Cocoa Markets and Value Chains: Implications For Sao Tome and Principe Organic Smallholders

Ibrahim Prazeres, Maria Raquel Lucas and Ana Marta-Costa
1Center for Advanced Studies in Management and Economics (CEFAGE), Centre for Transdisciplinary Development Studies (CETRAD), Portugal gibaedy@gmail.com
2University of Evora and Center for Advanced Studies in Management and Economics, (CEFAGE), Portugal mrlucas@uevora.pt
3University of Tras-os-Montes e Alto Douro (UTAD), Centre for Transdisciplinary Development Studies (CETRAD), Portugal amarta@utad.pt

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

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

1. Introduction

Cocoa is one of the main goods in the world agricultural trade markets, occupying the third position in exports (Blare and Useche, 2013; Díaz-Montenegro, 2019; Galarza, 2012). It 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 et al., 2019). Approximately 4 million tons of cocoa beans have been annually worldwide produced since 2010. The combined export value, of whole or broken grades, raw or roasted, amounted in 2017 to US $ 8.6 billion, with an estimated the global cocoa market grows at an annual rate of 7.3%, from 2019 to 2025, to reach $ 16.32 billion (Voora et al., 2019). The chocolate industry consumed about 43% of all cocoa in 2017, with a global retail market value of $ 106.19 billion in 2017 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 and three hectares. Even so, they represent more than 80% of the total cocoa available in the markets (Díaz-Montenegro et al., 2018; Voora et al., 2019) and guarantee the livelihood of 40 to 50 million people worldwide (Voora et al., 2019).

Worldwide, the cocoa value chain is characterized by asymmetric power relations with increasing
control by some dominant companies that have the ability 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 capture 25% and the processing and sales of retail chocolate capture a 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 globally and in STP. It is intended to show the main dynamics and challenges that 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, the used methodology in 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 and the main conclusions and perspectives for the continuity of the research.

2. Research Methods

The paper combined panel data from FAOSTAT (FAO, 2021) with literature review and field observation in order to look and characterize the cocoa market and value chain, globally and in STP, to know policies and practices development around the world and, to engender new ideas and directions for STP organic sector sustainability. The panel data analysis was carried out for the 20 main producing countries. It started with the identification and choice of the indicators and time period in FAOSTAT and 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 allowed characterize 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 economic growth.

3. The Cocoa Market

The global production of cocoa beans registered an annual growth of 3% in the period of 2007-2018, reaching a world production of 5.2 million tons in 2017 (FAO, 2021), with a second global boom in the consumption of cocoa and chocolate occurring since 1990 (Squicciarini and Swinnen, 2016). Between 2007 and 2012, the annual growth in production occurred mainly due to the increase in the harvested area and not in productivity or yield per hectare. Favorable climatic conditions and an increase in the production area seem to be related to the verified expansion (Fountain and Huetz-Adams, 2018). According to these authors, climate stability in West Africa, especially after the El Niño phenomenon, policy environment to stimulate cocoa production in Ecuador and Peru, and the increase in cocoa farms in Africa, many of which established in old protected forests and with significant cocoa yields, have clearly contributed
to expanding the cultivated area. Global cocoa production is dominated by Africa, a continent that held, in 2017, 70.4% of global production and, in the last decade, showed an annual growth of the order of 3.8%. The American continent is as follows, 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, contributes only with 13.2% of the global production, and Oceania has a marginal contribution (FAO, 2021). This situation can be visualized in Table 1. Cote d’Ivoire remains during all the years considered, as the main producer, accounting for about 40% of the total production and, consequently, it is the main exporter (FAO, 2021).

**Table 1: Cocoa Total Production by Country (Ton)**

| Country               | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|
| Brazil                | 201451 | 202090 | 218487 | 233389 | 248524 | 253211 | 256186 | 273793 | 278299 | 281843 | 235809 |
| Cameroon              | 212639 | 229103 | 235100 | 264077 | 240000 | 268494 | 275000 | 269228 | 274559 | 289312 | 295028 |
| Colombia              | 39904  | 44740  | 44740  | 39534  | 37202  | 42670  | 46793  | 47792  | 54798  | 50785  | 56808  |
| Côte d’Ivoire         | 1229908 | 1282441 | 1223153 | 1301347 | 1311235 | 1485882 | 1448992 | 1461241 | 1796000 | 1634000 | 2034000 |
| Democratic Republic   | 41584  | 46021  | 54094  | 58334  | 54279  | 72225  | 68021  | 69113  | 75500  | 81246  | 86599  |
| Ecuador               | 85891  | 94300  | 120581 | 132099 | 224163 | 133313 | 128446 | 152261 | 180192 | 175551 | 205955 |
| Ghana                 | 614500 | 680781 | 710638 | 630357 | 700020 | 879348 | 835466 | 858790 | 858790 | 858790 | 858790 |
| Guatemala             | 30129  | 30614  | 30591  | 10713  | 11594  | 13666  | 12569  | 13204  | 13331  | 15281  | 13305  | 11203  |
| Haiti                 | 8560   | 8000   | 8536   | 9393   | 10334  | 13666  | 12724  | 14633  | 15281  | 13305  | 14779  |
| India                 | 30180  | 30560  | 11820  | 12900  | 14400  | 13000  | 13000  | 15900  | 16000  | 17000  | 19000  |
| Indonesia             | 740006 | 833593 | 829583 | 846426 | 712200 | 740590 | 721900 | 782400 | 793331 | 656817 | 695276 |
| Madagascar            | 6445   | 6445   | 8000   | 10000  | 6500   | 8000   | 9000   | 10865  | 11535  | 13137  | 11010  |
| Mexico                | 400000 | 500000 | 60000  | 50114  | 42175  | 38825  | 31294  | 26969  | 28037  | 26863  | 27287  |
| Nigeria               | 360376 | 367106 | 365130 | 359200 | 351000 | 393990 | 362900 | 399800 | 420980 | 422230 | 392683 |
| Papua New Guinea      | 49300  | 51500  | 59400  | 39400  | 47690  | 38700  | 41200  | 44402  | 45215  | 44491  | 44504  |
| Peru                  | 31367  | 34003  | 36803  | 46613  | 56499  | 62492  | 71715  | 81051  | 92902  | 107922 | 121825 |
| São Tomé and Principe  | 2800   | 2000   | 2500   | 2600   | 2219   | 2236   | 2167   | 2400   | 3000   | 2813   | 2778   |
| Sierra Leone          | 34000  | 26000  | 20000  | 14700  | 18000  | 18000  | 14859  | 13727  | 14427  | 14788  | 14670  |
| Uganda                | 25006  | 13000  | 15000  | 15000  | 15000  | 16000  | 20000  | 27309  | 26690  | 29290  | 31312  |
| Venezuela             | 18911  | 20457  | 20920  | 20955  | 22816  | 32993  | 29740  | 22854  | 24156  | 23234  | 23349  |

**Source:** Own elaboration with FAO data

In second place as an exporting country is Ghana, which was surpassed by Indonesia only in 2010 in terms of value exports and in the years 2009 and 2010 in terms of volume exports (Figure 1). STP represents a small proportion both in the total cocoa production, which has fluctuated over the years, remaining in 2017 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)**

![Cocoa Exports by Country in Volume in 2017 (Ton)](image)

**Source:** Own elaboration with FAO data
In 2017, Cote d'Ivoire dominates in all indicators, with the exception of productivity per hectare, where Madagascar holds the first position, but one modest position with regard to exports (Table 2).

In the case of STP, although it has the lowest productivity per hectare of all the countries analyzed, its position as an exporter is superior. A curious piece of evidence is related to the ratio between total cocoa production and exports in volume, for the year 2017, because there are some countries where export volume exceeds 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 that there is some error or incongruity with the basic data provided by the different countries.

Table 2: Indicators by Country in Year 2017

| Ranking | Area harvested in 2017 (ha) | Productivity in 2017 (t/ha) | Total Production in 2017 (ton) | Exports in Value in 2017 (1000 US$) | Exports in Volume in 2017 (ton) |
|---------|-----------------------------|-----------------------------|-----------------------------|-----------------------------------|-------------------------------|
| 1st     | Côte d'Ivoire               | 6369                        | 2084000                     | Côte d'Ivoire                     | 3892400                      |
| 2nd     | Indonesia                  | 5737                        | 5737                        | Ghana                             | 403052                       |
| 3rd     | Ghana                      | 5028                        | 251050                      | Nigeria                           | 105189                       |
| 4th     | Nigeria                    | 4894                        | 268563                      | Ecuador                           | 158750                       |
| 5th     | Cameroon                   | 4016                        | 295430                      | Cameroon                          | 402056                       |
| 6th     | Brazil                     | 4246                        | 215800                      | Peru                              | 419791                       |
| 7th     | Ecuador                    | 4407                        | 269953                      | Dominican Republic                | 130572                       |
| 8th     | Côte d'Ivoire               | 4647                        | 251050                      | Ecuador                           | 403052                       |
| 9th     | Colombia                   | 4801                        | 80599                       | Sierra Leone                      | 71248                        |
| 10th    | Peru                       | 463169                      | Papua New Guinea            | Colombia                          | 50008                        |
| 11th    | Papua New Guinea           | 4028                        | Cameroon                    | Portugal                          | 54200                        |
| 12th    | India                      | 38000                       | Indonesia                   | Indonesia                         | 35137                        |
| 13th    | Uganda                     | 3014                        | Mexico                      | Madagascar                        | 27287                        |
| 14th    | Venezuela                  | 35239                      | Venezuela                   | Venezuela                         | 22259                        |
| 15th    | Mexico                     | 36888                      | Sierra Leone                | São Tomé and Príncipe              | 8571                         |
| 16th    | Sierra Leone               | 2754                        | Sierra Leone                | Haiti                             | 5473                         |
| 17th    | Haiti                      | 2711                        | Haiti                       | Haiti                             | 2512                         |
| 18th    | São Tomé and Príncipe       | 2209                        | Guatemala                   | Mexico                            | 2531                         |
| 19th    | Madagascar                 | 22753                      | Madagascar                  | Madagascar                        | 4000                         |
| 20th    | Guatemala                  | 4504                        | São Tomé and Príncipe        | São Tomé and Príncipe              | 2770                         |

World imports of cocoa and its processed products reached US $ 9.34 billion in 2017, with 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%) (OEC, 2020). As an agricultural commodity, the price of cocoa beans is volatile (Diaz-Montenegro, 2019; Utepi, 2007). Factors such as changes and climatic events, 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. In the particular excess supply causes prices to fall and, at the same time, encourage farmers to harvest intensively and also to replace cocoa with other crops, increasing even more 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 supply exceeds supply and prices increase, farmers have incentives to plant new trees. However, due to the length of the biological cycle, they take several years to reach their maximum productive performance, so farmers receive little benefit from the price increase (Diaz-Montenegro, 2019). The observation of international price in real terms at 2010 values for cocoa as a commodity shows price instability in the period considered (2007-2017). There was a rise until 2010 and between 2013 and 2016, but a decline between 2011 and 2012 and from 2016, 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 to the decline in the

Source: Own elaboration with FAO data
The demand for chocolate is elastic to price variations, but 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 induce 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 guarantee that does not harm the environment, and to the not exploitation of the workforce, which ensures fair trade (García-Herrero et al., 2019). If the fall in international cocoa prices persists, especially in the current state of the world pandemic, this could induce to 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, together with labelling and information on the origin and method of production and processing of cocoa, are also important elements for their acceptance, appreciation and preference by the consumer (Silva et al., 2017). Tools that help to 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).

3.1 The Organic Cocoa Market
Despite the fact that 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, with in some situations an inability of supply to meet demand for organic cocoa market. For this reason, and despite the social, environmental and economic problems faced by producers and countries, and the distance between producers and consumers who can 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 et al., 2019). The main producer of organic cocoa is the Dominican Republic, with a market share of around 70%. Peru, Mexico and Ecuador hold about 20%, with the remaining 10% distributed between Ghana, Uganda, Bolivia and Brazil (ICCO, 2018). The estimate of this source is that the African continent will be able to produce about 9% of the organic cocoa market by 2022 although, to that end, it must plan, organize and certify production so that cocoa does not have to be marketed as conventional due to difficulties in market access. The organic cocoa market encompasses, in general, 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 from cocoa and the driver of organic cocoa production is chocolate. Their demand by
Ibrahim Prazeres, Maria Raquel Lucas and Ana Marta-Costa  
Cocoa Markets and Value Chains: Implications for Sao Tome and Principe Organic Smallholders

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 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, 2018). The price of organic cocoa, although it is, like the conventional, determined by the balance between world supply and demand, and pay attention to the quality and flavor, it is always higher than that of conventional cocoa (Prazeres, 2018).

3.2 The Global Cocoa-Chocolate Value Chain

The global cocoa-chocolate value chain is exposed in Figure 3. Its analysis shows, on the one hand, a large spatial distance between production, which occurs in a fragmented way in 5.5 million small rural properties of 1 to 3 hectares, in Africa, Latin America and Asia and consumers and, on the other hand, a governance system where 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)

Some of the large companies involved in the global cocoa-chocolate value chain develop their activities simultaneously in the consumer markets, where they control high-value functions arising from the industrial manufacture of chocolate and branding, and in the intermediate processing markets, dominating the global supply chain for raw materials from cocoa and operating in markets of producing and 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%) are owners of well-known brands. They control high-value functions related to the manufacture of chocolate and the development and marketing of brands 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 et al., 2018). They are a link in the value chain with less negotiating weight, more fragmented and geographically atomized and without financial capacity to face the risks resulting from price volatility (Fountain and Huetz-Adams, 2018). Furthermore, they are the most dependent on local commerce and their respective dealers, commission agents or purchasing agents from the international chocolate industries, who press downward prices (Abdulsamad et al., 2015). In addition, 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 formation 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 even increase their profit margins, albeit temporarily (Fountain and Huetz-Adams, 2018; 2020).

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 | 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 | 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)

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, encompassing only 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, receiving a premium price in relation to the market (Prazeres, 2018). However, because the access of cocoa farmers to this market is difficult, it is common 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). What can also happen is that 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 CECCAC11), certification companies, cocoa traders, processors (associations or companies Satocao and Diogo Vaz, with their own production), chocolate manufacturers (national or international industry) and retailers. Despite its large size, the
Ibrahim Prazeres, Maria Raquel Lucas and Ana Marta-Costa  
*Cocoa Markets and Value Chains: Implications for Sao Tome and Principe Organic Smallholders*

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

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), where the average per capita area is 2.1 hectares at CECAB and 1.6 hectares at CECAC11. Both cooperatives are financially supported by IFAD - Fund for the Development of Agriculture and the Project for Small Commercial Agriculture (PAPAC) and other several non-governmental organizations, such as ADAPPA (Action for Agricultural Development and Environmental Protection), the ADIL Zatona, FENAPA (National Federation of Small Farmers) and the CIAT (Center for Agronomic and Technological Research). Each of the cooperatives brings together several associations that receive the cocoa seed from the farmers who integrate them, organized by geographical areas (Prazeres, 2018). According to this author, the training of farmers and motivation strategies to guarantee production with the levels and quality required by the market, is carried out by the cooperatives that provide training to the technicians of the associations that integrate them and these, later, called "sociotechnicians" provide training and technical support to their producers, being paid for this task. These sociotechnicians replace the role of the extension services that belonged to the state.

**Table 4:** Organic Producers by Cooperative in STP

| Cooperative | Producers (N) | Total Area (ha) | Production (Kg) | Average per-capita Area (ha) | Productivity (Kg/ha) | Cocoa Price (Db/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, inviting specialists who contribute to raising awareness among farmers on various topics (domestic violence, gender equality, and alcohol consumption - a problem that affects 10 to 10 years). 15% of the members of the cooperatives - sexually transmitted diseases), the cooperatives 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, approximately 1300 tons of production in total. 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, not members of the cooperatives, the smaller ones deliver the cocoa beans to a buyer / dealer / intermediary who may be an employee or representative of a large company or an export agent. Of the larger private producers, of note Sotocao, in partnership with a chocolate manufacturer in Switzerland and Kennyson in Roça Diogo Vaz, with a chocolate factory and a store in the country and two more stores abroad, one in Portugal and another in France. Organic cocoa is restricted to the island of Sao Tome. In the case of the island of Principe, the cocoa product is not certified as organic, except for incipient quantities produced in the Roças Paciencia and Sundy, certified by the Portuguese company Agricert. Roça Fundao buys from small producers about half of the 75 tonnes of total cocoa production (not certified), the remainder being bought by chocolate producer Claudio Corallo, who also gives his name to the chocolate brand that produces chocolate in the city of Sao Thomas. The value chain consists of approximately 20 intermediaries or dealers (buyers and local agents or wholesalers) who are the main links between individual private producers and cooperatives, with industry, 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, in this situation, 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 the use of irregular commercial practices, such as errors in weighing the volume transacted with payment accordingly, inaccurate price information or quality complaints and uniformity of cocoa beans. 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 process as biological, for its price and final value. One of the interviewees, from a public institution, affirms the relevance of organic cocoa for environmental, economic and social sustainability. Another, from one of the cooperatives, highlighted the specificity of the São Tomé ecosystem for the production of high quality organic fine cocoa. The certification is carried out by a qualified entity, qualified to do so and independent from all other players in the value chain, it starts with planting, visiting lots and obtaining information on density, age, health status, location (for example, there is no certification of plantations close to workshops and backyards), status of maintenance of the lot, so that it is possible to make a projection of the production to be obtained. If the lot is in a condition to be certified, the owner is asked about the cultural operations it carries out and the quantity produced.

5. Implications for Small Cocoa Producers

In a global context of scarcity of resources, the relative inability of cocoa production to satisfy the growing demand and the attention given to its sustainability, a balance must be found between production and profitability, with respect for the environment and benefits for small cocoa producers and for society (Garcia-Herrero et al., 2019).

Added concerns of producer countries about price volatility and the dependence of few buyers, farmers' organizations weak or with little bargaining power, the loss of soil fertility and biodiversity, and the different understanding and interest in the development of sustainable cocoa by different links in the chain (Mithofer et al., 2017). Also due to the existence of gaps between the standards and practices of sustainability and governance of the cocoa value chain.
(Moreno-Miranda et al., 2019) and the distance between the geographically highly atomized producers and the markets consumption (Prazeres, 2018). 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, which results in little bargaining power and low levels of income and well-being for producers (Mithofer 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 in sustainability in the cocoa chain, which are not just incremental changes, but help sustain transformation and 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 to producers, optimize productivity and, at the same time, limit environmental impacts (Ingram et al., 2018). Increasing the income of cocoa farmers and reducing poverty in rural areas is also achieved with the certification (Lwesya, 2018) the creation of Protected Designations of Origin and Protected Geographical Indication (Moreno-Miranda et al., 2019; Prazeres, 2018; Prazeres and Lucas, 2020) and quality improvements (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 that 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 more than 50% in the period between 1970 and 1990. Producers in these countries (mainly those with a small farm size) had, at the same time, to bear the fall in market prices and, higher costs and greater risks, production due to the effects of climate change, 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 behavioural 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 led 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 have the advantage of seeking 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 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. The decision of farmers to plant cocoa or another crop is influenced by external factors, such as market prices and, also, by internal factors such as physical, human or natural capital that farmers rely on. The way in which these factors affect the decision of small cocoa producers in STP has not yet been studied, requiring a thorough investigation in order to assess the impact and provide solutions. Support for organic production, although it is mostly done by the state, through...
cooperatives and respective associations, is not exclusive to this, with investments from the private sector (such as Satocao and Diogo Vaz), focusing on improving the fermentation process production systems, including commercial scale and increased market penetration. 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. In terms of the international market, these derive from the existing asymmetries between production, fragmented in about 5 million producers, the vast majority with less than 2 hectares of land and the consumer market, controlled by five large multinational companies and, from the small portion of value passed on to producers. At the level of STP and, despite measures to support organic production as a valuable alternative to the country's development strategy, imbalances in the value chain persist that compromise the livelihoods of small producers responsible for most of 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 responsible for this situation. Even for 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 that 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 by contrasted with the concentration of power in other links in the chain. Addressing these issues from a full perspective would also require taking into account producers' livelihood conditions (e.g. local infrastructure, including schools, health, access to markets) to understand how cocoa production can contribute to its improvement.

Acknowledgment
Maria Raquel Lucas is pleased to acknowledge financial support from Fundaçao para Ciência e a Tecnologia (grant UIDB/04007/2020).

References
• Abdulsamad, A., Frederick, S., Guinn, A., & Gereffi, G. (2015). Pro-Poor Development and Power Asymmetries in Global Value Chains. https://doi.org/10.13140/RG.2.2.32872.88323.
• Acerno, V., Alewijn, M., Zomer, P. & van Ruth, S. M. (2017). Making cocoa origin traceable: Fingerprints of chocolates using Flow Infusion - Electro Spray Ionization - Mass Spectrometry. Food Control, 81: 245-252. https://doi.org/10.1016/j.foodcont.2017.10.002. CrossRef
• ANEME - Associação Nacional das Empresas Metalúrgicas e Eletromecânicas (2018). Estudo de Levantamento e Caracterização das Empresas Industriais de São Tomé e Príncipe. Estudo São Tomé e Príncipe. Retrieved from: https://www.aneme.pt/site/wp-content/uploads/2018/09/Estudo_S%C3%A3o_Tom%C3%A9_e_Principe_2018_VF-CORRIGIDA.pdf.
• Blare, T., & Useche, P. (2013). Competing objectives of smallholder producers in developing countries: examining cacao production in Northern Ecuador. Environmental Economics, 4(1): 71–79. Retrieved from: file:///Users/raquellucas/Downloads/ee_2013_01_Useche.pdf.
• Díaz-Montenegro, J. (2019). Livelihood strategies of cacao producers in Ecuador: Effects of national policies to support cacao farmers and specialty cacao landraces (PhD Program: Sustainability). Universitat Politècnica de Catalunya Institut de Sostenibilitat, Barcelona. Retrieved from: https://upcommons.upc.edu/bitstream/handle/2117/170436/TJDM1de1.pdf. CrossRef
Díaz-Montenegro, J., Varela, E., & Gil, J. M. (2018). Livelihood strategies of cacao producers in Ecuador: Effects of national policies to support cacao farmers and specialty cacao landraces. Journal of Rural Studies, 63: 141-156. CrossRef

EAL-EuroAfriLink (2020). Organic Cocoa market: Global challenges & opportunities. Retrieved from: http://euroafrilink.com/second-blog/

Effendy, D., Pratama M.F., Rauf, R.A., Antara M., Basir-Cyio, M. & Mahfudz (2019). Factors influencing the efficacy of cocoa farms: A Study to increase income in rural Indonesia. PLoS ONE 14(4): e0214569. CrossRef

Eghbal, M. (2018). Global Chocolate Industry: From Bean to Bar. Euromonitor International. Retrieved from: https://blog.euromonitor.com/global-chocolate-industry.

FAO (2021). Faostat. Selected Indicators. Retrieved from: http://www.fao.org/faostat/en/#country

Fountain, A. C., & Huetz-Adams, F. (2020). Cocoa Barometer 2020. USA Edition, 118 p. Retrieved from: https://www.voicenetwork.eu/wp-content/uploads/2020/12/2020-Cocoa-Barometer.pdf.

Fountain, A., & Huetz-Adams, F. (2018). Cocoa Barometer 2018. USA Edition, pp. 1–72. Retrieved from: https://www.voicenetwork.eu/wp-content/uploads/2019/07/2018-Cocoa-Barometer.pdf.

Galarza, J. A. V. (2012). Smallholders and “fine” cocoa´s supply chain: designing an experiment on social dilemmas in cocoa “quality manipulation” (Master Thesis). Universiteit Gent. Retrieved from: https://lib.ugent.be/fulltxt/RUG01/001/894/545/RUG01-001894545_2012_0001_AC.pdf.

García-Herrero, L., De Menna, F., Vittuari, M. (2019). Sustainability concerns and practices in the chocolate life cycle: Integrating consumers’ perceptions and experts’ knowledge. Sustainable Production and Consumption 20: 117–127. https://www.sciencedirect.com/science/article/pii/S2352550919300582. CrossRef

ICCO - International Cocoa Organization (2016). Quarterly Bulletin of Cocoa Statistics - August 2016. Quarterly Bulletin of Cocoa Statistics, XLIII(1). Retrieved from: https://www.icco.org/about-us/icco-news/324-quarterly-bulletin-of-cocoa-statistics-august-2016.html.

ICCO - International Cocoa Organization (2018). Quarterly Bulletin of Cocoa Statistics, Vol. XLIV - No. 1. Retrieved from: https://www.icco.org/about-us/icco-news/389-may-2018-quarterly-bulletin-of-cocoa-statistics.html.

Ingram, V., van Rijn, F., Waarts, Y. & Gilhuis, H. (2018). The Impacts of Cocoa Sustainability Initiatives in West Africa. Sustainability 10 42-49. CrossRef

Lwesya, F. (2018). Towards Organic Agriculture: Assessing the Dynamics of Production and Exporting of Organic Cocoa in Tanzania. Academic Journal of Economic Studies, Vol. 4 (3): 25–31. https://ideas.repec.org/a/khe/scajes/v4y2018i3p25-31.html.

Mithöfer, D., Roshetko, J. M., Donovan, J. A., Nathalie, E., Robiglio, V., Wau, D., Sonwa, D. J. & Blare, T. (2017). Unpacking ‘sustainable’ cocoa: do sustainability standards, development projects and policies address producer concerns in Indonesia, Cameroon and Peru?, International Journal of Biodiversity Science, Ecosystem Services & Management, 13 (1): 444-469. CrossRef

Moreno-Miranda, C., Ordán, J., Moreno, R., Moreno, P. & Solís, J. (2019). Protected Designation of Origin and Sustainability Characterization: The Case of PDO Cocoa Arriba. Agriculture 9(10): 229. CrossRef

Nelson, V. & Phillips, D. (2018). Sector, Landscape or Rural Transformations? Exploring the Limits and Potential of Agricultural Sustainability Initiatives through a Cocoa Case Study. Business Strategy and the Environment 27: 252–262. CrossRef

OEC- The Observatory of Economic Complexity (2019). Cocoa beans trade. Retrieved from: https://oec.world/en/profile/hs92/cocoa-beans?redirect=true.

Prazeres, I. C. & Lucas, M. R. (2020). Repensar a cadeia de valor do cacau biológico de São Tomé e Príncipe. Revista de Ciências Agrárias, 43(Especial). https://doi.org/10.19084/rca.19045.
• Prazeres, I. C. (2018). Estratégia de Marketing e Criação de Valor do Cacau Biológico de São Tomé e Príncipe no Mercado Internacional (Trabalho de Projeto do Mestrado em Gestão, especialização em Marketing), Escola de Ciências Sociais, Departamento de Gestão, Universidade de Évora. Retrieved from: http://hdl.handle.net/10174/25358.
• Purcell, T., Martinez-Esguerra, E., & Fernandez, N. (2018). The Value of Rents: Global Commodity Chains and Small Cocoa Producers in Ecuador. Antipode, 50(3), 641–661. CrossRef
• Salazara, O. V., Ramos-Martín, J. & Lomasc, P. L. (2018). Livelihood sustainability assessment of coffee and cocoa producers in the Amazon region of Ecuador using household types. Journal of Rural Studies 62:1-9. CrossRef
• Silva, A. R. A., Bioto, A. S., Efraim, P. & Queiroz, G. C. (2017). Impact of sustainability labeling in the perception of sensory quality and purchase intention of chocolate consumers. Journal of Cleaner Production, 141: 11-21. CrossRef
• Squicciarini, M. P., & Swinnen, J. (2016). The economics of chocolate. In. M. P. Squicciarini & J. Swinnen (Eds.). New York: Oxford University Press. CrossRef
• Utepi - Unidad Técnica de Estudios para la Industria (2007). Estudio Agroindustrial en el Ecuador: Competitividad de la Cadena de Valor y Perspectivas de Mercado. Programa Integrado entre el Ministerio de Industrias y Competitividad y la Organización de las Naciones Unidas para el Desarrollo Industrial, Quito – Ecuador. Retrieved from: https://www.unido.org/sites/default/files/2007-11/71789_TCB_No.16.Cacao_Estudio_Agroindustrial_en_el_Ecuador_0.pdf.
• Voora, V., Bermúdez, S., & Larrea, C. (2019). Global Market Report: Cocoa. Sustainable Commodities Marketplace Series 2019. IISD-The International Institute for Sustainable Development. Retrieved from: https://www.iisd.org/system/files/publications/ssi-global-market-report-cocoa.pdf.
• World Bank (2019). World Bank Commodity Price Data. Retrieved from: http://www.worldbank.org/en/research/commodity-markets.