

Cocoa Markets and Value Chains: Dynamics and Challenges For São Tome and Principe Organic Smallholders

¹Ibrahim Prazeres, ²Maria Raquel Lucas and ³Ana Marta-Costa

¹Center for Advanced Studies in Management and Economics (CEFAGE), Centre for Transdisciplinary Development Studies (CETRAD), Portugal gibaedy@gmail.com

²University of Évora, Center for Advanced Studies in Management and Economics, (CEFAGE), Portugal mrlucas@uevora.pt

³University of Trás-os-Montes e Alto Douro (UTAD), Centre for Transdisciplinary Development Studies (CETRAD), Portugal amarta@utad.pt

Abstract: Cocoa is one of the leading goods in the world agricultural trade markets, occupying the third position in exports. The paper introduces the cocoa value chains worldwide, its asymmetries, and the supply and value chains specific to the São Tomé and Príncipe's (STP) organic cocoa. It aims to understand this value chain's internal and external tensions and analyse its potential to be inserted into the international markets. The study uses panel data analysis using the FAOSTAT database and field observation. The tensions mentioned are due to the asymmetries observed between international markets and the production of organic cocoa in STP. STP's structure has imbalances in the value chain that persist and compromise the livelihoods of small producers, who are responsible for most of production exported and the sustainability of the ecosystem, despite governmental measures to support organic production as a valuable alternative to the country's development strategy.

Keywords: International markets, value chain, organic cocoa smallholders, São Tome and Principe (STP).

1. Introduction

Cocoa is one of the main goods in the world of agricultural trade markets, occupying the third position in exports (Blare and Useche, 2013; Díaz-Montenegro, 2019; Galarza, 2012). Cocoa production is mainly concentrated in the tropics, in Africa, which concentrates two thirds of world production and where Côte d'Ivoire is the main country with around 40% of the world production (Voora, Bermúdez and Larrea, 2019).

Since 2010, approximately 4 million tons of cocoa beans have been annually worldwide produced. The combined export value of whole or broken grades, raw or roasted, amounted, in 2017, to US \$ 8.6 billion, with an estimated that the global cocoa market grows at an annual rate of 7.3%, from 2019 to 2025, so to reach \$ 16.32 billion (Voora, Bermúdez and Larrea, 2019). The chocolate industry consumed about 43% of all cocoa in 2017, with a global retail market value of \$ 106.19 billion and forecast to be \$ 189.89 billion by 2026 (Eghbal, 2018). Cocoa is produced mainly by hand, by about 5 million households, in more than 50 countries, of which 70% are small farmers with one to three hectares. Still, they represent more than 80% of the total cocoa available in the markets (Díaz-Montenegro et al., 2018; Voora, Bermúdez and

Larrea, 2019) and guarantee the livelihood of 40 to 50 million people worldwide (Voora, Bermúdez and Larrea, 2019).

Worldwide, the cocoa value chain is characterized by asymmetric power relations with increasing control by a few dominant companies that can able to decide how and where value is created and distributed. Five companies account for 56% of the chocolate market, of which, three account for half of the total cocoa supply. As a result, there is an asymmetric distribution of value, with producers receiving only 5% of the price paid by the final consumer, while marketing and processing activities seize 25% and the processing and sales of retail chocolate capture 70% share of revenues (Abdulsamad et al. 2015; Fountain and Huetz-Adams, 2020; Squicciarini and Swinnen, 2016).

In STP, the cocoa value chain is very fractional at the producer level, where approximately 70% of organic producers develop their activity in plots of less than 2 hectares (Prazeres, 2018; Prazeres and Lucas, 2020). In 2018, the number of organic cocoa producers was approximately 3300 (Prazeres, 2018) and cocoa, which occupied about 80% of the agricultural area, represented 90% of the country's export earnings (ANEME, 2018). In addition to its contribution to GDP, through the high weight of exports in the agricultural sector, the cocoa culture guarantees the livelihood of many families by creating jobs, developing local microeconomies and giving an international image to the country (Prazeres, 2018).

This paper aims to characterize the cocoa market and value chain both globally and in STP. It is intendeds to show the main dynamics and challenges which can reduce the asymmetries between the different actors and create value, as a way of reducing poverty and improving the quality of life of small agricultural households.

In addition to this introduction, the document is structured in six sections. In the second section, the methodology used for the development of the exploratory study is presented. The main characteristics of the international cocoa market, whether conventional or organic, form the body of the third section, which also includes the international cocoa value chain. The fourth focuses on the description of the organic cocoa value chain in STP. The fifth and last sections present, respectively, the implications, for small producers, related to the characteristics of the international market and the value chain as well as the main conclusions and perspectives for the continuity of the research.

2. Research Methods

The paper combines panel data from FAOSTAT with a literature review and field observation, which provided contextual data about small-holders cocoa producers and their value chain interactions. The panel data analysis was carried out for the twenty main producing countries. It started with the identification and choice of the indicators as well as the time period in FAOSTAT and proceeded to its subsequent treatment and interpretation. The indicators collected for the last available decade (2007-2017) included: (1) Production Area (ha); (2) Yield per hectare or Productivity (Kg/ha); (3) Total Production (Ton), (4) Exports in Volume (Ton); and (5) Exports in Value (1000 US \$). These indicators were chosen to allow for the characterization of the global cocoa market and its value chain, to compare the situation in STP to the other producing countries and, to show the contribution of agricultural exports of cocoa beans produced by small farmers to the economic growth.

The field observation was conducted amongst organic small-scale cocoa producers from STP, in 2020. This qualitative research technique was used to observe organic cocoa producers in their environment, so to gain insights on their behavior, activities and the processes which had implications in the cocoa value chain, including networking with cooperatives and other stakeholders. This field research method was used in a public setting to avoid ethical dilemmas.

3. The Cocoa Market

3.1 Global Cocoa Production and Trade

The global production of cocoa beans registered an annual growth of 3% between 2007-2018, reaching a world production of 5.2 million tons in 2017 (FAO, 2021), a second global boom, since 1990, in the consumption of cocoa and chocolate (Squicciarini and Swinnen, 2016).

Between 2007 and 2012, the annual growth in production occurred mainly due to an increase in the harvested area and the favourable climatic conditions, rather than increased productivity or greater yield per acre (Fountain and Huetz-Adams, 2018). According to these authors, several factors have clearly contributed to the expansion of the cocoa cultivated area, such as climate stability in West Africa, especially after the El Niño phenomenon, the environment policy to stimulate cocoa production in Ecuador and Peru, and the increase in cocoa farms in Africa, many of which established in old protected forests.

Global cocoa production is dominated by Africa (Table 1), a continent that held, in 2017, 70.4% of the global production and, in the last decade, showed an annual growth of 3.8%. The American continent is second with 15.4% of production and an annual increase of 5.3%. Finally, Asia, which has had annual decreases of 1% in the last ten years, contributing solely with 13.2% of the global production, and Oceania has a marginal contribution (FAO, 2021).

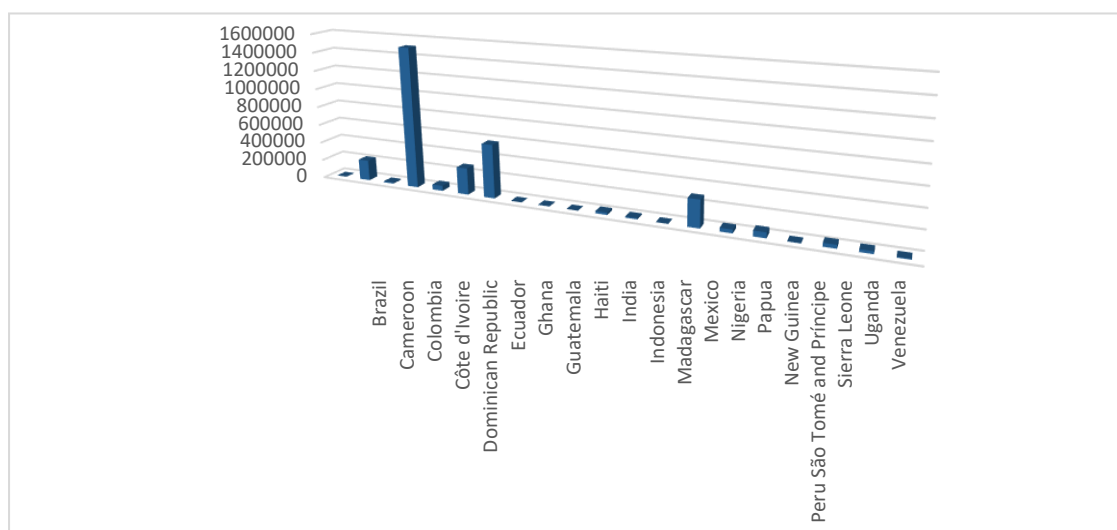
Table 1: Total of Cocoa production by country, between 2007 and 2017 (Ton)

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Brazil	201651	202030	218487	235389	248524	253211	256186	273793	278299	213843	235809
Cameroon	212619	229203	235500	264077	240000	268941	275000	269228	274559	289312	295028
Colombia	39904	44740	44740	39534	37202	41670	46739	47732	54798	56785	56808
Côte d'Ivoire	1229908	1382441	1223153	1301347	1511255	1485882	1448992	1613241	1796000	1634000	2034000
Dominican Republic	42154	45291	54994	58334	54279	72225	68021	69913	75500	81246	86599
Ecuador	85891	94300	120581	132099	224163	133323	128446	156216	180192	177551	205955
Ghana	614500	680781	710638	632037	700020	879348	835466	858720	858720	858720	883652
Guatemala	10129	10414	10591	10713	11594	11666	12569	11204	11331	11567	11803
Haiti	8500	8000	8536	9353	10334	11464	12724	14633	15281	13305	14173
India	10180	10560	11820	12900	14400	13000	13000	15000	16000	17000	19000
Indonesia	740006	803593	809583	844626	712200	740500	720900	728400	593331	656817	659776
Madagascar	6465	6465	8000	10000	6500	8000	9000	10865	11535	11327	11010
Mexico	40000	50000	60000	50114	42175	38825	33284	26969	28007	26863	27287
Nigeria	360570	367020	363510	399200	391000	383000	367000	329870	302066	298029	328263
Papua New Guinea	49300	51500	59400	39400	47600	38700	41200	44402	45235	44491	44504
Peru	31387	34003	36803	46613	56499	62492	71175	81651	92592	107922	121825
São Tomé and Príncipe	2800	2000	2500	2600	2219	2230	2617	3200	3000	2813	2778
Sierra Leone	14000	10500	10000	19700	18000	18000	14850	15727	14927	14788	14670
Uganda	10006	13000	15000	15000	18000	16000	20000	27300	26600	29100	31312
Venezuela	18911	20457	20920	20955	22856	31993	29740	22854	24156	23254	23349

Source: Own elaboration with FAO data (2021)

Côte d'Ivoire remains, during all the considered years, as the main producer, accounting for about 40% of the total production which consequently makes it the leading cocoa exporter (FAO, 2021). Ghana comes in second, only surpassed by Indonesia in 2010 in value of exports, and in 2009 and 2010, in volume of exports (Figure 1). STP represents a small proportion both of the total cocoa production, which has fluctuated over the years. Indeed in 2017 it was at the same level as in 2007 (approximately 2800 tons), but showing positive evolution of exports, both in terms of volume and value.

Figure 1: Cocoa exports by country in volume, in 2017 (Ton)



Source: Own elaboration with FAO data (2021)

In 2017, Côte d'Ivoire dominated in other output-related indicators, with the exception of productivity per hectare, where Madagascar held the first position, though it has a modest position concerning exports (Table 2). Although STP has the lowest productivity per hectare of all the analyzed countries, it has a superior position as an exporter. We found a curious piece of evidence related to the ratio between total cocoa production and exports in volume, in 2017, as some countries' export volume exceeded total production. This is the case of Ecuador, where volume exports represent 138.2% of total production, Madagascar (114%), Sierra Leone (253.9%) and STP (126%), which shows incongruities with the available data.

Table 2: Cocoa production and exports indicators by country, in year 2017

Ranking	Area harvested in 2017 (ha)		Productivity in 2017 by há		Total Production in 2017		Exports in Value in 2017 (1000 US\$)		Exports in Volume in 2017 (Ton)	
	Country	ha	Country	Kg/ha	Country	Ton	Country	Exports (1000 US\$)	Country	Exports(Ton)
1 ^o	Côte d'Ivoire	4147459	Madagascar	8629	Côte d'Ivoire	2034000	Côte d'Ivoire	3505214	Côte d'Ivoire	1510082
2 ^o	Indonesia	1730002	Dominican Republic	5737	Ghana	883652	Ghana	1642052	Ghana	573334
3 ^o	Ghana	1690237	Ghana	5228	Indonésia	659776	Nigeria	598189	Nigeria	287632
4 ^o	Nigeria	1191812	Côte d'Ivoire	4904	Nigeria	328263	Ecuador	589750	Ecuador	284546
5 ^o	Cameroon	729049	Haiti	4858	Cameroon	295028	Cameroon	402956	Cameroon	221667
6 ^o	Brazil	590813	Mexico	4649	Brazil	235809	Peru	148705	Peru	58238
7 ^o	Ecuador	467327	Ecuador	4407	Ecuador	205955	Dominican Republic	135972	Dominican Republic	54891
8 ^o	Dominican Republic	150943	Uganda	4156	Peru	121825	Papua New Guinea	73487	Papua New Guinea	37744
9 ^o	Colombia	146011	Cameroon	4047	Dominican Republic	86599	Sierra Leone	70248	Sierra Leone	37240
10 ^o	Peru	145169	Papua New Guinea	4038	Colombia	56808	Uganda	54208	Uganda	27528
11 ^o	Papua New Guinea	110225	Brazil	3991	Papua New Guinea	44504	Indonesia	53537	Indonesia	23594
12 ^o	India	83000	Colombia	3891	Uganda	31312	Colombia	27326	Madagascar	12555
13 ^o	Uganda	75338	Indonesia	3814	Mexico	27287	Madagascar	22785	Colombia	11876
14 ^o	Venezuela	62119	Venezuela	3759	Venezuela	23349	Venezuela	22290	Venezuela	8268
15 ^o	Mexico	58690	Sierra Leone	3618	India	19000	São Tomé and Príncipe	8371	São Tomé and Príncipe	3501
16 ^o	Sierra Leone	40549	Nigeria	2754	Sierra Leone	14670	Haiti	5473	Haiti	2512
17 ^o	Haiti	29173	Guatemala	2711	Haiti	14173	Brazil	2936	Mexico	1032
18 ^o	São Tomé and Príncipe	26020	India	2289	Guatemala	11803	Mexico	2811	Brazil	754
19 ^o	Madagascar	12759	Peru	1067	Madagascar	11010	Guatemala	1901	Guatemala	149
20 ^o	Guatemala	4354	São Tomé and Príncipe	1067	São Tomé and Príncipe	2778	India	362	India	94

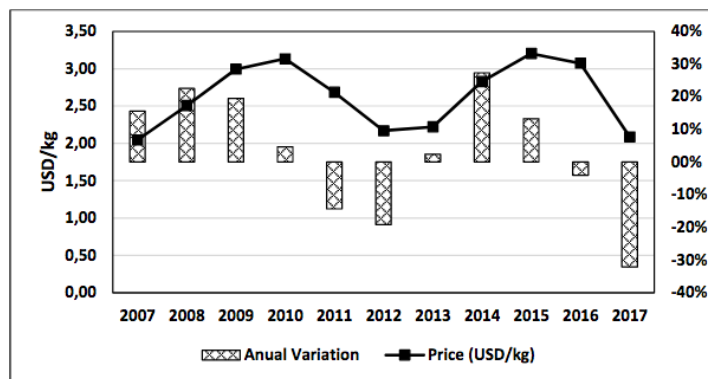
Source: Own elaboration with FAO data (2021)

World cocoa imports and its processed products reached US \$ 9.34 billion in 2017, with the Netherlands (25%), United States (13%), Germany (8.4%) and Belgium-Luxembourg (8.4%) being the main importers. The products in greatest demand were chocolate and other foods containing cocoa (57% of imports), raw or partially roasted cocoa beans (20% and cocoa powder without added sugar or other sweetener (8%) (OECD, 2020).

As an agricultural commodity, the price of cocoa beans is volatile (Díaz-Montenegro, 2019; Utepi, 2007). Factors such as climatic events and changes, pests and diseases, fluctuations in production cycles, especially in large producing countries, variations in cocoa processors' inventories or changes in consumer markets, influence the price. Excess supply causes prices to fall and, at the same time, encourages farmers to harvest intensively and to replace cocoa with other crops, further increasing the saturation of the cocoa bean market and causing an even steeper drop in prices (Fountain and Huetz-Adams, 2018). As a result, there is a future shortage of grains, leading to price increases.

Since supply in this market reacts slowly to price changes or demand pressures, when demand exceeds supply and prices increase, farmers have incentives to plant new trees. However, due to the length of the biological cycle, these take several years to reach their maximum productive performance, so farmers receive little benefit from the price increase (Díaz-Montenegro, 2019). The 2010 international price in real terms for cocoa as a commodity, shows price instability in the period considered (2007-2017). There was an increase until 2010 and between 2013 and 2016, but a decline between 2011 and 2012 and from 2016 onward, representing a drop of approximately one third in 2017 (Figure 2). The price drops observed seem to be linked to the excess supply of cocoa and to the stagnation of demand in emerging economies (Brazil and Russia), due to the economic crisis and the decline in the consumption of chocolate in the USA, China and India (Díaz-Montenegro, 2019; Fountain and Huetz-Adams, 2018; ICCO, 2016; World Bank, 2019).

Figure 2: Evolution of real cocoa price, between 2007 and 2019 (2010 values)



Source: Díaz-Montenegro (2019); World Bank (2019)

The demand for chocolate is flexible to price variations, though there are consumer segments focused on quality and brand (Squicciarini and Swinnen, 2016). Although the world consumption of cocoa has been decreasing in the last decade, chocolate consumers, especially in developed countries, are seen as fundamental to prompt changes in attitudes towards sustainability. This situation is due to the growing interest in sustainable and organic products, the requirement for certification and authenticity and the guarantee that it is not harmful to the environment, and does not exploit the workforce, which ensures fair trade (García-Herrero, De Menna and Vittuari, 2019). If the fall in international cocoa prices persists, especially in the current state of the world pandemic, it can encourage a drop in the price of finished cocoa and chocolate products, which could stimulate consumption. For ICCO (2016), there is always a time lag between the reduction in the price of cocoa beans and its effects on the price to the consumer (ICCO, 2016).

Sensory quality combined with labelling and information on the origin, method of production and processing of cocoa, are important elements to the acceptance, appreciation and preference by the consumer (Silva et al., 2017). Tools that help make cocoa traceable and assess the

geographical origin of the beans used in the production of chocolate are also seen as essential (Acierno et al., 2017).

3.2 The Organic Cocoa Market

Though the organic cocoa market represents only 0.5% of production, being a very small share of the total world cocoa market, the demand for this product has been increasing, and in some situation, the supply cannot meet the demand of the market. For this reason, and despite the social, environmental and economic problems faced by producers and producing countries, and the distance between producers and consumers who are able to value the product and its way of production, farmers have been sacrificing their few resources to produce organic cocoa, mainly in the least developed countries (García-Herrero, De Menna and Vittuari, 2019).

The main producer of organic cocoa in 2018 was the Dominican Republic, with a market share of around 70%. Peru, Mexico and Ecuador hold about 20%, and the remaining 10% was distributed between Ghana, Uganda, Bolivia and Brazil (ICCO, 2018). The estimate from this source gives to the African continent the capacity to produce around 9% of the organic cocoa market by 2022. However, the document mentions the need to that end of planning, organization and certification of the production so that cocoa does not have to be marketed as conventional due to difficulties in accessing the market.

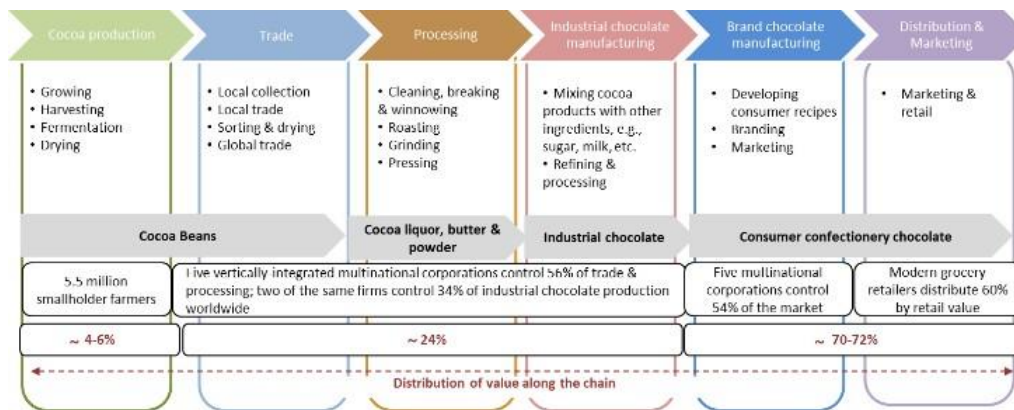
The organic cocoa market generally encompasses products such as cocoa powder, paste, butter and grains, which are used in confectionery, bakery, functional foods, healthy drinks, homemade food, pharmaceuticals, ointments and personal hygiene, among other possibilities. In the food industry, the main ingredient made from cocoa and the driver of organic cocoa production is chocolate. Its demand by consumers results from the growing awareness of health and, consequently, the demand for premium organic chocolate, organic ingredients in functional foods, beverages and personal hygiene products. However, there is a lack of information and market links that allow for small organic cocoa producers to supply high-demand regions such as North America, Western Europe, Japan and Asia-Pacific (except Japan), where there is an emerging cocoa market potential. Some emerging markets, including those in growing African countries, have also been linked to the demand for organic cocoa (EAL, 2020).

It is expected that there will be significant increases in the demand for chocolate in emerging markets while in traditional markets, with developed economies, the trend will go towards the preference for healthier and first quality chocolate products, expanding the range of prices offered for these products (ICCO, 2017). Although the price of organic cocoa is also determined by the balance between world supply and demand, paying attention to the quality and flavour, its price is always higher than that of the conventional cocoa (Prazeres, 2018).

3.3 The Global Cocoa-Chocolate Value Chain

The global cocoa-chocolate value chain is exposed in Figure 3 and based on references by Abdulsamad et al. (2015) and Díaz-Montenegro (2019). Its analysis shows a large spatial distance between production and consumers, as production occurs in a fragmented way, in 5.5 million small rural properties of 1 to 3 hectares, in Africa, Latin America and Asia. On the other hand, it revealed a governance system where a few companies control the segments of consumption and the stages of cocoa processing and chocolate manufacture, where the value is created.

Figure 3: The Cocoa-Chocolate Value Chain



Source: Adapted by Abdulsamad et al. (2015); Díaz-Montenegro (2019)

Some of the large companies involved in the global cocoa-chocolate value chain develop their activities in both markets, producers and consumers. Simultaneously they are operating in consumer markets, controlling high-value functions arising from the industrial manufacture of chocolate to the branding, and in intermediate markets, dominating the global supply chain for cocoa raw materials to consuming countries (Abdulsamad et al., 2015). According to these authors, the five leading companies in the consumer markets (Mondelez International 15%; Mars Inc. 14%; Nestlé 12%; Ferrero 8%; and Hershey Co. 7%) own well-known brands. They control high-value functions related to the manufacture of chocolate and the development and marketing of brands which have great purchasing and negotiating power (Abdulsamad et al., 2015). Three of these leading companies dominate the global supply chains, being vertically integrated, they operate from the rural areas of the producing countries to the main ports in Europe and North America, where the advanced processing facilities are located. Barry Callebaut (23%), Cargill (15.3%) and ADM (12.7%) are examples of these vertically integrated supply chains that control approximately half of processed cocoa worldwide (Abdulsamad et al., 2015).

Upstream of the cocoa-chocolate value chain are the approximately five million small-scale farmers, ranging from one to three hectares of land (ICCO, 2016), which account for 90% of the global cocoa harvest (Purcell, Martinez-Esquerria and Fernandez, 2018). They are a link in the value chain with less negotiating weight, more fragmented and geographically atomized and financial unable to face the risks resulting from price volatility (Fountain and Huetz-Adams, 2018). Additionally, they are the most dependent on local commerce and their respective dealers, commission agents or purchasing agents from the international chocolate industries, who exert downward pricing (Abdulsamad et al., 2015). Moreover, the processing (grinding) of cocoa beans is commonly carried out in importing countries (especially in Holland, Germany and the United States), which owns approximately one third of the world mills, and add the value corresponding to this operation (ICCO, 2016).

The asymmetry in the power relations of the cocoa-chocolate value chain explains the foundation and transmission of prices along the chain. In general, retail prices increase when the price of cocoa beans goes up, but they react more slowly when prices for cocoa beans go down. Thus, the fall in the prices of cocoa beans has different consequences for the different links in the chain. It will immediately and negatively affect farmers' incomes, but the rest of the players in the value chain can increase their profit margins, albeit temporarily (Fountain and Huetz-Adams, 2018). Table 3 shows the differences in the distribution of value along the chain between the production activities carried out by the cocoa-producing countries (6.6%), transportation and marketing (6.3%), processing (7.6%), manufacturing (35.2%) and retail sales (44.2%).

Table 3: Distribution of value in cocoa-chocolate Chain

Distribution of Value	Sales (\$)	Purchases (\$)	Value Added (\$)	Profit (\$)	Final Sale Price (%)
Farmers' Income (Weighted)	1,874	664	1,210	1,210	6,6
Ground transportation	1,971	1,874	97	Not available	0,5
Taxes Marketing Board	2,745	1,971	774	Not available	4,2
International Shipping	2,793	2,745	48	Not available	0,3
Cost per Arrival Fee	2,993	2,793	201	Not available	1,1
International Merchants Traders	3,038	2,993	45	15	0,2
Processors and Crushers	4,434	3,038	1,395	211	7,6
Manufacturer (per ton of cocoa sold)	10,858	4,434	6,425	870	35,2
Retail and Taxes	18,917	10,858	8,058	473	44,2

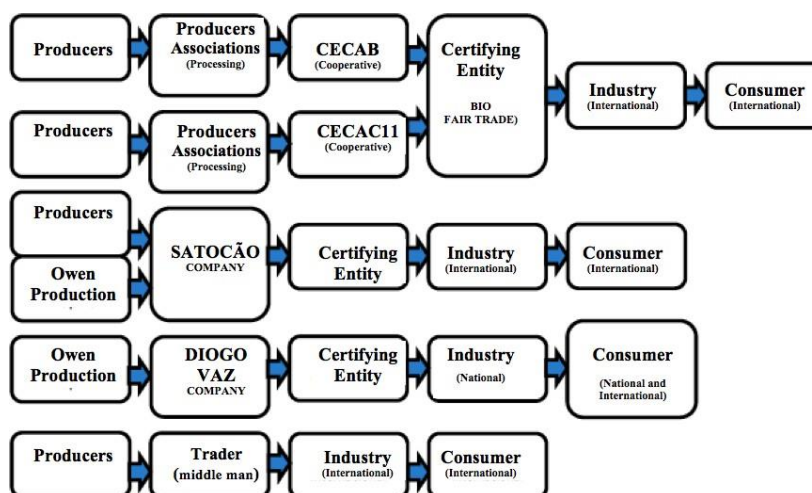
Source: Fountain and Huetz-Adams (2018); Díaz-Montenegro (2019).

When compared to the conventional cocoa value chain, that of organic cocoa is not very different, although, in some cases, it may be relatively shorter and more transparent, solely encompassing producers, their associations or cooperatives and international customers. There are also some cocoa farmers who individually produce and process cocoa and sell it to traders and intermediaries of the large international companies that operate locally, thus receiving a premium price in relation to the market (Prazeres, 2018). However, because cocoa farmer's access to this market is difficult, it is common for them to associate with cooperatives or associations of producers and, through these organizations, carry out the marketing of cocoa, with the required volume and quality (Prazeres, 2018). On the other hand, producer organizations are held hostage by a major international negotiator and have few possibilities to set prices (Prazeres, 2018; Lwesya, 2018).

4. The Organic Cocoa Value Chain in STP

The organic cocoa value chain in STP involves five main links - cocoa production, supply and marketing, powder and butter processing, manufacturing and distribution of industrial chocolate and retailing to final consumers (Figure 4). The main stakeholders include cocoa producers, two cooperatives (CECAB and CECAC11), certification companies, cocoa traders, processors (associations or companies Satocão and Diogo Vaz, with their own production), chocolate manufacturers (national or international industry) and retailers. Despite its large size, the international cocoa market is very concentrated, with few players representing a significant proportion of the market (Prazeres, 2018).

Figure 4: Organic cocoa value chain in STP



Source: Prazeres (2018)

The production link is very atomized, involving approximately four thousand farmers distributed by two cooperatives, CECAB, which brings together the largest proportion of producers, and CECAC 11, with about half of CECAB's cooperatives (Table 4). The average area per capita is 2.1 hectares at CECAB and 1.6 hectares at CECAC11. Both cooperatives are financially supported by the Fund for the Development of Agriculture (IFAD) and the Project for Small Commercial Agriculture (PAPAC) and other several non-governmental organizations, such as Action for Agricultural Development and Environmental Protection (ADAPPA), the ADIL Zatona, the National Federation of Small Farmers (FENAPA) and the Center for Agronomic and Technological Research (CIAT). Each one of the cooperatives brings together several associations, organized by geographical areas, which receive the cocoa seed from their farmers (Prazeres, 2018). According to this author, farmers' training and motivation strategies, so to guarantee production with the levels and quality required by the market, is carried out by the cooperatives, which provide training to the member-technicians. These, later called "socio-technicians" provide training and technical support to their producers, being paid for this task and replacing the role of the state-owned extension services.

Table 4: Organic producers by cooperative in STP, in 2015

Cooperative	Producers (N°)	Total Area (ha)	Production (Kg)	Average per-capita Area (ha)	Productivity (Kg/ha)	Cocoa Price (Dbs/Kg dry)	Price FOB (€/Ton)
CECAB	2139	4560	965774	2,1	212	46550	2540
CECAC11	1135	1800	302000	1,6	168	5000	2816

Source: Prazeres (2018)

In addition to strictly agricultural work, cooperatives carry out other actions, such as socio-recreational activities in the communities. They invite specialists who contribute to raising awareness among farmers on various topics (domestic violence, gender equality, alcohol consumption, and sexually transmitted diseases) and cooperatives which finance small social works in the communities and provide support to the neediest (medicines, glasses, coffins). Overall, the two cooperatives hold 90% of the country's organic cocoa producers and, in 2015, totaled approximately 1300 tons of production. The fact that the vast majority of producers are formally integrated into a cooperative, could mean a greater capacity to negotiate with intermediaries and suppliers of goods and services and to sell cocoa directly, benefiting from its sale in value markets. However, this is not the case and cocoa farmers, especially the smallest ones, face several problems, among which, aging plantations, low renewal rate, lack of improved varieties and technical assistance. This situation highlights the need to rethink the organic cocoa value chain through an integration model that encourages the formation of horizontal and vertical links, which link producers, cooperatives and other actors in the chain and guarantee the origin of cocoa through a legal figure such as the Protected Geographical Indication (Prazeres and Lucas, 2020).

Of the 10% individual producers who are not members of the cooperatives, the smaller ones deliver the cocoa beans to a buyer or dealer or intermediary who may be an employee or representative of a large company or an export agent.

Sotocão and Kennyson in Roça Diogo Vaz are concurrently larger private producers, chocolate manufacturers and also distributors. The first has a partnership with a chocolate manufacturer in Switzerland and the second has a chocolate factory, a local store and two stores in Portugal and in France.

Organic cocoa is restricted to the island of São Tomé. The cocoa product from the island of Príncipe is not certified as organic, except for incipient quantities produced in the Roças Paciência and Sundy, certified by the Portuguese company Agricert. Roça Fundão buys about

half of the 75 tonnes of total cocoa production (not certified) from small producers, the remainder being bought by chocolate producer Cláudio Corallo, who also gives his name to the chocolate brand that produces chocolate in the city of São Thomas.

The value chain consists of approximately 20 intermediaries or dealers (buyers and local agents or wholesalers) who serve as the main links between individual private producers and cooperatives, processing centres, brokers and exporters. These fulfil various functions such as granting credit to small cocoa farmers, providing basic products (rice, corn, sugar) or paying in cash. Intermediaries often operate on the credit of large exporters and, if so, can lend money to cooperatives, with which they reach pre-harvest agreements. They work with volume targets, demanding strict compliance and, in many cases, there are reports of irregular commercial practices, such as errors in weighing the transacted volume and incongruences in the appropriate payment.

All stakeholders in the value chain, from export traders (intermediaries) to those in charge of public organizations, cooperatives, development organizations, farmers and specialists, realize the importance of the quality of cocoa beans and the certification of its process as organic, for its price and final value. From a public institution point of view, the organic cocoa has high relevance for environmental, economic and social sustainability. Additionally, as highlighted by the cooperatives' representatives, São Tomé ecosystem has great specificity for the production of high quality organic fine cocoa.

The certification is carried out by a qualified and independent entity. The certification process includes random plantation visits to check density, age, health status, location, status of maintenance of the lot and cultural operations in order to make a production estimation possible.

5. Challenges for Small Cocoa Producers

In a global context of resource scarcity, the relative inability of cocoa production to satisfy the growing demand and the attention given to its sustainability, makes it necessary to find the balance between production and profitability, whilst respecting the environment and benefitting small-scale cocoa farmers and society (García-Herrero et al., 2019). Additionally, price volatility, dependency on a few buyers, weakness of farmers' organizations, little bargaining power, and the potential environmental problems such as loss of soil fertility and biodiversity, emphasize the need for a sustainable cocoa chain development (Mithöfer et al., 2017). However, the gaps between sustainable standards and practices and the cocoa value chain governance (Moreno-Miranda et al., 2019) as well as the distance between the geographically highly atomized producers and the chocolate markets consumption (Prazeres, 2018) difficult this enrollment.

Development policies and programs in many countries have focused on expanding cocoa production and increasing productivity, regardless of the needs of small farmers for economically viable agricultural systems and market structures. Such results in little bargaining power and low levels of producer income and well-being (Mithöfer et al., 2017). In addition to increasing production and productivity, improving the livelihood strategies of small cocoa producers may involve other alternative methods, such as agro-cultural practices in land use and other resources, modes of production (for example, biological) and changes in the fermentation, transformation and commercialization processes (Salazara et al., 2018).

Innovations and increased investments on the sustainability in the cocoa chain, which are not just incremental changes, but help sustain transformation, industry and improve the rights, representation and quality of life of small producers, are essential (Nelson and Phillips, 2018). Among these innovations, public-private partnerships stand out when they create governance rules that improve yields and services provided to producers, optimize productivity and, at the same time, limit environmental impacts (Ingram et al., 2018). The increase in the income of cocoa farmers and the reduction of poverty in rural areas is also achieved through certification

(Lwesya, 2018), through the creation of Protected Designations of Origin and Protected Geographical Indication (Moreno-Miranda et al., 2019; Prazeres, 2018; Prazeres and Lucas, 2020) and through beans quality standards' improvement (Effendy et al., 2019).

The governance of the global cocoa value chain, especially in the further downstream links, concentrated in a few agents, has created asymmetric power relations which block the distribution and transmission of upstream value for small producers. The share of the amount retained by the cocoa-producing countries was reduced by over 50% in the period between 1970 and 1990. Producers in these countries (mainly those with a small farming sizes) had to bear, simultaneously, with the fall in market prices, higher costs and greater risks, climate change's effects on production, a market driven by the dynamics of global markets price volatility and, institutional, due to its inefficient or inadequate functioning. The worsening social and economic conditions in producing countries as a result of these power imbalances have triggered a proliferation of private governance responses, such as industry behavioral codes, certification standards and schemes or multistakeholder initiatives and, more recently, governance mechanisms public and regulatory (Abdulsamad et al., 2015).

Different standards and certification schemes, with market-based approaches and the development of cocoa brands, can be included in the private governance processes that lead to the expansion of supply. However, there has also been a drop in demand resulting from economic crises and other diverse contexts, such as the reduction in sugar and fat consumption or the appetite for chocolate (Abdulsamad et al., 2015; Fountain and Huetz-Adams, 2018; ICCO, 2016; World Bank, 2019). Even in these cases, there is an asymmetrical distribution of value along the chain, with the portion of the price paid by the consumer not reverting to certified cocoa producers (such as organic ones) very different from that considered for conventional cocoa farmers (Abdulsamad et al., 2015).

Public governance mechanisms are advantageous on the sense that they seek a balance between the growth of the cocoa sector and the improvement of farmers' livelihoods (Abdulsamad et al., 2015). In the specific case of STP, the option taken by the state was to convert all cocoa plantations into organic cocoa. Currently, it can be said that all cocoa is produced in an organic way, promoting government support to producers and their cooperatives. Most producers who sell their product to cooperatives receive a different price when compared to the price of conventional cocoa, and the certification costs are borne by the cooperatives.

The main problem for organic cocoa producers is scale and pressure to use land with alternative crops or activities, which are more profitable. There is a tension between the allocation of land for cocoa production and for other productive activities and there is also real estate pressure. Farmer's decisions to plant cocoa or another crop is influenced by external factors, such as market prices and by internal factors such as physical, human or natural capital, which farmers rely on. The way in which these factors affect the decisions of small cocoa producers in STP has not yet been studied, requiring a thorough investigation in order to assess the impact and provide adequate solutions.

In spite of the state support of organic production, through cooperatives and respective associations, other investments come from the private sector (such as Satocão and Diogo Vaz). These are focused on improving the fermentation process, finding the best production practices, and commercial scale. Whether through private or public governance, associating small producers with specialized value chains is an opportunity to alleviate poverty and improve their quality of life.

6. Final Remarks

There are several tensions between the different links in the cocoa value chain. Concerning the international market, these tensions derive from the existing asymmetries between production and the consumer market. Production is fragmented in about 5 million producers, the vast majority with less than 2 hectares of land, whereas the consumer market is controlled by five large multinational companies and solely a small portion of value passed on to producers. At STP level and, despite measures to support organic production as a valuable alternative to the country's development strategy, there are persisting imbalances in the value chain that compromise the livelihoods of small producers, who are responsible for most of the production exported and the sustainability of the ecosystem. Low productivity and the effects of climate change, combined with the drop in world prices and / or the lack of premium prices in the domestic market, are the main factors responsible for this situation. Even for the many producers who sell organic cocoa through cooperatives and are able to receive payments at higher prices, it is not entirely clear whether this strategy allows them to significantly improve their livelihoods, a situation which needs to be researched. Cooperatives and private companies have focused on technical solutions linked to improving agricultural practices, quality and market prices, with little information on price transmission and governance in the value chain, where the lack of bargaining power contrasts with the concentration of power in other links in the chain. Addressing these issues from a thorough perspective would require taking into account producers' livelihood conditions (e.g. local infrastructure, including schools, health, access to markets) so to understand how cocoa production can contribute to their improvement.

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