



A comparative analysis of the factors that influence the purchase of cocoa as a raw material in Costa Rica and France

Análisis comparativo de los factores que condicionan la compra de cacao como materia prima en Costa Rica y Francia

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Abstract

The sale of raw material (RM) is the main objective of small and medium-sized cocoa producers. Most studies analyse the preferences of processing companies (PCs) regarding RM but do not identify the factors that influence their purchasing decisions. This study sought to address these gaps by analysing PC behaviour in the Costa Rican and French markets. The research examined a total of 57 PCs in Costa Rica and 54 in France, all which process cocoa from plantations owned by third-party growers. The research was conducted in two stages: first in relation to both markets, and then focusing on Costa Rica. The samples sent for analysis consisted of 1 kg dry cocoa, 500 g nibs, and three 85 g 100% cocoa liquor bars. The results show that in Costa Rica, PCs focus on moisture content, fermentation, aroma, national origin, and quality standards, while in France, priority is given to aroma, conservation practices, and business trajectory.

Keywords: raw material, marketing, cocoa, purchasing factors, cocoa market

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Resumen

La venta de materia prima (MP) es el principal objetivo de los pequeños y medianos productores cacaoteros. La mayoría de los estudios analizan las preferencias de las empresas procesadoras (EP) respecto a la MP, pero no identifican los factores que inciden en su decisión de compra. Por ello, surge la inquietud: ¿cuáles son los factores determinantes en la compra de una MP? y ¿cuáles son las diferencias y similitudes entre ellos? Este estudio aborda dichas brechas mediante un análisis del comportamiento de las EP en el mercado costarricense y francés. Se consultó a 57 EP en Costa Rica y 54 en Francia, todas procesadoras sin plantaciones propias. La investigación se realizó en dos etapas: la primera en ambos mercados y la segunda solo en Costa Rica, enviando muestras de 1 kg de cacao seco, 500 g de nibs y tres barras de licor de cacao 100 % de 85 g. Los resultados evidencian que en Costa Rica se priorizan la humedad, la fermentación, el aroma, el origen nacional y los estándares de calidad, mientras que en Francia destacan el aroma, el sistema conservacionista y la trayectoria empresarial.

Palabras clave: materia prima, comercialización, cacao, factores de compra, mercado cacaotero

1. INTRODUCTION

According to data provided by the Ministerio de Agricultura y Ganadería (MAG), cited in Mencía Guevara (2021), indicate that 1,414 active farms were dedicated to cocoa cultivation nationwide in that year. Of the total cultivated area, the Huetar Caribe region accounted for 52%, followed by the Huetar Norte region with 33%, and the Brunca region with the remaining 15% (Promotora de Comercio Exterior [PROCOMER], 2024). For 2022, national cocoa production in Costa Rica was estimated at 6,202 hectares, with a total production of 800 tons, placing the country 39th worldwide and fifth in Central America (Promotora de Comercio Exterior [PROCOMER], 2024).

Regarding the genetic profile of the crop, Trinitario hybrids, Criollo-type beans, and clones developed by the Tropical Agricultural Research and Higher Education Center (CATIE) predominate. In addition, Costa Rica ranks twelfth in export value of fine flavor cocoa, surpassing several Caribbean islands such as Jamaica, Trinidad and Tobago. Meanwhile, regarding global cocoa exports as an ingredient for the industrial sector, in 2023 the country ranked 73rd in terms of export value and 78th in terms of imports (Promotora de Comercio Exterior [PROCOMER], 2024).

The international price of dry cocoa has been considerably volatile since 1969. Despite a slight recovery in the last quarter of 2019, with a positive trend projected for 2020 (Ginatta, 2020), the COVID-19 pandemic affected global demand, leading to a decline of nearly 20% in its price on the London Stock Exchange (Rikolto, n.d.). In 2024, cocoa prices recorded a quarterly growth of nearly 45%, reaching levels 112% higher than the previous year. In this way, prices surpassed 7 USD per kg in March 2024 for the first

time since high-frequency price records began. For 2025, prices are expected to increase by 52% on a year-to-year basis before supply expands (World Bank, 2024; International Monetary Fund (IMF), 2025).

Costa Rica is recognized as a producer of high-quality cocoa, largely due to its geographical location, which provides optimal climatic conditions and suitable soils (Furcal Beriguete, 2015; Aramburo Rojas, 2017; Wexler et al., 2025). Nevertheless, the sector faces significant competitive challenges in both national and international markets. Among these challenges is the limited negotiating capacity with principal markets, which restricts the expansion of Costa Rican production and companies (Aramburo Rojas, 2017). Additionally, a lack of knowledge concerning the attributes and standards valued by the processing industry in the selection of RMs still continues, limiting the ability to compete with international suppliers (Salazar Quesada, 2023).

A key challenge in the commercialization of cocoa in Costa Rica lies in the gap between production and the sale of RMs and finished products. While production capacity remains limited, demand in national and international markets continues to increase.

In local markets, grain supply coincides with the volume of RM required for finished products; however, surpluses are insufficient to support significant export volumes (Chaves-Abarca et al., 2016; Carmiol González, 2017; Nadurille, 2010). Similarly, a discrepancy continues between business quality standards and actual customer demands.

From a market-trend perspective, the vertical integration of multinational companies in the cocoa and chocolate sector generates a barrier to local processing in producing countries, as these international companies tend to be established in importing countries rather than producing ones (Food and Agriculture Organization of the United Nations (FAO), 2004). Additionally, in markets such as Costa Rica and France the shortage of trained staff limits the exploration of new commercial opportunities and hinders the identification of key factors in RM decision-making processes (Nadurille, 2010; Santos et al., 2024).

This study examines these gaps and analyzes the behavior of cocoa RM processing companies in Costa Rica and France. Given that product characteristics such as moisture content, fermentation, and aroma influence purchasing decisions, this study focuses on the key factors of cocoa acquisition in both countries. The selection of these markets is based on differences in their processing capacities, allowing a comparison of their commercial dynamics and specific requirements.

2. LITERATURE REVIEW

From a production perspective, only a few countries, most of them in the Americas, are recognized for producing 100% fine flavor cocoa. Costa Rica is the only country in Central America holding this classification, which enables producers to negotiate higher prices in international markets compared to conventional cocoa (Promotora de Comercio Exterior, PROCOMER, 2025). On the other hand, fine flavor cocoa cultivation represents less than 6% of global cocoa production. Only a limited number of countries, including Bolivia, Colombia, Costa Rica, and Mexico, are recognized for having between 95% and 100% of their cocoa commercially classified as fine flavor (Arvelo Sánchez et al., 2016; International Cocoa Organization [ICCO], 2023). Although global share is relatively low, coincides fine flavor cocoa is highly valued in the market for its taste and distinctive aroma, making it especially valuable in the production of gourmet products (Nuriza Putri et al., 2024).

Fine flavor cocoa is primarily cultivated by small-scale producers in the Mesoamerican region, who employ family-based, sustainable, and often organic production systems. As a result, the region is recognized as an important center of fine flavor cocoa production (Wexler-Goering & Alvarado-Marengo, 2024).

From a market perspective, specialty cocoa is targeted at PCs and consumers who value distinguished products and are willing to pay for their unique characteristics, such as flavor and aroma. About the demand, an increase has been observed, driven by the fact most major manufacturers have developed products that require cocoa of specific origin, with distinctive flavor and aroma profiles (Squicciarini & Swinnen, 2016; Promotora de Comercio Exterior de Costa Rica. PROCOMER, 2023). Notably, specialty cocoa is targeted at PCs that market their products based on unique sensory characteristics, promoting fair and sustainable trade, and emphasizing the origin and primary production of RM (Centre for the Promotion of Imports from Developing Countries. CBI, 2020).

To classify and categorize fine flavor cocoa, various criteria were used, including genetic origin, plant morphological characteristics, sensory and physicochemical properties of the beans, degree of fermentation and moisture content. However, some of these indicators may be subjective; therefore, a solid scientific basis is required to accurately determine the physicochemical and sensory attributes of this type of cocoa (Aprotosoie et al., 2016; Carmiol González, 2017; Nuriza Putri et al., 2024; Wexler et al., 2025).

When considering the context of RMs, confusion often arises regarding the concept of dried cocoa beans since, they may be regarded either as a RM or as a by-product. This confusion originates from the common perception among consumers that chocolate is produced directly from cocoa beans. However, cocoa beans undergo a series of processing steps to obtain by-products such as cocoa butter, cocoa powder, and cocoa

shells, which are used in the production of chocolate and other market products (Beckett, 2011; Afoakwa, 2014; Payero & Fuenzalida, 2017).

When referring to cocoa, the term is generally used to describe the plant and its fermented and dried seeds, commonly known as cocoa beans. Once the shells are removed, the beans are roasted and ground. Eventually, resulting into cocoa nibs, which are subsequently powdered to obtain cocoa paste, also known as cocoa liquor. Once the cocoa liquor is obtained, cocoa butter is extracted through a pressing process, leaving a cocoa press cake, which can later be powdered to produce cocoa powder (CAOBISCO, ECA & FCC, 2015).

Dry cocoa beans are recognized in international markets as whole, fermented, dried, and clean beans (Instituto de Normas Técnicas de Costa Rica. INTECO, 2009). However, this RM must meet a series of conditions to be commercialized, which can be measured and compared, such as 1) bean size, 2) cocoa butter content, 3) hardness; in contrast, other attributes such as flavor and aroma are more difficult to quantify (Quintero R. & Díaz Morales, 2004).

The international market for cocoa beans as RM maintained a relatively stable price trend for more than a decade (Figure 1), with moderate variations within a range of 2,000 USD to 4,000 USD per ton. However, toward the end of 2023, this stability was interrupted due to a reduction in supply in the main cocoa-producing countries in Africa, as a direct consequence of climate change. Data from the International Cocoa Organization (ICCO, 2025) showed a reduction in production driving prices to historic levels exceeding 10,000 USD per ton in April and December 2024. This price increase led to a decline in demand. By 2025, prices have fluctuated between 8,000 USD and 14,000 USD per ton, in real terms, based on the value of the U.S. dollar as of April 2025.

Figure 1. International market price of cocoa beans, January 2020–April 2025 (without inflation adjustment) (Source: International Cocoa Organization, ICCO, 2025).

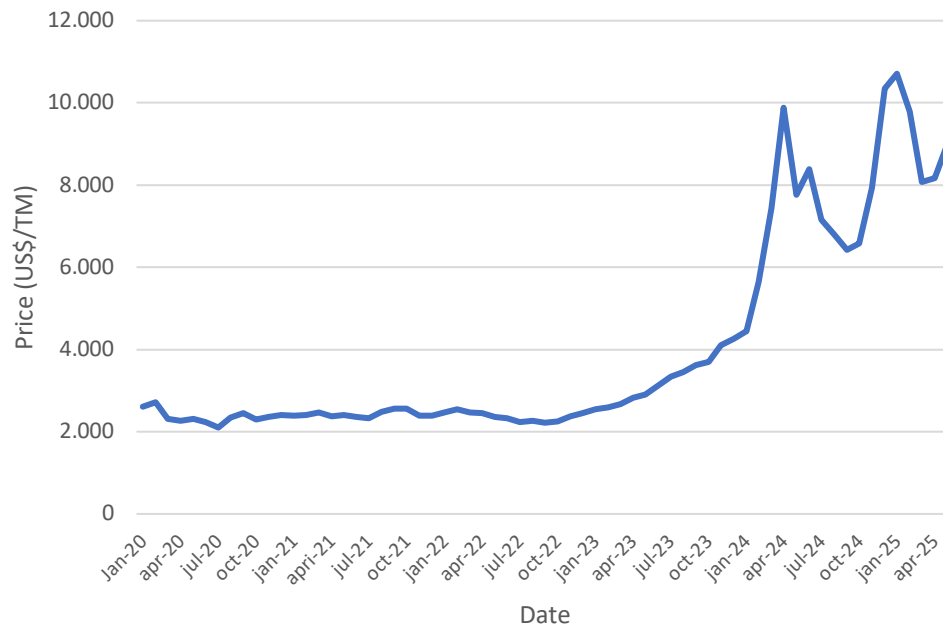
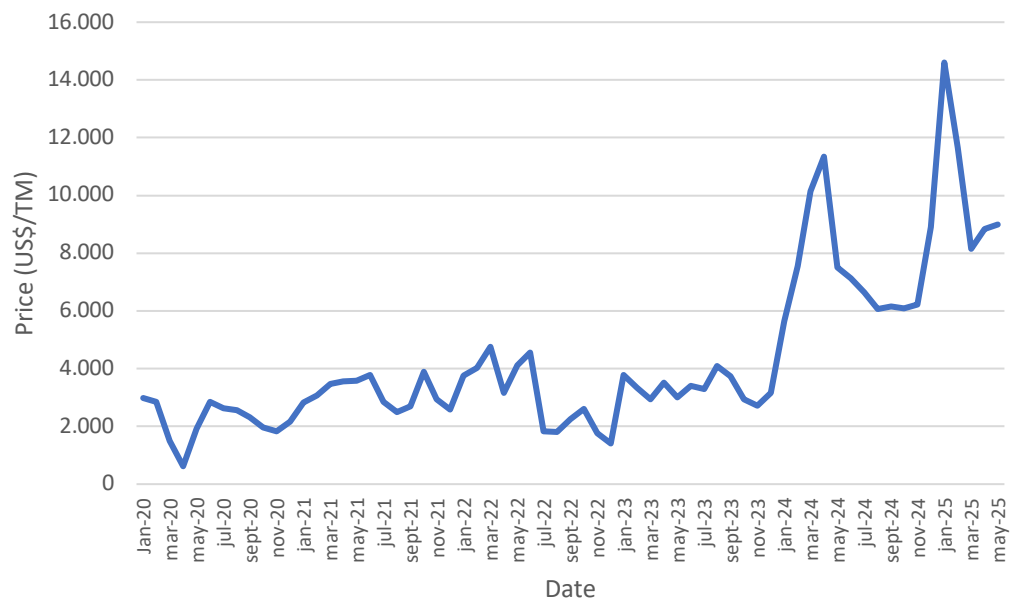


Figure 2. International market price of cocoa beans, January 2020–April 2025 (with inflation adjustment) (Source: International Cocoa Organization, ICCO, 2025).



3. METHODOLOGY

3.1 Participants and Setting

The study was conducted on fine flavor chocolate PCs that process cocoa but do not own cocoa plantations, meaning they acquire their RM through third-party growers. All participants in this study met the required profile: cocoa processors specializing in the commercialization of finished products, such as bars, bonbons, confections, and tablets with varying cocoa concentrations.

For this study, 57 companies were identified in Costa Rica, most of them located in the Greater Metropolitan Area. In France, a total of 54 companies were identified, mainly based in cities such as Paris, Montpellier, Marseille, Nantes, Lille, Lyon, Bordeaux, Strasbourg, Versailles, Saint-Étienne, Orléans, and Tours. Costa Rica's case, official sources such as the Ministry of Economy, Industry, and Commerce were consulted, as for the French market, the FCCI directory was used.

3.2 Data Scope

The data collection process was conducted between September 2022 and June 2023 among PCs in the chocolate-making sector that purchase cocoa-based raw materials in both Costa Rica and France. The study analyzed the factors influencing the purchasing decision of cocoa raw materials in both markets.

3.3 Data Collection Instrument

This research aimed to collect and analyze data on the criteria employed by companies in Costa Rica and France when selecting cocoa-based RM.

The material used to gather data was a survey created using Google Forms, a data collection tool. Specifically, the data collection process was structured in two stages.

Stage I focused on gathering general information on product characteristics and the factors influencing the decision to purchase cocoa as a RM. **Stage II**, which was conducted exclusively in Costa Rica, focused on collecting specific information on each of the raw materials evaluated, based on the shipment of product samples.

Four structured surveys were designed. The first instrument, applied in **Stage I**, consisted of six sections: 1) general aspects considered in the purchase of raw cocoa materials; 2) physical and sensory characteristics; 3) commercial conditions; 4) motivating factors in the purchasing decision; 5) data on purchasing habits; 6) company information.

The remaining three instruments, applied in **Stage II**, focused on each of the specific raw materials under study. Each instrument consisted of three sections: 1) general company information; 2) physical and sensory characteristics of the RM; 3) information on purchasing practices, such as frequency of acquisition and quantity in kilograms.

Each instrument combined open-ended and closed-ended questions. Instrument A, designed for the processing industry in Costa Rica, included 22 items, while its counterpart, France, consisted of 24 items. Instruments B, C, and D were applied exclusively to the local processing industry, containing nine items each.

To determine the response options for each of the variables (questions) included in the survey, input from experts in cocoa quality³ was considered, along with references from the cocoa industry⁴. Additionally, questions related to production conditions, commercialization, and negotiation terms, various documents and references that describe these aspects in detail, such as undergraduate and graduate thesis⁵ were reviewed. Furthermore, for each variable, an “other” category was included, allowing respondents to add an alternative response category when applicable.

After the application of the instruments, a specific response rate was obtained for each of the processing companies, both in Costa Rica and in the French market (Table 1).

Table 1. Survey Response Rates of PCs in Both Industries, 2023 (source: authors' own elaboration).

Country	Companies Consulted	Responses	
		Stage I	Stage II
Costa Rica	57	21 (37 %)	18 (86 %)
France	54	12 (22 %)	Not considered ⁶
Total	111	33 (30 %)	

3.4 Design and Procedures

The data collection process of instruments A, B, C, and D were administered to companies in Costa Rica and France between September 2022 and June 2023. These instruments provided detailed information on the conditions that determine the acceptance and purchase of RM. Additionally, in the case of Costa Rica, product samples were sent to identify the price that companies would be willing to pay for 1 kilogram of dried cocoa beans, 500 grams of cocoa nibs, or an 85-gram bar of 100% cocoa liquor, considering their physical, chemical, sensory, and commercial characteristics.

During **Stage I** in Costa Rica, each company was contacted through cellphone calls with three objectives; confirm the adequate reception of the information, inform about **Stage II** of the study, and determine how many local companies are willing to receive the samples.

³ PhD Elba Cubero and MSc Lea Wexler, faculty members of the School of Food Engineering at the University of Costa Rica, associated with the research.

⁴ Mr. Giovanni Palavicini, Manager of Colibrí Chocolate, Costa Rica.

⁵ Montero (2020) discusses performance criteria in cocoa-processing SMEs that establish a baseline of strategic commercial actions for the 2018–2028 National Cocoa Plan.

⁶ For the purposes of this study, Stage II was not conducted in France due to budgetary constraints.

Stage II in Costa Rica consisted of sending samples of cocoa beans, cocoa nibs, or cocoa liquor, according to the selection of each participating company. The purpose of this delivery was for the chocolate manufacturers to process the samples and complete the questionnaires corresponding to Instruments B, C, and D, which were sent by email together with the technical data sheets at the same time the samples were dispatched through Correos de Costa Rica.

During **Stage I** in France, some contacts did not respond to the initial study or to the emails sent in the first instance. This issue was addressed with the collaboration of Mr. Dejoie⁷ and several assistants from Université Sorbonne Nouvelle – Paris 3, who, through cellphone calls, assisted in completing the remaining surveys from the participating companies.

3.5 Data Analysis

Once the data was collected, a descriptive analysis was conducted, complemented by chi-square tests to identify the effects of different intrinsic characteristics and commercial conditions on the decision-making process related to the purchase of cocoa-based raw materials. Additionally, cluster analysis was employed to identify potential patterns or differences in cocoa purchasing preferences between Costa Rican and French processing companies.

Regarding company size, the categorization of the data collected from both markets was based on the number of employees in each participating company. According to the definition provided by the Organization for Economic Co-operation and Development (OECD, 2023), companies can be classified into different size categories, with the number of employees being a commonly used measure (Table 2). To this end, an analysis of micro, small, and medium-sized companies was conducted to examine their willingness to pay for the RMs evaluated in this study. For example, companies with fewer than 250 employees are classified as small and medium-sized enterprises (SME). These are further subdivided into microenterprises (fewer than 10 employees), small enterprises (10 to 49 employees), and medium-sized enterprises (50 to 249 employees). Large enterprises, in contrast, employ 250 or more.

Table 2. Classification of the Consulted Companies by Country, 2023 (source: authors' own elaboration)

Company Size	France	Costa Rica
Microenterprise	75,00 %	76,20 %
Small Enterprise	16,70 %	14,30 %
Medium-sized Enterprise	8,30 %	9,50 %

⁷ Anthropologist and French graduate student who visited the country between December 2022 and March 2023 while preparing their graduate thesis project on cocoa production and uses in Costa Rica.

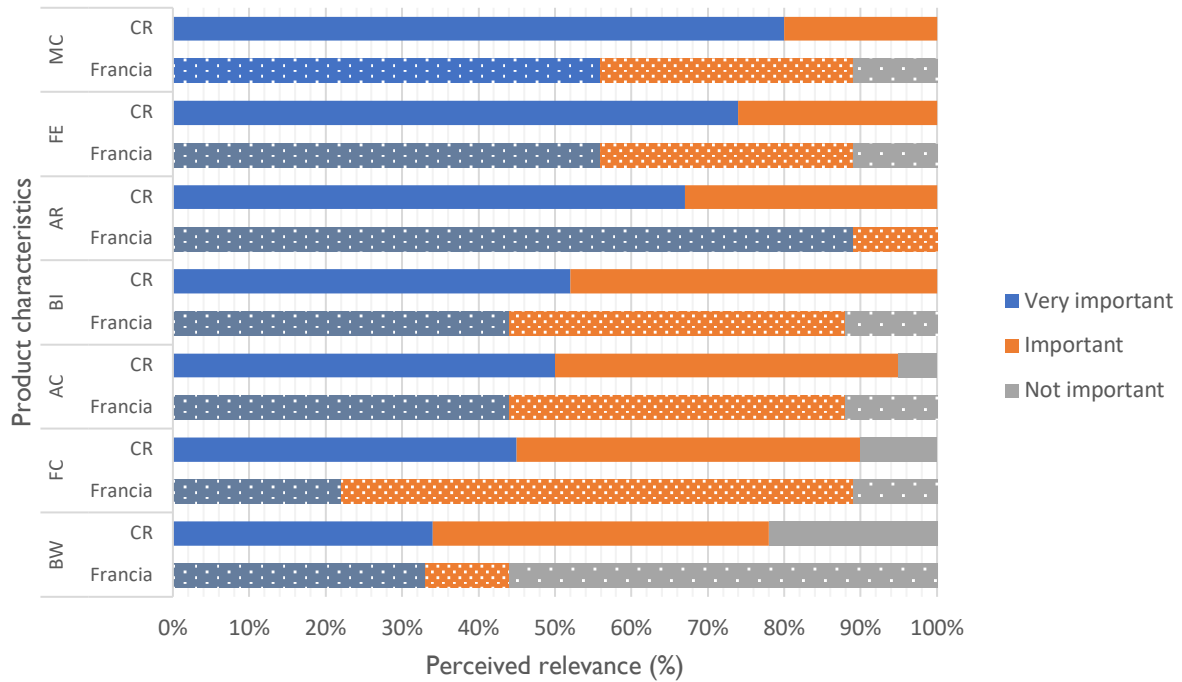
Total	100,00 %	100,00 %
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The data obtained indicates that most of the companies that responded to the survey are classified as microenterprises. In addition, the study included larger firms, as reflected in the percentage of medium-sized enterprises participating. However, in Costa Rica, 97% of the business sector is composed of micro, small, and medium-sized enterprises (SMEs), of which 62% are classified as microenterprises, 32% as small enterprises, and only 3% as medium-sized enterprises (Revista Summa, 2022; Revista Summa, 2023).

4. RESULTS

The preference analysis conducted in this study shows that 50% of Costa Rican PCs prefer cocoa derived from Trinitario and Criollo hybrids, followed by CATIE clones, which account for 21%. Additionally, some of these companies import RMs derived from the same cocoa varieties, identifying them as a potential market for Costa Rican companies. Nonetheless, to fully capitalize on this market, a precise understanding of the different quality attributes valued by these companies is essential. On the other hand, French processing industries show a 45% preference on Trinitario hybrids, followed by a 32% preference for Criollo hybrids. For the remaining companies, the cocoa variety used is either indifferent or corresponds to alternative options (not included in the data instrument). In contrast to Costa Rica, the French processing industry demonstrates a more precise knowledge of the cocoa varieties used in their production processes. In Costa Rica, however, 6% of the companies included in the study reported not knowing the cocoa variety they use.

Figure 3. Relevance of Product Characteristics for Cocoa-Based RM Purchasing Decisions Among PCs, by Country (source: authors' own elaboration)



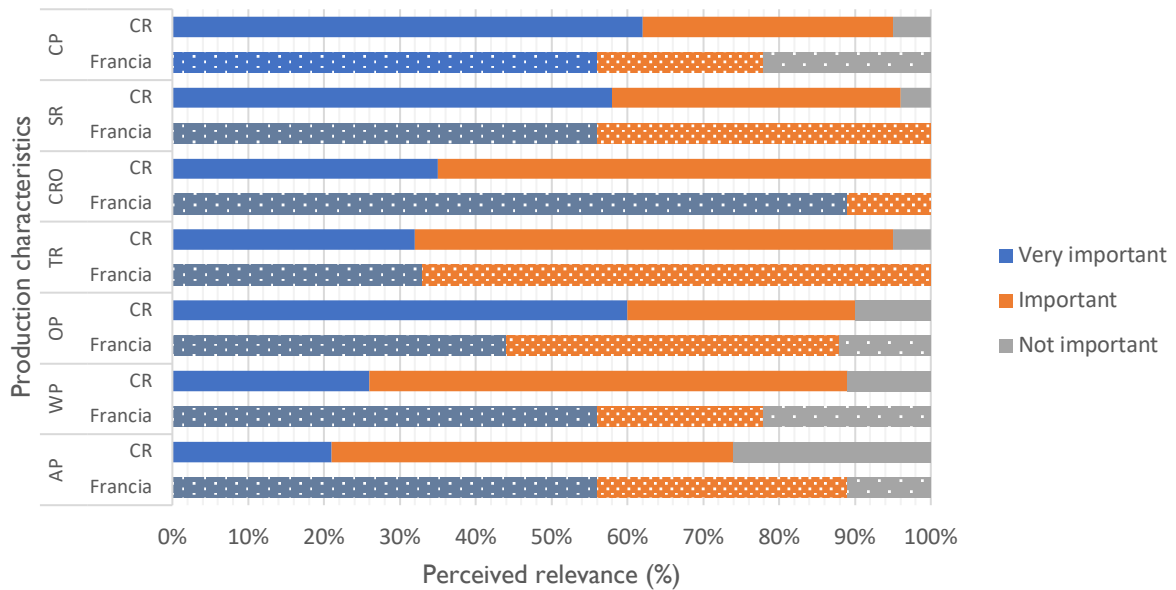
Note: MC: Moisture content; FE: Fermentation; AR: Aroma; BI: Bitterness; AC: Acidity; FC: Fat content; BW: Bean weight.

Both Costa Rican and French companies attribute greater relevance to moisture content, fermentation, and aroma characteristics. As can be seen in Figure 3, among these attributes, aroma is particularly relevant, with approximately 90% of French companies classifying it as “very important”. By contrast, the remaining characteristics barely exceed a 50% rating of “very important”.

Conversely, in the French market, more than 50% of respondents classify bean weight characteristics as “not important”.

For Costa Rican companies, more than 60% classified moisture content, fermentation, and aroma as “very important” attributes when acquiring cocoa-based raw materials. Regarding cocoa butter content, 43% of the participants rated it as “very important,” while 29% classified it as “important.”

Figure 4. Relevance of Production Characteristics in the Purchasing Decisions of Cocoa-Based RMs Among PCs, by Country (source: authors' own elaboration)



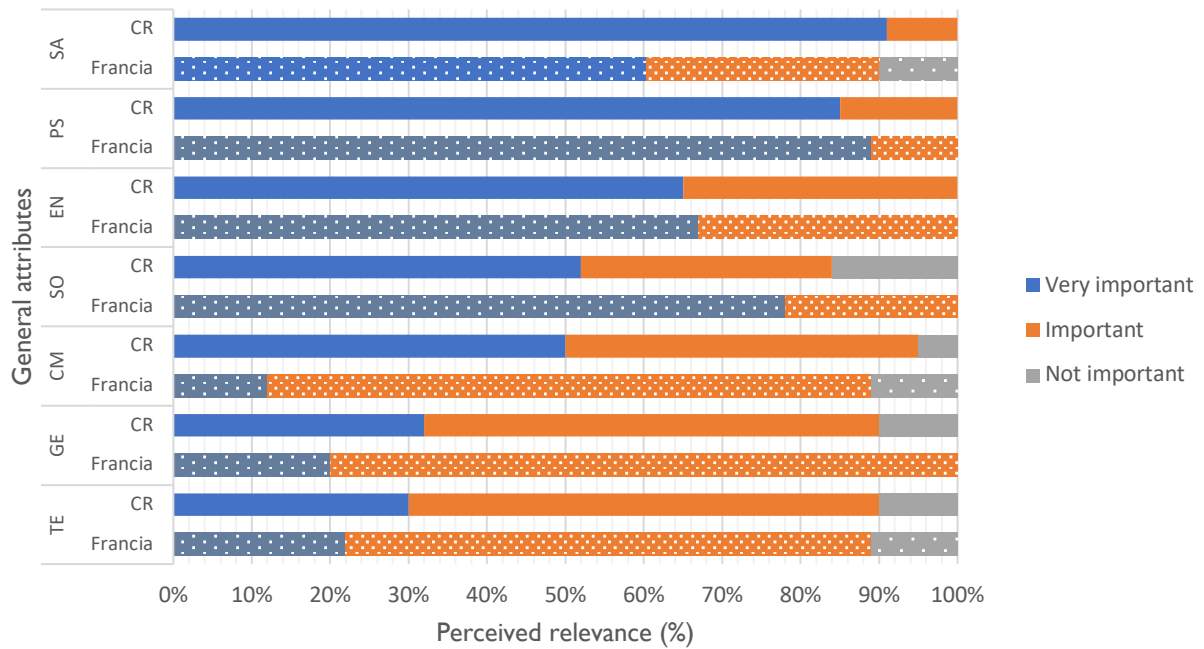
Note: CP: Conservation practices; SR: Social responsibility; CRO: Costa Rica origin; TR: Traceability; OP: Organic production; WP: Women's participation; AP: Affiliated producers.

Production-related characteristics differ in both Costa Rican and French markets depending on the country's company. As shown in Figure 4, Costa Rican companies emphasized that RMs should be of national origin and meet social responsibility criteria. Although these characteristics were also considered relevant by French companies, they placed greater emphasis on sustainable and conservation-oriented production practices, with nearly 90% rating both as "very important".

The analysis indicates that processing companies show a greater preference for Costa Rican-origin products that meet social responsibility standards, particularly in aspects related to fair trade and the eradication of child labor. Regarding the remaining evaluated factors, most participants rated them as "important," but not as "very important," indicating lower relevance compared to the previously mentioned criteria. On the other hand, 24% of participants indicated that their purchasing decisions are not influenced by organizational affiliation. Additionally, Costa Rican PCs show greater interest in RMs derived from conservation-oriented production rather than from organic-oriented production.

The results of this section imply that the French chocolate industry assigns greater importance to RMs sourced from conservation-oriented production rather than from organic-oriented production. Likewise, in the Costa Rican industry, the second most relevant factor is social responsibility. Conversely, the provider's traceability does not appear to be a deciding factor in the purchasing decisions of the French industry.

Figure 5. Perceived Relevance of General Attributes for PCs in the Purchase of Cocoa-Based RMs, by Country (source: authors' own elaboration).



Note: SA: Sanitary attributes; PS: Physical–sensory attributes; EN: Environmental attributes; SO: Social attributes; CM: Commercial attributes; GE: Geographical attributes; TE: Technological attributes.

Technology has emerged as a key factor in agri-food systems, both in Costa Rica and internationally, as reflected in the data obtained in this study. As shown in Figure 5, sixty percent of the participants considered technological attributes to be ‘important’ when making purchasing decisions. Some of these aspects include processing capacity, crop preparation, and maintenance.

Moreover, geographic attributes were considered relevant due to the determining influence of climatic and edaphic conditions on cocoa quality and production in Costa Rica. In contrast, as shown, French companies show greater preference for products that meet social responsibility standards, followed by physical–sensory attributes, and product safety. Conversely, the Costa Rican industry prioritizes products that meet with necessary sanitary measures, followed by physical–sensory and environmental attributes.

4.1 Factors Influencing Purchase Decision (Stage II - Costa Rica)

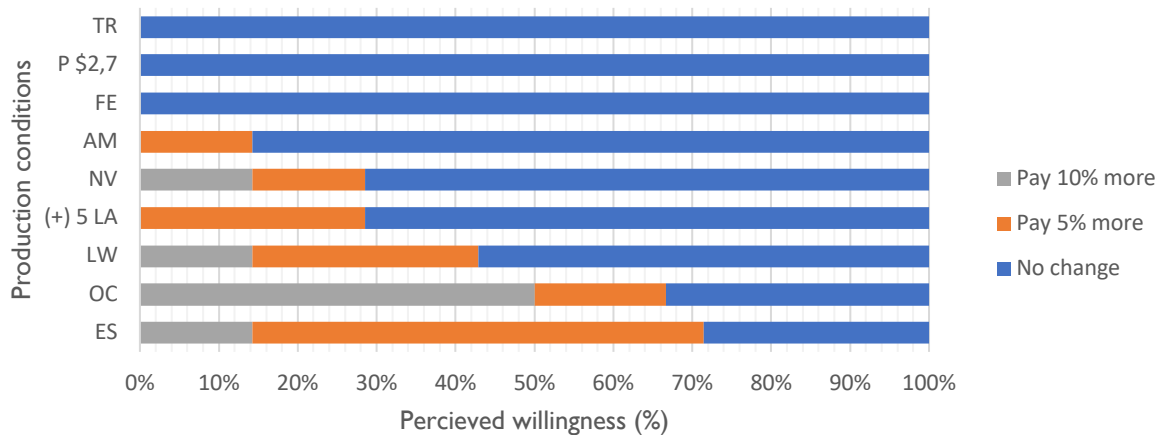
To investigate the participants responses about the evaluation of specific RMs, a set of results was observed once each company tested the sample products, such as dried cocoa, cocoa nibs, and cocoa liquor, used exclusively in the Costa Rican market.

The results suggest that the Costa Rican market shows low sensitivity to conditions that a company can offer to improve product quality. As shown in Figure 6, most Costa

Rican processing companies do not demonstrate a willingness to increase payment for the inclusion of attributes such as traceability or fair trade. However, among the aspects that are emphasized, although without statistical significance to allow generalization, environmental sustainability accounts for 57% of participants who stated they would be willing to pay an additional 5% over the base price if the product meets this criteria. Similarly, for organic certification, 50% of participants indicated they would pay 10% more if the product possesses this certification.

In this context, purchase intentions are influenced by the following conditions: 1) organic certification, 2) environmental sustainability or agroecological practices, 3) use of native Upala cocoa varieties, 4) processing conducted by women from the region.

Figure 6. Costa Rica: Willingness to Pay for Dried Cocoa Beans in the Cocoa Processing Industry under Different Production Conditions (source: authors' elaboration)



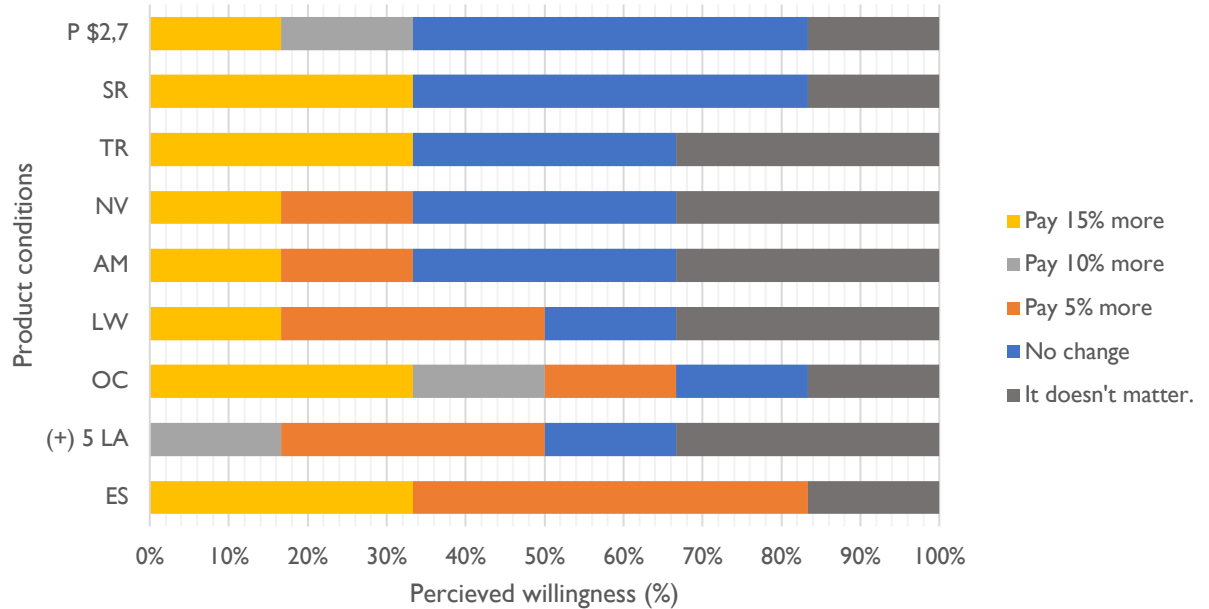
Note: TR: Traceability, P \$2,7: Price \$2,7 dry cocoa, FE: Formal employment of workers; AM: Association membership; NV: Native cocoa varieties from Upala; (+) 5 LH: Landholding more than 5 hectares; LW: women from the local area; OC: organic certification; ES: environmental sustainability or agroecology.

In the case of cocoa nibs, clear patterns are observed in the behavior of PCs about their willingness to adjust payments (Figure 7). However, the data obtained for nibs do not align with those for dried cocoa beans, even though both products are directly related. This finding suggests that the processing industry does not demonstrate uniform behavior across cocoa-derived products.

Among the main findings, Costa Rican PCs showed a willingness to pay up to 10% above the base price for RMs from suppliers that offer a minimum producer price (2.70/kg USD at the time of the study), hold organic certification, and cultivate more than 5 hectares of land. Nevertheless, 50% of participants indicated that they would not adjust their willingness to pay if the company only meets the criteria of offering a minimum price and assuming social responsibility. On the contrary, they show greater

willingness to pay up to an additional 5% when cocoa is produced according to environmental sustainability and agroecological criteria.

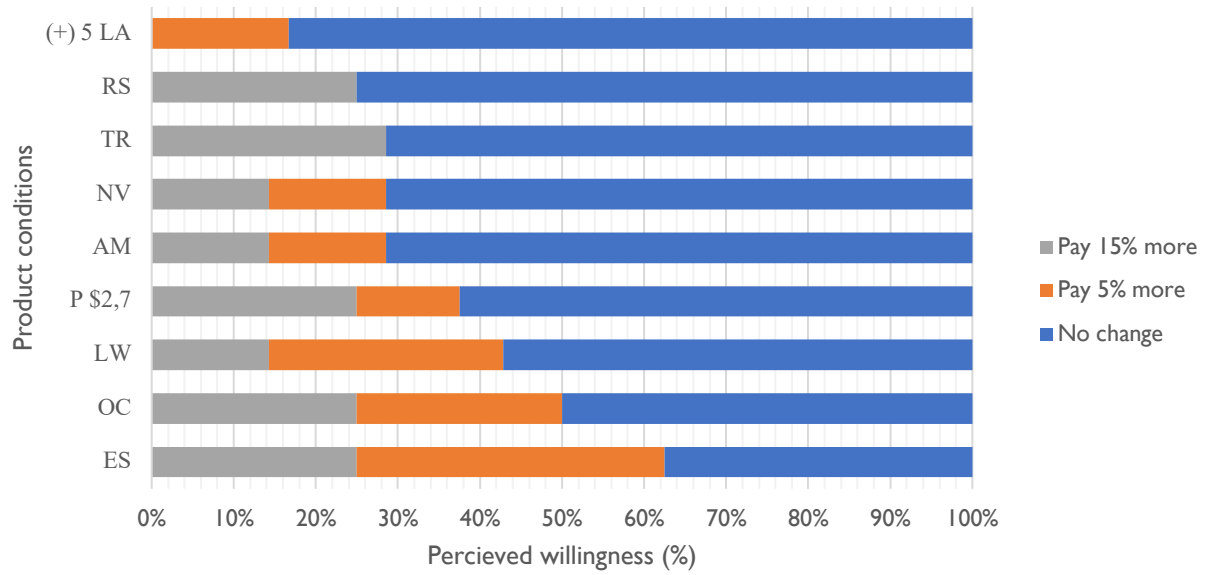
Figure 7. Costa Rica: Willingness to Pay for Cocoa Nibs in the Cocoa Processing Industry by Production Conditions (source: authors' own elaboration)



Note: "No change" refers to companies that would not modify their willingness to pay regardless of the characteristics of the cocoa nibs. "Indifferent" refers to a company that shows no concern about whether the RMs meet any of the defined characteristics.

P \$2.7: USD 2.70 price per kilogram of dry cocoa beans; SR: Social responsibility; TR: Traceability; NV: Native varieties from Upala; AM: Association membership; LW: Local women participation; OC: Organic certification, (+) 5 LA: landholding more than 5 hectares, ES: Environmental sustainability or agroecological practices.

Figure 8. Costa Rica: Willingness to Pay for Cocoa Liquor in the Cocoa Processing Industry by Production Conditions (source: authors' own elaboration)

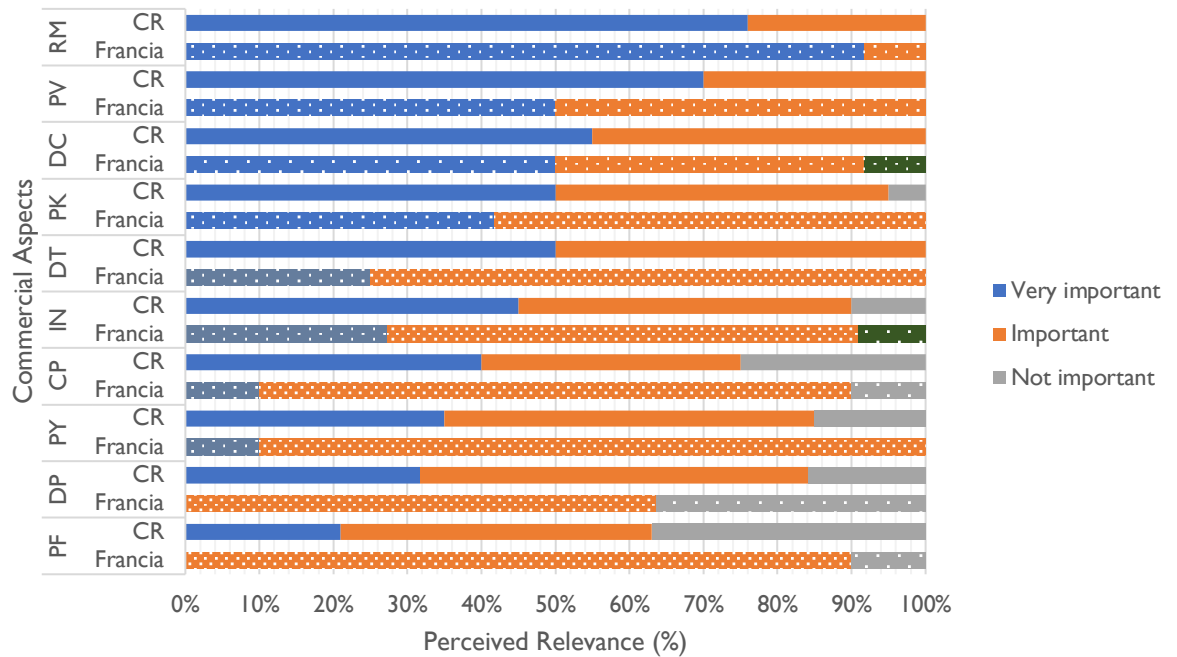


Note: (+) 5 LA: Landholding more than 5 hectares; SR: Social responsibility; TR: Traceability; NV: Native varieties from Upala; AM: Association membership; P \$2.7: Price of USD 2.7 per kg of cocoa liquor; LW: Local women participation; OC: Organic certification; ES: Environmental sustainability or agroecological practices.

In the case of cocoa liquor, more than 50% of Costa Rican processing companies indicated that they would not modify their willingness to pay based on the different characteristics evaluated (Figure 8). Nevertheless, a proportion of the respondents expressed a willingness to pay an additional 5% when the product holds organic certification, is produced under environmental sustainability, agroecological practices, processed by women or the producers belong to an association.

Those willing to pay more than 10% above the base price tend to prefer products that feature attributes such as environmental sustainability, organic certification, social responsibility, traceability, etcetera.

Figure 9. Perceived Relevance of General Commercial Aspects Considered by PCs When Purchasing Cocoa-Based RMs, by Country (source: authors' own elaboration)



Note: RM: Raw material condition; PV: Price-value ratio; DC: Delivery conditions; PK: Packaging; DT: Delivery time; IN: Insurance; CP: Credit period; PY: Payment policy; DP: Discount policy; PF: Pre-financing.

Based on the data collected, this market segment assigns greater importance to commercial variables directly associated with the product, such as raw material quality and the price-value ratio. Secondary importance is given to delivery conditions and packaging, which are considered “very important” factors in the purchasing decision-making process (Figure 9). In contrast, financial and contractual elements, such as discount policies, payment terms, and delivery times, although recognized as “important”, carry relatively less weight in the final purchasing decision.

When comparing both markets, a meeting point is observed in the prioritization of key attributes as decisive factors such as raw material quality, the price–value ratio, and delivery punctuality. In contrast, financial variables such as pre-financing and discounts are not considered determining criteria in this context, reinforcing the idea that intrinsic product attributes play a more influential role in purchasing negotiation decisions.

Regarding certifications, a clear preference is observed in the Costa Rican industry for those associated with fair trade and national organic certification. Similarly, the French also evaluates these two certifications as relevant differentiators in purchasing negotiation decisions. Nevertheless, a secondary segment shows indifference toward the presence of certifications, while a smaller proportion of companies assigns particular importance to certifications such as USDA Organic and the Essential Costa Rica License. Regarding company size, measured by the number of employees, a positive relationship was observed between companies' size and the level of demand placed on suppliers.

Specifically, 67% of companies in both markets, with personnel between 11 and 100 employees, rated the supplier's market trajectory as a 'very important' criteria when selecting cocoa-based raw materials. These results suggest that, regardless of country of origin, larger companies tend to place greater value on the supplier's proven experience.

A similar pattern was observed about certification requirements. A direct relationship was identified between company size and the level of demand for certifications, particularly those guaranteeing organic production practices and fair trade. While medium and large-size companies tend to require several certifications as purchasing conditions, micro-sized companies show less standardized criteria, reflecting a lower degree of standardization in the importance assigned to these attributes.

Although this study focused on product attributes, production characteristics, and commercial aspects to guide the Costa Rican supply toward industry preferences, it also enables an evaluation of which type of raw material (dry cocoa, nibs, or cocoa liquor) may offer higher profit margins, considering transformation costs.

Each company should conduct its own cost analysis for each product format. This study presents information on production losses or weight reduction at each stage of the transformation process⁸, as well as the average price that the processing industry reported being willing to pay per kilogram for each type of product presentation.

Table 3. Quantity and Price Changes by Cocoa Processing Level, 2023 (source: authors' own elaboration)

Product	Output (grams)	Product Loss	Price \$/kg	Midpoint price (\$/kg)	Premium Price (\$/kg)
Cocoa Mucilage	1000		-	2,70	
Dry Cocoa	330	-67 %	From 4,42 to 4,98	4,70	74 %
Nibs	264	-20 %	From 5,35 to 6,83	6,09	30 %
Liquor	264	0 %	From 7,20 to 8,30	7,75	27 %

5. CONCLUSION

The present study compared the responses of companies that use cocoa as a RM in a developing market, such as Costa Rica, with those operating in a market with a long-established trajectory, such as France. The comparison revealed only minor differences in the importance assigned to product characteristics. In particular, aroma was strongly emphasized in the French market, while in both markets companies value the use of

⁸ Based on the experience of a Costa Rican agro-industrial company in the canton of Upala, Alajuela.

specific fermentation and drying protocols, as these processes enable the differentiation of organoleptic and sensory attributes.

Altogether, the results obtained from the processing industry indicate that most companies are not willing to modify their willingness to pay for cocoa-based RMs. However, those companies willing to pay an additional 5%, 10%, or even up to 15% would do so only for products that hold organic certification and are produced under controlled sustainable production systems. PCs should view this preference as a strategic opportunity to differentiate themselves and position their products in international markets by leveraging the growing recognition of sustainability and quality standards. Cocoa production in Costa Rica, associated with favorable agroecological conditions and low use of agrochemicals, facilitates this differentiation. The added value lies in obtaining certifications that support these sustainable practices. Moreover, Costa Rican organic certification is recognized in the European market, along with other distinctions that involve relatively low administrative costs, such as the Blue Flag Ecological Program (Galardón Bandera Azul) and the Good Agricultural Practices certification (Certificación en Buenas Prácticas Agrícolas) administered by the Ministry of Agriculture. Furthermore, Cocoa-based RM processing companies need to consolidate their market offer by incorporating additional quality attributes related to sustainability and environmental conservation, market traceability, and the scale of supply required to maintain consistent availability over time. In addition to competition based on RM characteristics, competition is also associated with consistency in market participation, reflected in variables such as delivery conditions and packaging.

Other studies agree that the cocoa processing industry requires a proven market trajectory that ensures the ability to supply products consistently and with guarantees in commercial relationships. This, in turn, implies fostering more stable and closer relationships with producers to achieve conditions related to environmental conservation, minimum price guarantees for producers, social labor safeguards, associative participation and the inclusion of women.

6. Author Contributions (CRediT taxonomy)

Dayner Baltodano Zúñiga: Conceptualization; Methodology; Software; Validation; Formal analysis; Investigation; Resources; Data curation; Writing – original draft; Writing – review and editing; Visualization; Supervision; Project administration; Funding acquisition.

Vanessa Villalobos Ramos: Conceptualization; Methodology; Software; Validation; Formal analysis; Investigation; Resources; Data curation; Writing – review and editing; Supervision; Project administration; Funding acquisition.

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