every stage of supply chain activity, especially in the provision of agro-input and cultivation processes that do not yet support increased productivity. In addition, there are still limitations of processing and marketing equipment among all business actors.

JPAC East Manglayang basically has a fairly good competitiveness because it has been certified Geographical Indications (GI) so that it has the quality and unique taste that can only be produced in the Manglayang mountainous area. This competitiveness becomes even higher when coffee is processed

into specialty coffee. JPAC processed into specialty coffee could give a variety of value-added, and the wine process can provide the highest value-added compared to other processing processes.

Due to overcome the various problems faced by JPAC business actors, the role of the government is needed to establish cooperation with stakeholders such as the private sector, academia, the coffee community, and the media. It is also necessary to synergize program activities between local government agencies in developing coffee as a superior commodity. Specifically, to support JPAC Manglayang Timur business, The Sumedang Regency Government should provide regulations that could accommodate public land use through collaboration with Perhutani, including road construction for agro-inputs, farming, and post-harvest activities. Good road access is expected to encourage agro-tourism activities at a coffee plantation and increase domestic coffee consumption and add higher value-added.

Farmers can increase the product added value through the coffee farmer group with support from the regional government or related agencies to procure coffee grinding machine equipment (pulper and huller). Also, by joining the groups, each farmer is expected to extend the area and productivity of coffee, especially JPAC Manglayang Timur. The wide open coffee market and increaseing demand for specialty coffee are opportunities for coffee farmers in Indonesia to expand their marketing, so various specialty coffee from Indonesia can compete globally. National policy support is needed to make the coffee supply chain more efficient by increasing farmer capacity and assistance in using coffee processing equipment. Hence, coffee farmers can produce specialty coffee with higher added value to increase farmer income and welfare.

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