

## Cocoa value chain analysis in São Tomé e Príncipe

Value chain analyses assist in informing policy dialogue and investment operations. They help the understanding of how agricultural development fits within market dynamics. They permit an assessment of the value chains' impact on smallholders, businesses, society and environment.

The European Commission has developed a standardised methodological framework for analysis (<https://europa.eu/capacity4dev/value-chain-analysis-for-development-vca4d-wiki/1-vca4d-methodology>). It aims to understand to what extent the value chain allows for inclusive growth and whether it is both socially and environmentally sustainable.

### The value chain context

Reaching a volume of around 3,550 t in 2017, the cocoa produced in the Democratic Republic of São Tomé e Príncipe (STP) only represents 1/1000 of the world production (3 to 4 million t/year) and is considered as a niche-oriented product. Cocoa is the main export product of the country and its organoleptic quality is recognised in the international market,

with 30% of STP cocoa being classified in the category of 'fine or flavour' cocoa. The cocoa value chain (VC) relies on a diversified organisational structure, made of small producers' cooperatives but also of private companies of medium and large size.

### The European Union intervention

The cooperation between STP and the European Union (EU) is in line with the objectives of National Strategy for Poverty Reduction (ENRP III, 2017–21) and of the National Development Plan (PND 2017–21). Within the pillar "acceleration of sustainable economic growth", the government aims to promote investments in the agricultural sector to reduce poverty, increase food security, boost employment and improve exports competitiveness. In the framework of the National Indicative Programme 2014–2020, the EU contributes to the efforts of the government via the programme "Support to the export agricultural value chains of STP" funded by the 11th European Development Fund for an amount of €6.75 million. The objective is to increase the quality and quantity of sustainable production of traditional export products, including cocoa, by reinforcing the access to and recognition of these products in the international market. Figure 1 shows the main operations and flows in the conventional and certified cocoa sub-chains.

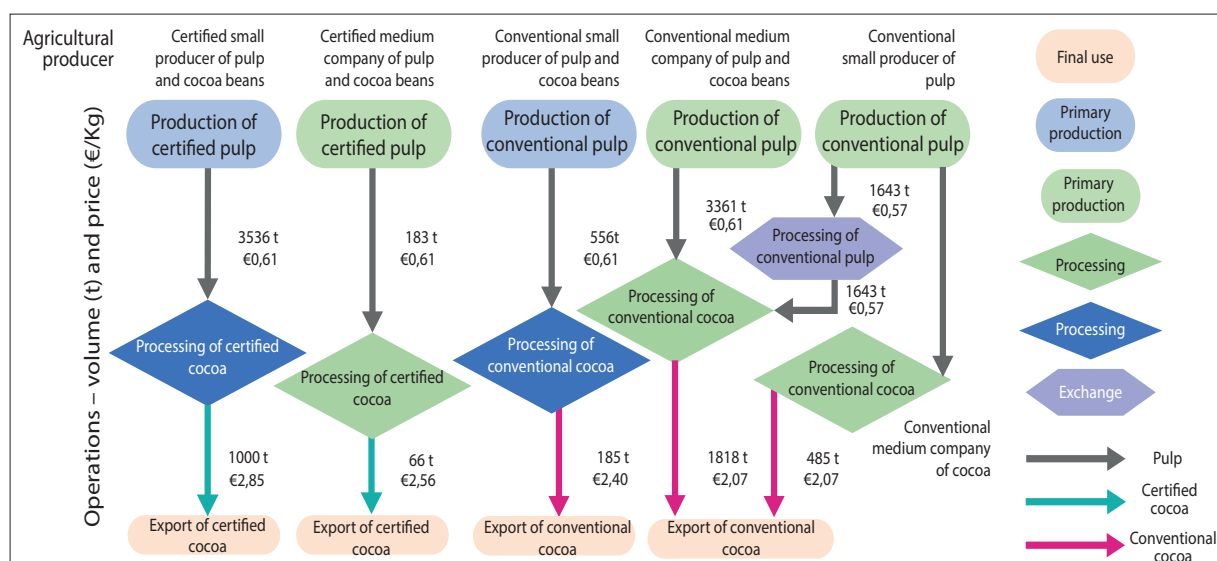


Figure 1: Main flows of the cocoa value chain in São Tomé e Príncipe

## Functional analysis

### Areas of production and actors

The main areas of production on the island of São Tomé are the Centre-South, the Centre-North and the North. Cocoa plantations cover an area of approximately 25,000 ha and they are often cultivated in association with other crops such as bananas, breadfruits and mangoes.

Two systems of production exist in STP: **conventional cocoa** (2,488 t in 2017), depending on the prices set by the New York stock exchange; and **certified cocoa** (1,065 t in 2017), being it biological, organic or linked to fair trade circuits (Figure 1).

According to the plot size, there are **small producers** (~7,600, with an average plot of 1.5 ha cultivated with cocoa) and **medium or large companies** (12, with different land concessions, ranging from hundreds to thousands of hectares). Production of certified cocoa is mainly guaranteed by small producers organised in **two cooperatives**: the Cooperative for the Export of Biological Cocoa (CECAB) and the Cooperative for the Export of Quality Cocoa (CECAQ11), **the certification being granted directly to the cooperatives and not to the individual producer**.

**Most of the production is grown by producers that carry out the activities from cultivation, to harvesting, fermentation, drying and export** (Figure 2). Consequently, there are no organisations devoted specifically to the post-harvest, wholesaling, and retailing activities. Small producers (4,270) sell pulp directly to medium companies producing conventional cocoa beans. Small producers of pulp and cocoa beans (2,775 certified and 556 conventional) carry out the production of pulp, fermentation and drying in producers' associations and then export cocoa beans via the cooperatives. Medium companies for pulp and cocoa beans (2 certified, 3 conventional) perform all the activities in their own facilities. A company located in the island of Príncipe also produces chocolate from local cocoa beans.

### Markets, prices and certification

**The domestic market is still incipient (less than 0.1% of production)**, constituted mainly by the sale of local chocolate to tourists, and by a simple array of other products (cocoa powder, biscuits, chocolate almonds, dried bananas with chocolate, etc.) produced by a group of about 10 small entrepreneurs.

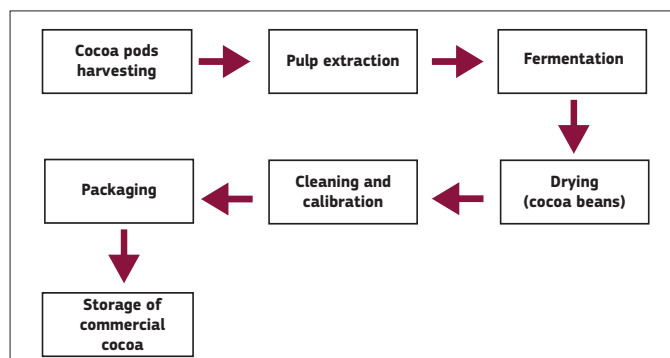


Figure 2: Different steps of cocoa production

More than **99% of the production is exported**, mostly via sea transport, towards EU countries. Cocoa from STP reaches a high-quality niche status in the conventional cocoa market, particularly for the one designated as fine or flavoured cocoa (even without a specific denomination of origin) or supplies the market of certified cocoa (biological, fair trade, etc.).

Currently exporters declare a value at customs gate equal to the international price. This means that **fair trade or biological cocoa have an undervalued price, given that a premium is paid to the agricultural producers**. Usually, for producers organised in cooperatives under the fair trade label, the **premium is given in the form of social benefits** (schooling, roads improvement, medicines); while, in the case of biological cocoa, the premium is granted in the **form of production inputs** (copper sulphate, lime, pruning services, work clothing, construction of fences, etc.).

**Conventional production** is particularly **vulnerable to international prices** and a drop in cocoa prices could even turn the economic situation of the country critical. On the other hand, certified production is less exposed to price volatility. Thus, small organised producers seem more resilient to prices drops than conventional companies.

### Governance

The cocoa VC depends mainly on the Ministry of Agriculture and Rural Development (MADR). The Centre for Agro-Technological Research (CIAT), linked to the MADR, manages the activities for sanitary treatments and certification for exports. There is **weak provision of services to producers by the State** (i.e. technical assistance to treat diseases, quality control on soils, irrigation methods, advanced training, etc.).

Other important institutions are the Chamber of Trade, Industry, Agriculture and Services (CCIAS), which represents the national private sector; as well as the National Federation of Small Producers (FENAPA) that provides assistance on the price monitoring, mostly for producers not associated to cooperatives. Indeed, the **main support to producers comes from the two cooperatives CECAB and CECAQ11** that, in fact exclude non-associated small producers. Moreover, the coordination between medium companies is relatively weak with their own circuits of action.



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## Economic analysis

### Profitability for the actors

**Cocoa production is profitable for many actors** in the VC, **except for conventional small producers of pulp** (4,270 out of 7,600 producers).

**The annual net operating profit (NOP) for a small producer of pulp and cocoa beans, either certified or conventional, is similar**, i.e. respectively 8,233 and 8,372 dobras (db) (€336 and €342). On the contrary, a **conventional small producer of pulp has a negative NOP**, equal to -1,137 db (-€46). This is due to low international prices in 2017 and more structurally to low yields, lack of technical assistance, aged plantations, and dependency on the purchase of their product by the companies, all factors that push these producers to prefer waged work in this VC. As for **companies**, a **conventional medium company of pulp and cocoa beans obtain the highest NOP** (4.6 million db or €190,000), followed by a certified medium company of pulp and cocoa beans (1.2 million db or €50,000) and by a conventional medium company of cocoa beans (530,000 db or €21,000). **The profit for cocoa is lower than the minimum wage** (13,200 db/y in 2017) **for a producer** and for this reason there is a tendency to combine cocoa with other cash crop cultivations.

In terms of **return on turnover, certified production has the highest value** (59% for medium companies but 33% for producers including the premium), followed by conventional production (46% for medium companies and 43% for producers). In the production of pulp, a clear fragility on profitability can be noted (6,5% for companies and -12% for producers).

### Impacts on the national economy

**In 2017, the total value added (VA) (78% of direct VA and 22% of indirect VA) of the cocoa VC was estimated at 178 million db (€7.2 million)**, with a contribution of 2.1% to the GDP and 17.3% to the agricultural GDP. The total VA is composed mostly by wages and salaries (44%) and by the NOP for all actors (46%) (Figure 3). Of this NOP, 16% is for small producers while 26% for companies. Around 60% of the total VA goes to small producers and workers, making the cocoa VC in STP inclusive.

The VC **contribution to the balance of trade is very positive**, for a value of **183 million db (€7.5 million)**. Total export is around 227 million db (€9.3 million). Import of production inputs (phytosanitary products, fuel, small equipment, agricultural tools and packaging) is around 44 million db (€1.8 million), 80% of which is imported by Portugal. The State collects taxes for a value of 17 million db (€696,000), mostly derived from custom taxes applied to imports (for copper sulphate, lime, fuel, etc.). On the other side, it grants subsidies for an amount of around 27 million db (€1.1 million), mainly to provide producers with copper sulphate, covering up to 67% of the costs. Consequently, **the VC contribution to the public finance is negative** (-10 million db/ -€406,000).

### Viability in the international economy

**The VC is competitive at the international level. The Domestic Resource Cost (DRC) ratio is below 1 (0.50)**, being the cost of the domestic resources used less than the economic value generated by the VC, at international prices. **The VC is also relatively protected as regards to international markets** as demonstrated by the Nominal Protection Coefficient (NPC) and the Effective Protection Coefficient (EPC) above 1. This is mostly due to the fact that certified small producers are subsidised by two thirds for the purchase of the sulphate copper via the cooperatives.

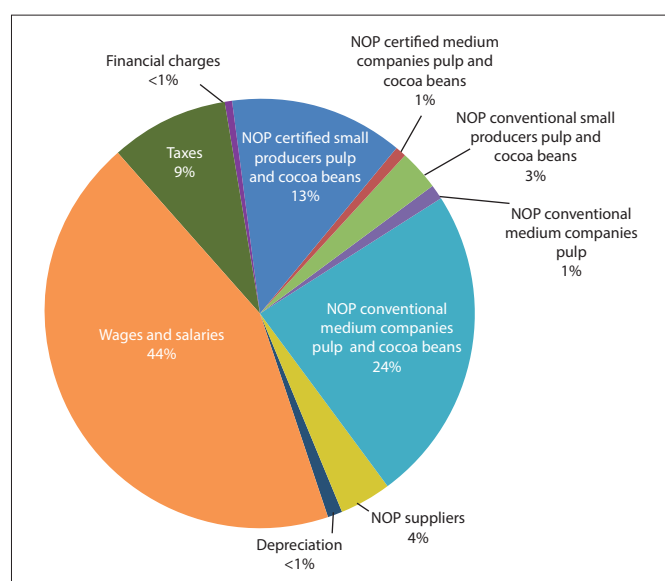


Figure 3: Total value added distribution

## WHAT IS THE CONTRIBUTION OF THE VALUE CHAIN TO ECONOMIC GROWTH?

The value chain is profitable for most of the actors involved. Cocoa represents 57% of the value of the exports and it contributes significantly to the agricultural GDP (17%). Production, processing and export actors favour job creation at all levels of the value chain. In this context, incipient but promising initiatives are starting to arise on artisanal or semi-industrial processing of chocolate products for both the export and the domestic markets.

The value chain is competitive at the international level, with encouraging perspectives in particular for the sub-chains of fine or flavour quality and of certified cocoa. Despite this, the value chain remains vulnerable to the drop of cocoa price at the international level, which can jeopardise its economic sustainability, especially with regards to conventional production.

## Social analysis

Figure 4 and the table below provide an image of the situation in the six strategic domains of the social analysis.

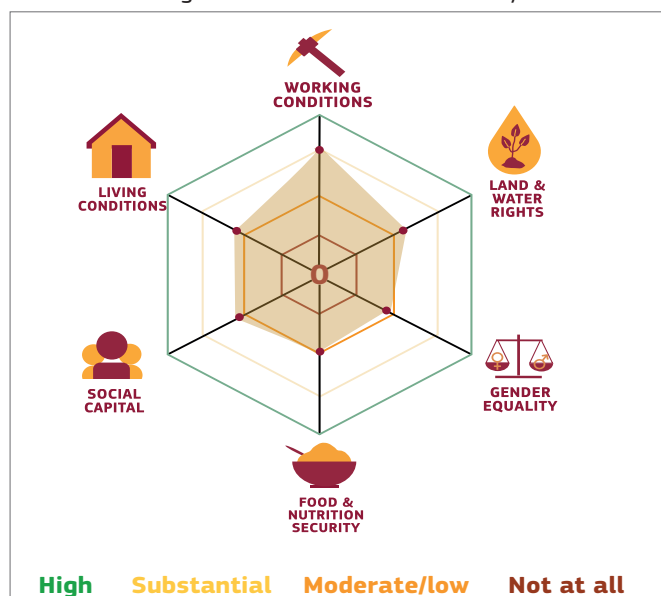


Figure 4: Social profile

### IS THIS ECONOMIC GROWTH INCLUSIVE?

The VC is globally inclusive as the distribution of the value added is favourable to waged workers and small producers.

Nevertheless, the annual net operating profit for conventional small producers of pulp not associated to cooperatives is negative, not allowing them in 2017 to recover their investments in family labour and showing their sensitivity to international prices. For the other small producers, the annual net operating profit is below the minimum rural wage, making it necessary to associate cocoa production with other cash crops.

The State plays an important role to reinforce the inclusiveness of the value chain, in particular subsidising the purchase of sulphate copper for small producers.

### IS THIS VALUE CHAIN SOCIALLY SUSTAINABLE?

The value chain is socially significant despite the situation being variable. Some areas need improvements, notably on the role of women, often employed only in minor and traditional tasks but without any decision-making role. Moreover, living conditions of workers in the areas where cooperatives operate are significantly different, especially as regards to the access to drinkable water, health and education structures (nurseries), housing and electricity.

The keyword to promote improvements in the value chain is "professionalisation" both at the technical level and in terms of institutional capacity. The cooperative model has the advantage to add a social dimension to the farms' development. However, even with the presence of cooperatives and associations, the interests of small producers are scarcely considered and their negotiating power is limited.

Working conditions	<ul style="list-style-type: none"> <li>Cooperatives and formal companies guarantee overall safe working conditions for their workers.</li> <li>Child labour is not officially declared even though some children are pushed by their families to help in agricultural activities.</li> <li>There is good agreement with employers on the salaries paid and respect of the work contract conditions.</li> </ul>
Land and water rights	<ul style="list-style-type: none"> <li>Access to land is guaranteed overall.</li> <li>Land transactions are based on negotiations between the seller and the buyer. They do not follow in practice the land property law that is an old legal framework (1991) still under revision.</li> <li>Although producers are consulted and involved in the process of redistribution of unused plots, they have limited power to object the decisions.</li> <li>No cases of land grabbing are detected in São Tomé. In Príncipe, there are some cases of land displacement for tourism investments that follow compensation mechanisms for the families displaced.</li> </ul>
Gender equality	<ul style="list-style-type: none"> <li>Gender equality is formally recognised, but not fully practiced.</li> <li>Women are present in all the VC steps but in most cases, their role is limited to minor technical and traditional tasks.</li> <li>Women do not have managing roles, except in some local processing companies.</li> </ul>
Food and nutrition security	<ul style="list-style-type: none"> <li>Farmers can cultivate and/or have access (thanks to the selling of cocoa) to a great variety of food products such as avocado, cassava, sweet potato, fish, etc.</li> <li>Some cooperatives organise a system of private shops (canteens) where members, during the period of cocoa sale, contribute to a down payment account used to buy essential goods when the cocoa season is off.</li> <li>Touristic projects linked to cocoa increase commercial opportunities and the increased profits can be used to buy food products, among other uses.</li> </ul>
Social capital	<ul style="list-style-type: none"> <li>Cooperatives are production umbrella organisations, with a social dimension for producers (managing premium, providing technical assistance, etc.).</li> <li>The autonomy of cooperatives could be compromised in the long term, due to the lack of financial means and the end of strengthening projects.</li> <li>The negotiating capacity to deal with medium and large companies is still low (as regards to inputs, volumes, sale prices, etc.).</li> <li>There is a significant difference between associated and non-associated producers</li> <li>Cooperatives only federate around half of the producers, none of whom are in Príncipe.</li> </ul>
Living conditions	<ul style="list-style-type: none"> <li>Support given by several private and public projects through investments to the building/rehabilitation of infrastructures, building of schools, transport, construction of water supply facilities in communities, etc.</li> <li>In the case of certified cocoa production, cooperatives also support producers in social projects, by managing the premium.</li> </ul>



## Environmental analysis

### Damages to human health and resources depletion

Both the certified and conventional sub-chains, showcase the typical characteristics of low input agriculture and processing systems, with **transport** having a **dominant role on the impact categories related to human health** (due to the fine particles emitted that contribute to global warming) **and to resources depletion** (in particular of fossil resources) (Figure 5).

Despite the similar characteristics and degree of damages of the two sub-chains, **the conventional one has higher environmental impact in absolute terms**. This is due to higher use of fuel per functional unit (same volume of product), due to the transport of fungicides and herbicides. The relative impact of transport should not be inflated, given that it is essential to the existence of the VC (as typical in short VCs) and mitigating measures could be introduced

with the enforcement of more stringent public policies (i.e. regulations on fuel emissions and promotion of vehicles efficiency, improvements of the roads, etc.).

### Damages to the ecosystem quality

The **main damage to the ecosystem quality derives from the land use in the agricultural production phase**. Possible mitigating measures to improve the yields could include the gradual substitution of old orchards and the improvement of plantations management. Also, on the ecosystem quality, the conventional sub-chain registers higher damages due to the low productivity of the non-associated small producers who suffer from difficult access to technical assistance. Finally, it is also important to note **higher water consumption by conventional medium and large producers** (26% higher than in the certified sub-chain).

Certified cocoa %	Transport to the port	Cleaning, Calibration, storage	Solar drying	Transport to the drying facility	Fermentation	Transport to the fermenting facility	Agricultural production	Installation of the crop	Nursery	Conventional cocoa %	Transport to the port	Cleaning, Calibration, storage	Solar drying	Transport to the drying	Fermentation	Transport to the fermenting	Agricultural production	Installation of the crop	Nursery
Human health	4,219	0,736	0,675	0,003	0,081	88,515	4,108	1,279	0,403	Human health	5,423	0,627	0,575	0,003	0,069	86,972	4,783	1,191	0,357
Ecosystem	0,957	0,074	2,869	0,000	0,613	9,854	81,504	3,982	0,146	Ecosystems	1,341	0,070	2,711	0,000	0,579	10,733	80,484	3,939	0,144
Resources	9,968	0,108	1,822	0,003	0,146	86,917	0,150	0,685	0,201	Resources	12,489	0,092	1,539	0,003	0,123	84,658	0,359	0,560	0,177

(red for a relative contribution greater than 50%, lilac between 50-20%, yellow 20-5% and green if less than 5%)

Figure 5: Contribution of the different steps of the certified and conventional cocoa VC to environmental damages (on the São Tomé island)

Impact (mid-point)	Land use	Ecotoxicity	Non-carcinogen toxicity (heavy metals)	Water consumption (irrigation)	Global warming and emission of fine particles
Area of protection (end- point)	Ecosystems	Ecosystems	Human Health	Human Health and Ecosystems	Human Health
Degree of impact	High	Moderate	Moderate	Moderate	High
Step of the value chain	Agricultural production	Agricultural production	Agricultural production	Agricultural production	Transport
Cause of the impact	Alteration in the land/ soil use	Phytosanitary control (sulphate copper)	Phytosanitary control (sulphate copper)	Water scarcity in non favourable areas and seasons	Emissions from fuel consumption

Figure 6: Synopsis of main environmental impacts of cocoa production in STP

### IS THE VALUE CHAIN ENVIRONMENTALLY SUSTAINABLE?

The assessment of the environmental impacts shows results typical of an agricultural value chain using low inputs and with relatively simple agro-industrial processing activities. The conventional sub-chain has bigger impacts, meaning that the certified and biological production can better guarantee environmental conservation and protection in the longer term. This depends mostly on the fact that this sub-chain needs less transport for the cocoa (pulp and beans) and the production inputs (lime, herbicides, etc.). The key aspects that will ensure the environmental sustainability of the value chain are the conservation of the soil fertility, the improvements in water management, here including in the upscaling of irrigation systems. It is also important to note that the future scenarios of climate vulnerability indicate an increase in water scarcity in some areas and an increase of water availability in others, deepening the territorial heterogeneity in STP.

## Findings and recommendations

Cocoa is a traditional product and an inbuilt patrimony of STP, with an internationally recognised quality. The VC contributes to the economic growth and has an inclusive effect from the social point of view even though bottlenecks exist (i.e. low profit for producers). Moreover, cooperatives associations stick out as the best example of success for producers, despite the relative institutional and economic fragility. Taking into account the specific characteristics of STP, especially its geographical position and the infrastructural difficulties for export, the cocoa VC has opportunities for improvement by specialising in the production of certified cocoa for the fine or flavour market segment, and by increasing the array of local quality products for export as well as for tourists and the local market (i.e. chocolate, jams, cocoa pulp syrup, biscuits).

The main strategic risk to the value of cocoa production resides in the loss of the bio or organic certification. This risk will only occur in case of failure to withstand the costs for certification or incapacity to enable traceability. Moreover, other challenges persist such as: price volatility in the international market, unregulated competition for the purchasing of cocoa from small producers, instability in the support of public policies, fragility of agricultural producers' organisations, reduction in land availability for producers and companies, climate vulnerability and the risk of water sources scarcity.

Therefore, to promote the VC reinforcement, the following recommendations are addressed to the State, the family and agro-industrial businesses and to all associations in the sector:

1. Stabilise the **public policies in support of the cocoa value chain** and strengthen the **financial support to increase the value added creation**;
2. Increase the economic entrepreneurial potential of cocoa, investing first in the **quality** and **excellency** of the product and, secondly, in **increasing its productivity**;
3. Guarantee the maintenance of the **certification of bio quality** and support the promotion of the voluntary social certification (linked to the fair trade circuit);
4. Reinforce the public support to the ongoing technical work to develop a certification for premium cocoa, with certified origin, to promote the international visibility of the cocoa coming from STP;
5. Invest in **the training and development of technical skills**, including the strengthening on **phytosanitary control and environmental management**;
6. Invest in the development of social competencies in rural areas, especially to support the most vulnerable (producers of pulp and non-associated small producers);
7. Modernise the road network to reduce environmental pollution, notably by introducing a system of regular road inspections;
8. Promote **complementary environmental mitigating measures** such as soil conservation to maintain the fertility, and availability of **irrigation systems** in order to reduce the water scarcity already evident in some less favourable areas.



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**Agrinatura** (<http://agrinatura-eu.eu>) is the European Alliance of Universities and Research Centers involved in agricultural research and capacity building for development.

The information and knowledge produced through the value chain studies are intended to support **the Delegations of the European Union** and their partners in improving policy dialogue, investing in value chains and better understanding the changes linked to their actions. VCA4D uses a systematic methodological framework for analysing value chains in agriculture, livestock, fishery, aquaculture and agroforestry. More information including reports and communication material can be found at: <https://europa.eu/capacity4dev/value-chain-analysis-for-development-vca4d->

This document is based on the report "Análise da cadeia de valor do cacau em São Tomé e Príncipe (2019)" by Antonio Guerreiro de Brito (ISA), Gustavo Saldarriaga, Sylvain Dardel (ICRA), Benjamim Nascimento, Ana Maria Buritica and Helena Farrall (ISA). Only the original report binds the authors.

