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VALUE CHAIN ANALYSIS FOR DEVELOPMENT

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Analysis of the cheese value chain of Caquetá, Colombia

Value chain analyses assist in informing policy dialogue and investment operations. They help the understanding of how agricultural, aquaculture and fisheries 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://capacity4dev.europa.eu/projects/value-chain-analysis-for-development-vca4d_en) It aims to understand to what extent the value chain allows for inclusive economic growth and whether it is both socially and environmentally sustainable.

Value chain context

The department of Caquetá, in southern Colombia, represents 8% of the national territory, and less than 1% of the national population (400,000 inhabitants). In Caquetá, for more than seven decades, in a context of spontaneous colonisation and deforestation, violence and physical insecurity of the inhabitants have been highly disruptive factors for the performance of economic activities in general, and for cheese production activities in particular.

The production of cheese in Caquetá is composed of salty and chopped cheese (picado y salado), and of the quesillo and its variants (criollo, doble crema, mozzarella and ricotta). Milk production in 2020 in Caquetá was estimated at 438 million liters, of which 93% was destined for the production of cheese and, to a lesser extent to dairy products. 41% of milk is processed directly on farms in rural cheese factories (Figure 1). 52% is transported by pre-established dairy routes and controlled mostly by transporters and destined for medium (65%) and small-scale (35%) cheese companies.

Cheese production in Colombia can be estimated at 150,000 tonnes (t) (half of which is informal). Imports reached 4,200t in 2020, while exports were less than 1,000t but growing rapidly. Despite the instability in the area, cheese production in Caquetá was estimated at one-third of the national production.

Intervention by the European Union

Within the framework of the European Fund for Peace in Colombia (established in 2016), the "PDET Routes for Stabilization Project" is financed by €21 million (€18 million by the EU and €3 million by the Government of Colombia). The project contributes to the 'Comprehensive Rural Reform' promoted by the Government of Colombia with a view to territorial stabilisation and the promotion of inclusive and sustainable economic development and improved access to resources, services, infrastructure and markets. The project is executed during the period 2020/2024 by three main partners: Red ADELCO, ICCO and CIAT. Its interventions focus on the value chains (VC) of cheese in Caquetá and cocoa in Putumayo and Nariño.

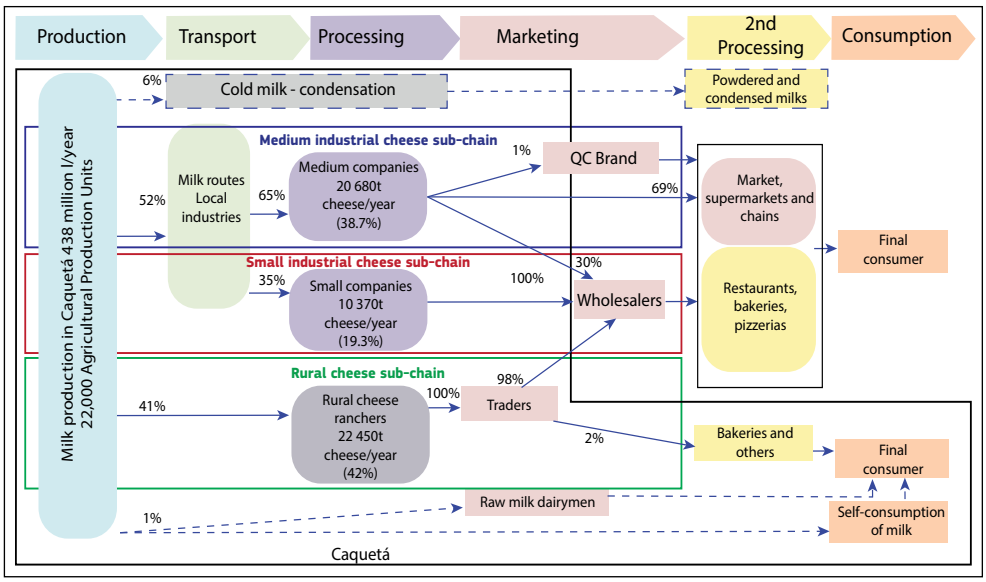

Figure 1. Map of the cheese VC in Caquetá

Functional analysis

Production and actors

Cheese production in 2020 was estimated at **53,500t**: 31,050t contributed by small and medium-sized companies, and 22,450t produced by rural cheese factories. Milk producers use whey for pig breeding.

The VC is composed of **60 companies, 21,195 milk producers (family ranchers, semi-commercial ranchers, commercial ranchers), 200 local traders and 97 national traders**.

Sub-chains

The VC is composed of three sub-chains (Figure 1 and 2), with different characteristics.

The **rural cheese sub-chain** collects **180 million liters of milk per year**, to produce **picado and salado cheese**. Being in remote areas without access roads and without cold chain infrastructure, **ranchers**, scattered throughout the territory, are forced to produce this type of cheese daily, as salt preserves it only for a few days. The total production of this cheese in 2020 was estimated at **22,450t**, equivalent to **42% of the cheese produced in the department**. The marketing is done through **local traders** who acquire the cheese at the production site or in the village and municipal centres. A small part of the production, estimated at 2%, is sold to bakeries and other local food trading establishments, and the remaining 98% reaches **wholesalers outside** the department, who, in turn, deliver it to markets, shops, restaurants, bakeries, pizzerias.

The **small-industrial cheese sub-chain** collects **78 million liters of milk per year**. This sub-chain is composed by a significant number of companies, mostly semi-formal or informal, located in both urban and rural areas. The products are marketed through **wholesalers**, who supply markets, salsamentarías, restaurants, pizzerias, bakeries outside the department.

The **medium-industrial cheese sub-chain** collects **148 million liters of milk per year**. It represents **39% of cheese production** and is located mainly in urban areas where they are supplied of milk according to their area of influence. 1% of the products are marketed directly through the Queso del Caquetá (QC) brand, while 30% is through **wholesalers** in cities such as Bogotá, Cali, Neiva, Ibagué, Pereira, Quibdó, and 69% goes to supermarkets and chains, which sell it to salsamentarías, bakeries and pizzerias.

Actors' strategies and value chain governance

Extensive **dual-purpose** cattle ranching (meat and milk) is the main legal agricultural activity in Caquetá, which allows the development of cheese production. Agricultural activities are severely constrained by soil **depletion** and the **low availability of labour**, a factor aggravated by the conflictual situation.

For both rural and industrial cheese factories and companies, **the level of coordination between actors is low**, even with regards to information flows. Although there are a number of livestock farmers' organisations, some of them with a lot of potential, their inclusion into milk processing is minimal, although growing. The actors are mainly linked up through a relationship of supply and demand to set the exchange price of the products, without there being particular specifications, requirements or consolidated commercial alliances. Therefore, for producers of picado and salado cheese, as well as for milk producers, switching buyers or sellers does not represent any additional cost, although for processing companies this volatility in the commercial relationship represents a difficulty in sourcing raw milk in the quantities required to operate at full capacity. Market distortions are generated by oligopsony and limited access to dairy routes.

The national regulatory framework is poorly applied in this VC in Caquetá, as it is characterised by a high degree of informality. As for public investment (public services, infrastructure...), there is a strong lag in the department related to the conflict situation and limited state presence. Due to this, new forms of local governance emerged and they continue to play an important role in economic and social organisation locally.

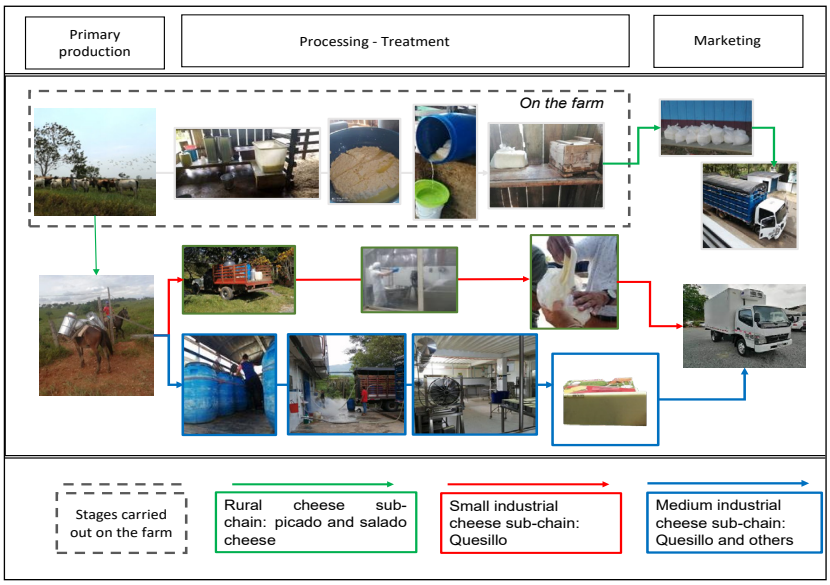

Figure 2. Illustration of the stages and sub-chains

What is the contribution of the VC to economic growth?

Financial viability of producers

The annual net operating profit of family ranchers participating in the VC was of the order of COP$8,200,000 (€1,950), for all the sub-chains. **This benefit is lower than the annual minimum wage in Colombia** (COP$18,960,545 (€4,500) in 2020). It should be noted that milk producers receive income from other activities, especially beef farming. The annual profit of a semi-commercial dairy ranchers was COP$23,800,000 (€5,650) and that of a commercial rancher COP$87,900,000 (€20,900). The family and semi-commercial ranchers have a slightly lower profit in the rural cheese sub-chain compared to the other two sub-chains.

Impact on the national economy

The **total value of production** of the cheese VC in Caquetá in 2020 was **COP$700,237 million** (€166.3 million). 77% corresponds to direct value added (VA) and 23% to intermediate consumption (salt, medicines and herbicides, coal, diesel, rennet, packaging, etc.). The total VA, which takes into account also the VA of input suppliers, is equivalent to COP$ 642,991 million (€153 million). 19% of the direct VA is created by the small-industrial sub-chain, 42% by the medium-industrial-scale sub-chain and 39% by the rural cheese sub-chain (Figure 3A). **Benefits and salaries** account for most in direct VA of the VC with almost **90%** and **10%** respectively (Figure 3B).

91% of the direct VA remains in Caquetá and the rest corresponds to the direct VA that goes to the rest of the country because some actors are located outside the department (Table 1).

Taking into account the importance of milk and cheese in the department, **the contribution of the VC to the GDP of Caquetá** was 4.5% and **62%** of the **agricultural GDP**. Likewise, t**he rate of integration into the national economy** was equivalent to **93%**, meaning that the chain uses few imported inputs; this indicator is measured by the relationship between total value added and value of production.

The **contribution of the VC to public finances** is characterised by a low level of taxes: **COP$11,435 million (€2.7 million)**, due to the high degree of fiscal informality in which the VC operates in the department, which reduces departmental and national tax collection for this activity. No subsidies are registered.

The **balance of trade** in the VC is measured by the difference between exports of cheese and imports of inputs for the VC. The cheese produced in Caquetá is not exported and is destined for consumption within the country, so exports are zero. Imports of inputs were **COP$ 31,950 million (€7.6 million)**. This difference results in a negative balance of trade of equal value.

Sustainability within the international economy

The VC can be considered competitive in the international market, with a **nominal protection coefficient of 1.0** and **a domestic resource cost of 0.10**, which means that there is good remuneration for the non-marketable domestic factors (labor, capital, land, environmental goods, ...) mobilised in the VC.

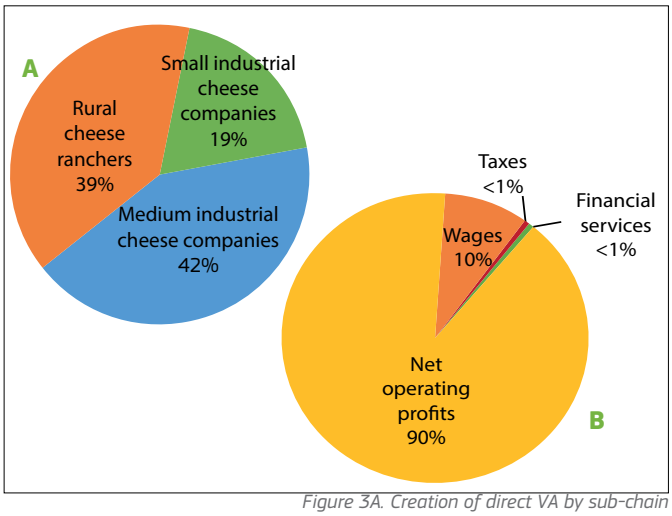

Figure 3A. Creation of direct VA by sub-chain

Figure 3B. Distribution of direct VA from the VC

Family ranchers' profits are less than the minimum wage, but they constitute only part of their income and contribute to improving their standard of living. The rural cheese sub-chain represents about 40% of the value added created in the value chain. However, the processing of milk into cheese does not significantly improve the income level of these semi-commercial ranchers compared to the other two sub-chains. Although the cheese produced is mostly consumed in the country's large cities, about 90% of the income created is distributed among actors located in Caquetá and contributes to more than 60% of the agricultural GDP of the department. Due to its very informal nature, the VC contributes few financial resources to the State and, in turn, receives little support.

Sub-chains	Direct VA of the VC in the country (COP$ million)	% VA directo que se queda en Caquetá
Rural cheese-making	208,700	82%
Industrial cheese-making from small-companies	103,300	92%
Industrial cheese-making from medium companies	228,600	91%
TOTAL	540,600	91%

Table 1. Distribution of the Value Added of the VC

Is this economic growth inclusive?

Distribution of income among actors

The annual income of the ranchers participating in the VC was equivalent to 69% of the direct VA of the VC: family ranchers obtained COP$ 81,075 million (15% of the direct VA), semi-commercial ranchers COP$ 231,477 million (43%) and commercial ranchers COP$ 62,329 million (12%).

This means that the distribution of income among the actors shows the **significant weight of milk producers**. However, the weight of family ranchers is relatively low, compared to their numerical importance. The other actors benefiting from a significant part of the VA distribution are employees (9%) and national traders (9%).

The profits of ranchers are not that high but the bulk of the income generated in the value chain is distributed among small-industrial ranchers and employees , despite the fact that semi-commercial and commercial ranchers get more benefits than family ranchers. In this regard, the chain could be more inclusive.

Job creation

The VC is highly favourable in the generation of jobs with **17,635 jobs in total** (full-time equivalent) of which **89% are in the department**. Most jobs are in production (livestock), followed by cheese transport. The participation of **women** in the VC is equivalent to **15% of total jobs**, concentrated in permanent unskilled jobs, and corresponding to family employment of women in rural cheese factories. Most jobs are temporary (92%), followed by permanent unskilled jobs (7%) and permanent skilled jobs (1%). This is due to the high level of labor informality of the VC.

Is the VC socially sustainable?

Figure 4 and the table provide a picture of the main social consequences of the VC activities in 6 strategic domains.

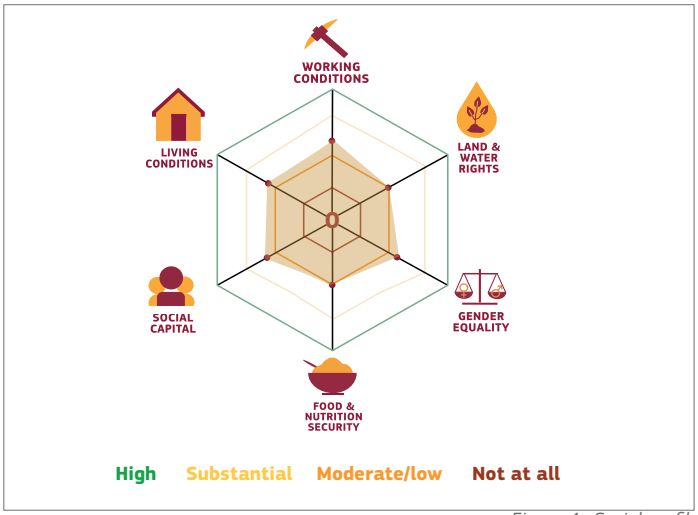

Figure 4: Social profile

Working conditions	• Informality predominant in labor relations, except for larger companies • Effective freedom of association tarnished by the situation of citizen insecurity, with threats to social leaders and their eventual removal • Limited child labour, but the VC impacts the high level of school dropout among the young male population. • Attractiveness of the chain for young people concentrated in the cheese industry
Land and water rights	• Legal insecurity in land tenure, largely due to the violence, which limits the investments that ranchers could make on their farm, to increase their productivity and implement sustainable livestock schemes
Gender equality	• Substantial gender equality • Active participation of women in food engineering, administration and accounting in the processing industry • Significant gender gap in production and household chores in terms of workload, decision-making, leadership and empowerment
Food and nutrition security	• Food insecurity slightly receded in recent years, partly thanks to the contribution of the VC • Contribution of the VC with milk, cheese, meat and other dairy products • High level of food insecurity (56% of the population), with 41% of livestock households in a situation of monetary poverty
Social capital	• Significant organisational base among Caqueteño ranchers, with relative differences in strength and articulation with local authorities • Lack of an organisation of industrial actors, as well as a strong organisation of traders of picado and salado cheese at the departmental level • The Community Action Boards are important drivers in the voluntary mobilisation of the inhabitants to carry out works for the benefit of the community
Living conditions	• Living conditions degraded by serious deficiencies in access to health services, as well as to quality housing and education, aggravated by a low level of investment in infrastructure • The professional training provided by the National Apprenticeship Service (SENA) offers potential to impact the living conditions of the actors in the chain

The social sustainability of the value chain as a whole is moderate/low, mainly due to the post-conflict situation of the department, as well as the prevailing informality and legal insecurity in land tenure. Gender equality seems better than other social issues.

Is the VC environmentally sustainable?

Impacts were estimated for the VC, the sub-chains and actors considering different functional units.

Damages to the environment of the different stages of the value chain

At the value chain level, 90% of the **damage** to **human health and 98%** to the **ecosystem quality** comes from milk production. The damage to **resource depletion** comes primarily from **milk processing (59%)**; the stages of milk production, domestic marketing, and milk collection transportation account for 18%, 17%, and 6%, respectively (Figure 5).

Damages of the milk production stage

Milk production is responsible for **80% of the damage to human health** caused by **herd emissions**, in particular greenhouse gases (GHG) (enteric and faecal excretions). Damage to the **ecosystem quality results from grassland management (85%)**, mainly due to the change in land use due to the grazing of wooded areas of farms, burning and the use of herbicides. The **damages on resource depletion** originate according to the type of system, between 36% and 84% in the manufacture of inputs and their transport, (mineral salt for animal feed), and between 14% and 64% during the maintenance of paddocks with scythe (use of fuel).

The system with the greatest impacts per liter of milk produced is by family ranchers, except for the depletion of resources where commercial ranchers stand out. If impacts by surface are considered, i.e. 1 ha of area used to produce 1 t of milk, the system with the greatest impacts is the business one. In general, to improve the environmental footprint of all systems, it is necessary to intensify production with various measures, such as cutting pastures, the improvement of existing pastures and even the promotion of silvo-pastoral systems.

Deforestation seriously affects the department and causes the **collapse of biodiversity**. GHG emissions from dairy production that contribute to **climate change** are multiplied by 15 if the history of deforestation in farms is considered.

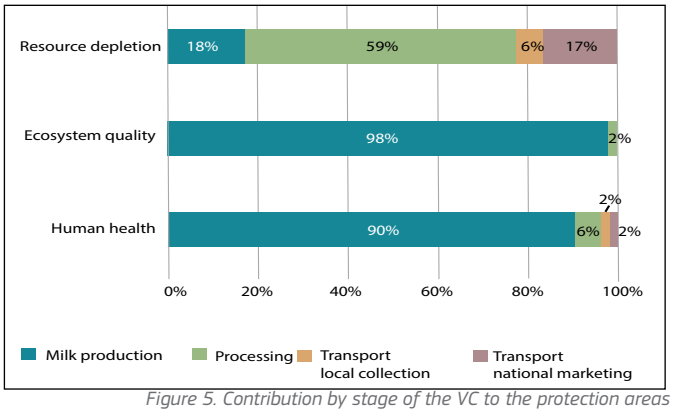

Figure 5. Contribution by stage of the VC to the protection areas

Damage from the other stages and milk processing

The milk processing and transport stages present the greatest **damage on resource depletion** caused by plastic inputs for packaging and fuel consumption. The sub-chain with the greatest impact is the one small-scale industrial companies due to its low level of efficiency in milk to cheese yield. In the industrial process, it is necessary to deepen how to improve the use of packaging and dairy routes.

Damage by sub-chain

The functional units allow to compare the three sub-chains and the functions that they fulfill such as productivity or the creation of value added (Figure 6). For human health and ecosystem quality, the medium-industrial sub-chain presents the best results with both functional units. The rural cheese sub-chain has the lowest use of resources since the processing is totally manual.

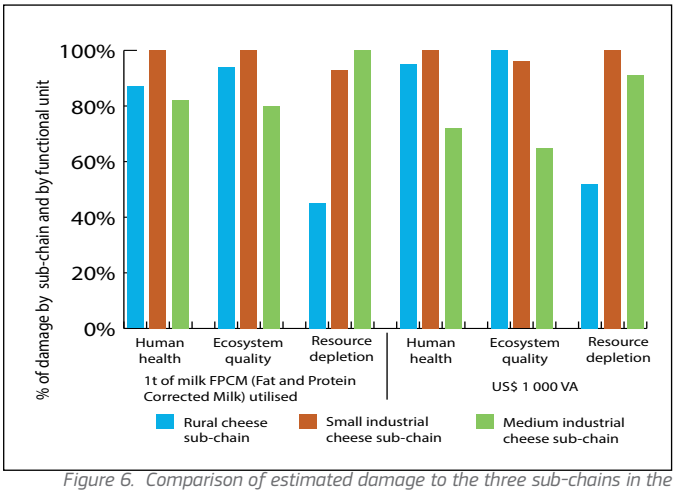

Figure 6. Comparison of estimated damage to the three sub-chains in the protected areas

In the cheese VC of Caquetá, milk production has a very low eco-efficiency (relationship between productivity and the level of damage). The lack of technical monitoring and the low productivity of pastures are critical points for the reduction of environmental impacts. The practices of forest meadowing and pasture burning, combined with low investments in livestock systems, show the interweaving of socio-economic and environmental factors in this VC. Legal insecurity of land tenure can be very limiting for the application of more environmentally friendly and productive practices such as cut pastures, silvopastoral systems or civil society forest reserves..

Main findings

SWOT Matrix

Strengths	Weaknesses
• Good composition and nutritional quality of milk • Significant value added at the production level • Rooting of the rural population in dairy and cheese activities • Designation of origin and new collective brand "QC", which lay the foundations for greater vertical coordination of the industry	• Low productivity and competitiveness • Poor bargaining power of ranchers in the sale of products • Poor hygienic and sanitary conditions • Lag in the provision of public goods • Unfavorable impact of the expansion of the agricultural frontier and deforestation on populations and biodiversity
Opportunities	**Threats**
• Growth in consumption of solid milk products • Rich biodiversity of the territory • Incursion of middle-class entrepreneurs and involvement of young workers • Tourism potential • Departmental pacts and agreements on zero deforestation in the chain • Potential for strengthening the roundtable	• Displacement of dual-purpose ranchers to favour fattening livestock, affecting the availability of raw material for cheese production • Substitution of the production of picado and salado cheese by the direct sale of raw milk, in the face of improved routes, which may invalidate investments in the rural cheese factories • Strong external competition from imported cheeses (low prices and better quality).

Main recommendations generales

Reduce deforestation and grassland, which are closely linked to the legal informality of land ownership. In the exclusion zone of the 'Forest Reserve Zone', the adoption of agro-ecological practices towards an intensification of production and productive reconversion depends on the security that ranchers have over the land.

Ensure greater coverage and quality of technical assistance for milk processing. Both in the case of companies, and for ranchers producing picado and salado cheese, provide adequate and timely technical assistance services required to apply more effective practices. Exchanges between actors can be a catalyst for innovations.

Raise and improve the associativity and articulation between the actors, to strengthen their commercial negotiation capacity and achieve greater transparency in transactions. Although an inter-profession of the dairy sector and derivatives in the department is desirable to enhance its weight in the national market, its implementation supposes the prior organisation of each group of actors (producers of picado and salado cheese, industrials, as well as local traders).

In terms of governance, improve the inclusion of the chain, by overcoming conflicts between existing trade union organizations.

Promote the benefits that result from the initiative of the Denomination of Origin and the QC Mark to enhance the development of the cheese industry of the department. The initiative merits developing its capacity for inclusion at the department level and a greater degree of openness to new members.

Undertake a program to boost pork farming, which allows producers to increase their income.

Food insecurity has declined in recent years, in part thanks to the chain's contribution to increased food availability and to greater availability and accessibility of food, but it remains high (55.5% of the population).

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://capacity4dev.europa.eu/projects/value-chain-analysis-for-development-vca4d/info_en

This document is based on the report «Saldarriaga, G., Acosta-Alba, A., Sfez, P., Martínez, G, Buriticá, A. 2022. Análisis de la cadena de valor del queso de Caquetá, Colombia for the European Union, DG-INTPA Value Chain Analysis for Development Project (VCA4D CTR 2018/392-416), 150p + annexes. Only the original report binds the authors.