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VCA4D
VALUE CHAIN ANALYSIS FOR DEVELOPMENT

Analysis of the cocoa value chain in Putumayo and Tumaco, Colombia

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.

Context of the value chain

Although different, the department of Putumayo and the municipality of Tumaco, in the department of Nariño, share numerous characteristics: isolation from the rest of the country, rugged terrain criss-crossed by many rivers, remoteness from major markets—particularly the national cocoa market—and also from the centres of decision-making and power in the capital, Bogotá. They appear to be neighbouring territories, but they are separated and isolated by the Andes mountain range. They are also characterised by the location of Tumaco and Putumayo within two of the planet's most important ecosystems: the Chocó Biogeographic Region and the Amazon, respectively.

These two territories also share the complexity of having to cope with various simultaneous threats posed by illicit crops, illegal logging, illegal mining, monocultures and illegal armed groups.

Nevertheless, cocoa is projected as a unique alternative for rural development, being native and endemic to these areas and with market conditions that ensure purchase for its producers.

European Union Intervention

Under the European Peace Fund for Colombia (established in 2016), the 'PDET Routes for Stabilisation Project' is being funded to the tune of €21 million (€18 million from the EU and €3 million from the Colombian Government). The project contributes to the Comprehensive Rural Reform established in the Peace Agreement with the FARC-EP, with a view to promoting inclusive and sustainable economic development and improving access to resources, services, infrastructure and markets. The project is being implemented during the 2020–2024 period by three main partners: Red ADELCO, ICCO and CIAT. Its interventions focus on the cheese value chain in Caquetá and the cocoa value chain in Putumayo and Nariño.

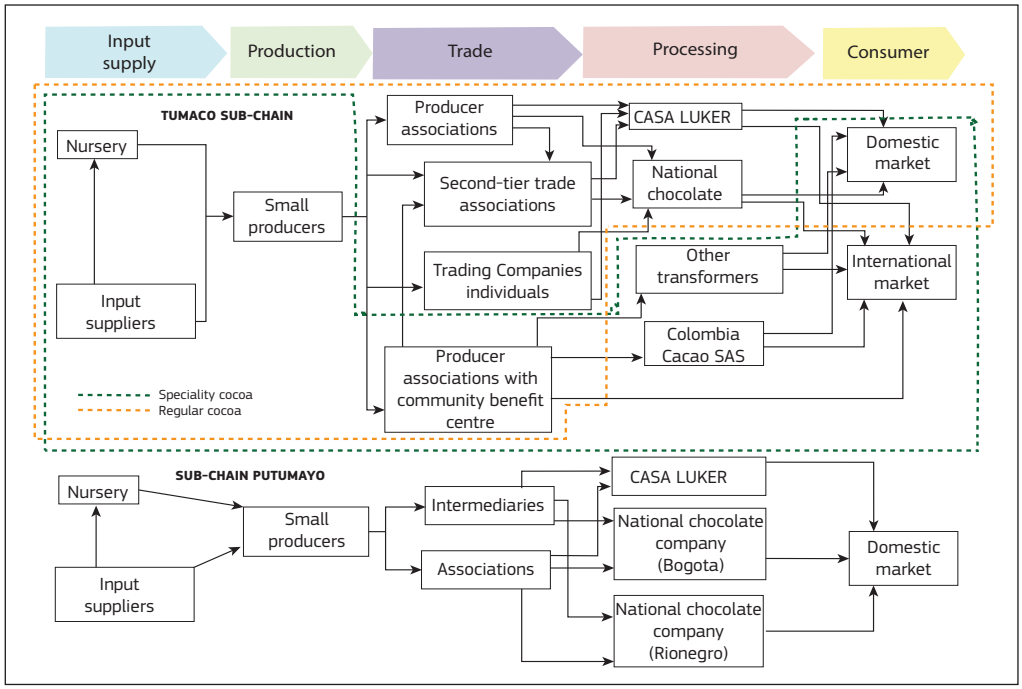


Figure 1. Sub-VC for standard cocoa and speciality cocoa in Tumaco

Functional analysis

Cocoa production

Cocoa ranks eighth in Colombia in terms of cultivated area (~3% of the national total). However, growth in this sector has accelerated in recent years, owing to its importance in the alternative development strategy in areas affected by armed conflict and illicit crop cultivation. In terms of dry cocoa bean production, Tumaco is the sixth-largest producer and Putumayo ranks 14th nationally. Estimated yields in Putumayo (400 kg/ha/year) are higher than those in Tumaco (350 kg/ha/year). Tumaco, with a long tradition of cocoa farming, accounts for 94% of Nariño's production with 3,271 tonnes in 2021, whilst in Putumayo cocoa has been adopted as an alternative to illicit crops over the last 20 years and produced 769 tonnes in 2021.

The cocoa sub-chains

Although Putumayo and Tumaco share similarities in their cocoa production, they have two distinct sub-chains (Sub-VC) differentiated by the degree of development of their socio-business processes and by the quality of the cocoa. In Tumaco, there are two distinct Sub-VCs: one for standard cocoa and another for speciality cocoa, which, due to its organoleptic characteristics, is classified as fine-flavoured and aromatic cocoa. The Putumayo Sub-VC is defined as distinct from that of Tumaco, with standard cocoa as its central focus (Figure 1).

Value Chain (VC) Actors

Input suppliers, in both Putumayo and Tumaco, are involved in the production of plant material through certified nurseries and the sale of agricultural inputs, which are acquired with high levels of subsidies through cocoa development projects. The purchase of plant material and inputs by producers using their own resources is exceptional.

Producers in both regions are the backbone of the chain. These are small-scale family farmers who, in addition to cocoa, must undertake other work to supplement their household income. On their land, they typically combine cocoa with other productive activities for subsistence (self-consumption) and commercial purposes which, taken together and adapted to the agroecological conditions of the territory, are considered agroforestry systems (AFS).

In Tumaco, there are an estimated 8,120 cocoa-producing families, with an average plot size of 1.64 ha per family and a density of between 500 and 700 trees per hectare. In Putumayo, there are an estimated 1,259 cocoa-producing families, with an average of 2 ha per family and a density of between 600 and 800 trees per hectare.

The marketers in both regions are producer organisations and, to a lesser extent, private intermediaries. In Putumayo, there are 12 organisations that purchase dry cocoa beans from producers at their collection points. The organisations then transport and sell the beans outside the department to the country's two major processors, who together purchase 99% of the cocoa produced in this region.

In Tumaco, standard cocoa is mainly (75%) marketed by two second-tier producer organisations. The remaining 25% is purchased by six first-tier associations. The country's two major processors buy 90% of the dry cocoa beans produced in Tumaco from outside the territory. The marketing of Tumaco's speciality cocoa accounts for 10% of its cocoa production and is carried out through 11 associations with operational community processing centres, which purchase cocoa paste from producers to obtain fine cocoa with a consistent flavour and aroma through the processing process, in order to sell it at a premium price to small-scale processors and exporters outside the department.

Marketing of Colombian cocoa

83% of Colombian cocoa is purchased and processed within the country, of which it is estimated that a quarter is exported as semi-finished products, chocolates and confectionery, and the remainder is consumed in the domestic market (Figure 3). The two major processors acquire 77% of the national cocoa and are responsible for 98% of the country's semi-finished product exports and 66% of chocolate products, whilst the remaining 34% of chocolate products are exported by more than 100 different companies.

Seventeen per cent of domestic production is exported, mostly as standard cocoa. Although the ICCO classifies 95% of Colombia's cocoa as fine-flavoured and aromatic, the vast majority of cocoa traded in the country is marketed as standard cocoa, and 80% of exports are sold at the international average price.

The main constraints facing the Putumayo and Tumaco cocoa-growing regions relate to public order and illicit crops, a lack of integration of development projects, insufficient research and technology transfer, a lack of cocoa production technology adapted to the local areas, an imbalance between producers and processors, and a lack of technical assistance, amongst others.

Although the results of the economic, social and environmental analyses focus on the Putumayo and Tumaco sub-value chains up to the marketing stage, the national context of the value chain is also taken into account in the interpretation.

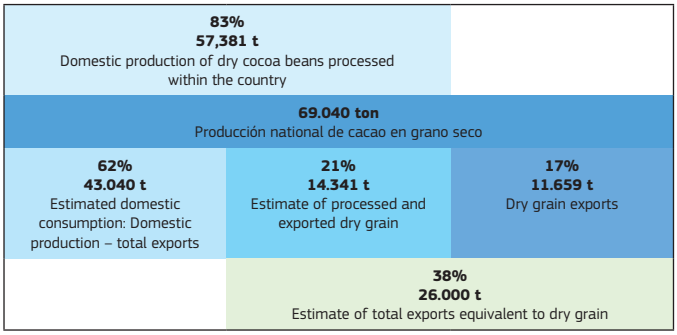


Figure 2: Cocoa flow in Colombia

What is the contribution of the value chain to economic growth?

Profitability and financial viability

In 2021, the average annual net operating profit for standard cocoa producers in Putumayo was 3.5 million Colombian pesos and 2.1 million Colombian pesos in Tumaco, whilst it stood at 2.3 million Colombian pesos for specialty cocoa producers in Tumaco. All producers operate within the SAF system, where cocoa represents one of several sources of income.

First-tier associations in both regions recorded average operating losses, whilst in Tumaco, second-tier associations made a profit of up to Col$ 680 million, and associations with processing centres made an average profit of Col$ 34 million.

The profitability and financial viability of the stakeholders depend largely on the volumes handled. The operating losses of producer associations during 2021 could be partly explained by the consequences of the Covid-19 pandemic in both regions, and in Putumayo, additionally, by the significant reduction in the volume of cocoa marketed at the departmental level. However, the losses are linked to the marketing of low volumes of cocoa, which do not generate sufficient income to cover all operating costs.

Impact on the national economy

The direct value added (VA) of the VC in 2021 was Col$ 62 billion, with net profits accounting for 53% and wages for 34%. The VA by territory is distributed as follows: Col$ 4.8 billion in Putumayo (7.8%), Col$ 25.5 billion in Tumaco (41.2%), and Col$ 31.6 billion outside the territories (51%).

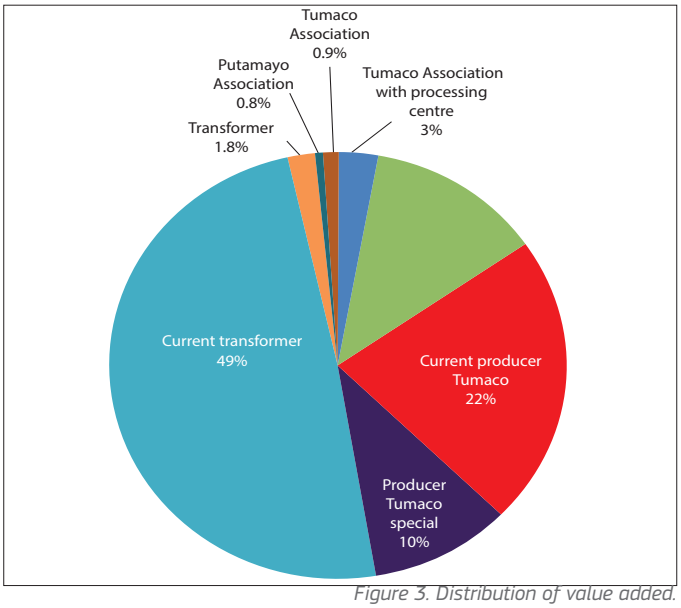


Figure 3. Distribution of value added.

In 2021, the CV's contribution was 1.7% of the departmental agricultural GDP and 0.1% of the GDP of Putumayo department. In the same year, the CV's contribution was 0.8% of the departmental agricultural GDP and 0.1% of the GDP of the department of Nariño. The combined contribution of Tumaco and Putumayo to the national agricultural GDP was 0.03%.

In other words, when Col$ 100 worth of cocoa is produced in these territories, Col$ 91 is generated and distributed as income—such as wages or profits—to participants in the national economy, whilst only Col$ 9 is spent on imported goods.

The CV's contribution to public finances was measured using the balance of public funds (tax revenue minus subsidies paid). In 2021, tax revenue from the CV was estimated at over Col$5 billion, and subsidies paid at around Col$3.5 billion, corresponding to a public funds balance of around Col$1.8 billion.

The VC's trade balance, which is the difference between exported cocoa and imported inputs for production in the chain, is positive at Col$12.4 billion.

The trade balance for cocoa and by-products, which is the difference between cocoa exported and cocoa imported across Colombia, stood at Col$ 204 billion in 2021.

Sustainability within the global economy

The Nominal Protection Coefficient (NPC) is equal to 1.0, indicating that there is no state protection for the sector. Furthermore, this means that the overall remuneration within the sector does not exceed international parity prices.

The Domestic Resource Cost Coefficient (DRCC) is 0.5 and demonstrates viability within the global economy, as being less than 1 measures the value of domestic factors required to obtain a unit of foreign currency.

Soil and climate conditions contrast sharply with those in other cocoa-producing areas in Colombia, which influences factors such as disease incidence, planting density and shade, and consequently affects productivity indicators per hectare in both Putumayo and Tumaco. Likewise, the complexity of logistics is evident in some areas with river, sea and track access, which generate high costs for transporting the product. Despite this, the supply chain provides supplementary income to the majority of small-scale producers, generates revenue for national stakeholders and is viable in the international economy.

Is this economic growth inclusive?

Distribution of income among CV stakeholders

On average, the share of stakeholders in the direct GVA of the VC was 7% for cocoa producers in Putumayo and 32% in Tumaco, 10% for marketing associations in both areas, and 51% for processors, who are based outside the region. In Colombia, informality in rural areas can exceed 85% of workers. Generally, producers do not make contributions to the contributory health, pension and occupational risk schemes.

The average share of the farm-gate price in the final product price (for domestic sales and exports) for the sub-value chain of standard cocoa is estimated to be between 9% and 27% in Putumayo and between 8% and 25% in Tumaco. It is estimated to be higher, between 18% and 55%, for the sub-value chain of speciality cocoa in Tumaco.

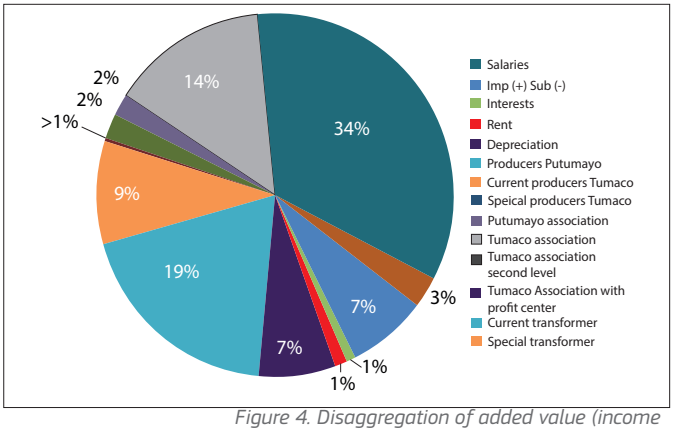


Figure 4. Disaggregation of added value (income distribution among actors).

Job creation

The value chain generates 4,775 jobs: 493 in Putumayo and 3,774 in Tumaco. An estimated 4,064 jobs are in primary production, 203 in marketing and 508 in processing. In other words, 88% of employment is generated in Putumayo and Tumaco. On average, women account for 30% of jobs.

Is the value chain socially sustainable?

The cocoa value chain is sustainable in its social dimension. Efforts must be made to address nutrition (protein) and social capital (trust). Figure 5 and the table below provide an overview of the main impacts of social variables on the value chain across six strategic areas of analysis.

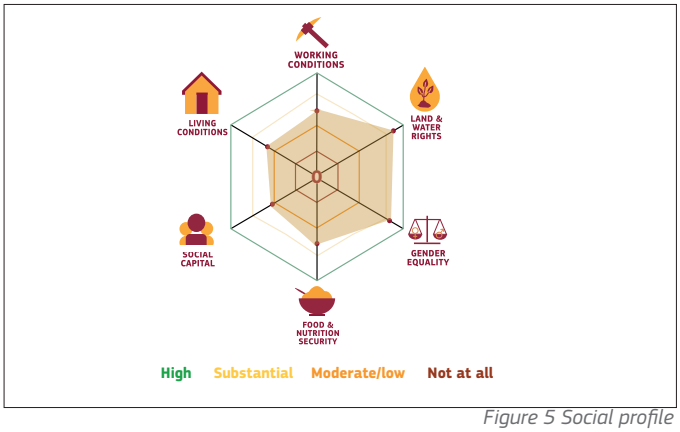


Figure 5 Social profile

Factors external to the value chain pose a high risk to the stability and sustainability of the social dimension: the presence of illegal armed groups and the production of illicit crops.

Although there is a legal framework regulating working conditions, this applies only to formal employment, which is not the case for workers on cocoa plantations, thereby limiting their access to social services associated with formal employment. Land and water rights do not jeopardise cocoa production or the sustainability of the supply chain. As for gender equality in both regions, cultural and social practices have changed for the better over time. Cocoa is produced under a SAF, which is conducive to good household food and nutritional security. Social capital needs improvement. The associative nature and grassroots organisation of rural producers and their communities was, and must continue to be, a very important intervention strategy. Finally, there are producers living in poverty, but the majority enjoy decent living conditions.

It can be concluded that the value chain is socially sustainable. However, further work is required on working conditions, food security and nutrition, and social capital.

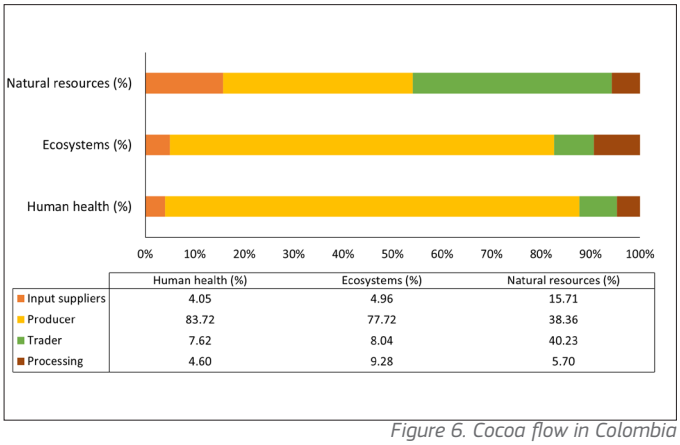
Working conditions	• Low levels of education • Family labour • No child labour found
Land and water rights	• The territories of Putumayo and Tumaco have been classified as tropical rainforest, with sufficient water availability for cocoa • Land use: mainly collectively owned land in Tumaco and privately owned land without legal titles in Putumayo
Gender equality	• High participation of women in organisations, but the majority of producers are male • Landowners are mainly men
Food and nutritional security	• Cocoa accounts for around 30% of household income and enables the purchase of food from outside the farm • Cocoa has little influence on nutrition in its own right • Cocoa grown under SAF (Sustainable Agricultural Farming) alongside various 'food crop' species diversifies food availability • Protein is the limiting nutrient in the household diet
Social capital	• A tradition of grassroots organising processes spanning over 25 and 50 years in Putumayo and Tumaco respectively. • There are at least 12 active grassroots organisations of cocoa producers in Putumayo, and at least 43 active grassroots and second-tier organisations of cocoa producers in Tumaco
Living conditions	• Most producers have access to the subsidised healthcare scheme in Colombia • Limited basic sanitation in cocoa-producing communities

Is the value chain environmentally sustainable?

Impacts of the sub-chains

Based on the contributory Life Cycle Assessment (LCA) for standard and speciality cocoa in environmental terms, the cumulative impacts of each actor and link in the Tumaco cocoa sub-supply chain (i.e., suppliers, producers, traders and processors) are mainly influenced by activities in the production and marketing links.

The activities with the greatest impact on the performance of these links are (bottlenecks – hotspots): the application of fertilisers and agrochemicals to seedlings in the input supplier link (nursery operator); fertilisation and the application of agrochemicals in agricultural production within the producer link; the use of raw materials, energy and waste disposal within the processor link (Figure 6).



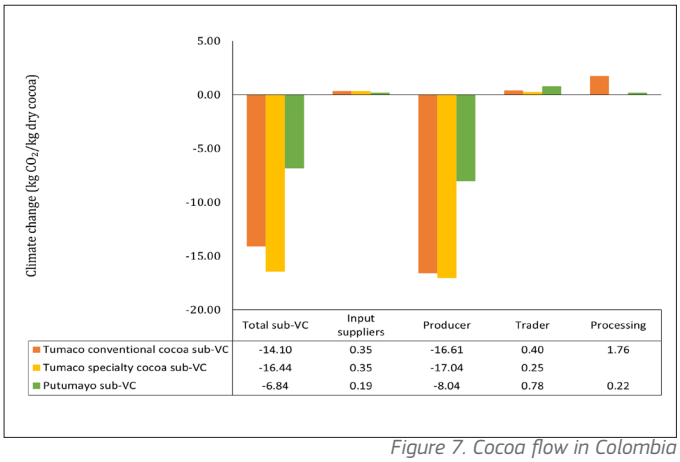
	Human health (%)	Ecosystems (%)	Natural resources (%)
Input suppliers	4.05	4.96	15.71
Producer	83.72	77.72	38.36
Trader	7.62	8.04	40.23
Processing	4.60	9.28	5.70

Figure 6. Cocoa flow in Colombia

The most relevant links and actors in the Putumayo common cocoa sub-VC are producers, input suppliers and processors. The activities with the greatest impact on the performance of these links were the same as for Tumaco.

Climate change, biodiversity and cadmium

Cocoa cultivation and the entire value chain contribute to climate change mitigation (Figure 7) due to the very low use of inputs and the amount of carbon sequestered in biomass within agroforestry systems (SAF).



	Total sub-VC	Input suppliers	Producer	Trader	Processing
Tumaco conventional cocoa sub-VC	-14.10	0.35	-16.61	0.40	1.76
Tumaco specialty cocoa sub-VC	-16.44	0.35	-17.04	0.25	
Putumayo sub-VC	-6.84	0.19	-8.04	0.78	0.22

Figure 7. Cocoa flow in Colombia

Compared to other cocoa value chains in Colombia and worldwide, the Putumayo and Tumaco value chains show better results regarding climate change. This is due to the low use of agrochemicals, the agroforestry system, and the context of the cocoa value chain within the Chocó Biogeographic Region and the Amazon Rainforest. It was confirmed that values between -7 and 16 kg CO_2eq/kg of dry cocoa contrast with its main threat, coca, which has values close to 600 kg CO_2eq/kg of dry cocoa. This makes cocoa a key alternative for replacing illicit crops, not only from a social perspective but also from an environmental one.

The cocoa plantations established in Putumayo and Tumaco coexist with the environment without affecting the surrounding flora and fauna. There is no evidence of species displacement; on the contrary, the cocoa plantations appear to attract them. There is no deforestation caused by cocoa cultivation, as the plantations are mostly traditional or established in areas already cleared for other crops. In Tumaco, farming practices do not involve the use of agricultural inputs, which is why these crops have become part of the area's biodiversity. The culture is not one of farming but of harvesting, and for this reason, the use of fertilisers or agrochemicals (fungicides, herbicides and insecticides) is virtually non-existent.

In Putumayo, unlike Tumaco, a greater use of fertilisers and agrochemicals such as herbicides and insecticides is observed in cocoa cultivation, but it is very low compared to what is considered a technified crop. Nevertheless, cocoa cultivation coexists with the region's typical fauna. In fact, this region belongs to the world's main ecosystem, the Amazon.

The cadmium content in cocoa in the two regions has not been rigorously studied, but specific data showed that Tumaco has the lowest levels in the country, whilst Putumayo's levels are higher, ranging from 0.6 to 0.8 mg/kg.

In environmental terms, the three sub-supply chains in Tumaco and Putumayo have a positive impact on the environmental dimension of sustainability. It can be said that, overall, the supply chain is environmentally sustainable. Indeed, the VC does not exert any significant pressure on inputs. The greatest contribution to impacts comes from the production stage. In terms of climate change, the Sub-VCs have carbon sequestration potential due to their biomass, which, when balanced against the impacts, helps to mitigate climate change. Cocoa in these areas does not cause deforestation. On the contrary, it is seen as a solution for replenishing organic carbon in the land previously used for coca cultivation that it replaces. The crop is also one of the most compatible with the ecosystems of the Amazon and the Chocó biogeographic region.

Conclusions

Main problems

- The average size of cocoa production units does not allow the activity to generate sufficient income for producers.
- The quality of cocoa from Putumayo receives low ratings from the market, whilst that from Tumaco, although recognised, largely fails to meet the standards of specialist markets due to post-harvest handling practices.
- Interventions carried out and currently underway in both regions have been fragmented and, at times, repetitive, involving isolated capacity-building initiatives for producer organisations.
- Lack of productive and logistical infrastructure.
- Producer organisations lack sufficient clarity regarding their role in the chain.
- The almost total lack of research in Putumayo and the limited progress in Tumaco leave the links in the value chain within the territory without a technological foundation.
- Technical assistance services lack the required coverage, frequency, continuity and relevance.Lack of sector-specific information for strategic decision-making.

Recommendations

Develop research and productive development strategies tailored to the region, defining short-, medium- and long-term plans that identify production models for each region and incorporate dissemination and transfer strategies.

Develop territorial strategies for market access through coordinated actions with a territorial vision to enter new markets, without losing sight of existing ones, seeking to engage buyers and consolidate long-term relationships.

Develop climate change adaptation strategies that strengthen crops and promote ecosystem conservation, through agroforestry models adapted to each territory and the use of bioproducts in crops that do not harm the environment.

Risks

- The greatest risk facing the Putumayo and Tumaco cocoa-growing regions is the proliferation of illicit crops.
- Producers' preference for the CCN 51 plant variety may affect the quality of cocoa in the future.
- The lack of a cadmium distribution map may affect decisions regarding future entry into higher-value markets.
- The increase in national production and shifts in market preferences towards higher quality may alter the current situation, which guarantees the purchase of all cocoa produced at uniform prices.
- The processes of climate variability and change occurring in the country, and in these regions in particular, which are altering and increasing temperatures and rainfall patterns, may affect productivity.
- The smuggling of cocoa with Ecuador – a situation for which there are no official records but which is clearly evident – generates unexpected flows of the product and distorts production and quality indicators in both territories, which may hinder the development of strategies and sectoral decision-making that reflect the actual situation.

Define and consolidate differentiation strategies for each territory by characterising the unique profiles of each region and adopting cultivation, harvesting and post-harvest protocols that ensure the consistency and uniformity of product quality.

Improve the profitability of Agricultural Production Units (APUs), aiming to achieve minimum APU sizes, sufficient crop yields and quality specifications that ensure at least the minimum income required for their sustainability.

Strengthen the value chain within the territory with a view to creating a cluster- , by integrating stakeholders and technological, logistical, productive and commercial actions to add value within the territories, with less fragmented producer organisations and clear roles in support of producers.

Value Chain Analysis for Development (VCA4D) is a tool funded by the European Commission / INTPA and is implemented in partnership with Agrinatura.
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 'Cardona CA, Monroy LF, Ochoa L, Puerta D, 2022. Value Chain Analysis of Cocoa in Tumaco and Putumayo, Colombia. Report for the European Union, DG-INTPA. Value Chain Analysis for Development Project (VCA4D CTR 2017/392-416), 274 pp. + annexes'. The authors are solely responsible for the original report.