

R&D for Supporting the Colombian Amazon Vision and Building the UK Business Case for Support, with a Focus on Private Sector Engagement

Prioritization of Products and Supply Chains in the Departments of Caquetá and Guaviare

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1. Introduction

From 2011 – 2012 deforestation in Colombia was 295.892 hectares¹. Forty-seven percent of overall deforestation during this period occurred in the Amazon region departments, mainly Caquetá, Meta and Guaviare. Fifty six percent of the total area that was deforested was transformed into pasture for cattle.²

During the Conference of the Parties of the United Nations Framework Convention on Climate Change in 2009, the Colombian government announced the national goal of achieving zero net deforestation in the Colombian Amazon by 2020. In order to achieve this goal, the Colombian government has formulated the Amazon Vision Program led by the Ministry of Environment and Sustainable Development and with the participation of the Ministry of Agriculture, Sinchi Institute, IDEAM, and the Unit of National Natural Parks, among others. As a part of this process, four pillars of work have been defined containing eight strategies aimed at reducing deforestation.

Interested in supporting this program and Colombia in achieving this goal, the government of the United Kingdom is exploring options for providing financial support through the International Climate Fund (ICF). To that end, in July 2014 it signed an agreement with the Consortium comprised of Earth Innovation Institute (lead), Fundación Natura, WWF Colombia, and Forest Trends to carry out a study focused on developing and identifying common commitments for supporting the Amazon Vision Program, with an emphasis on identifying, designing, and developing mechanisms for attracting the participation and support of the private sector in the Program. Complementarily, this work will support the development of a Business Case, which will be submitted by the government of the United Kingdom for financing the necessary interventions within the framework of this initiative.

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In order to promote the active participation of the private sector in this initiative, the study is focused on identifying and analyzing potential public-private alliances under Strategies Three, Four, Five, and Six of the Amazon Vision Program and in the design of the necessary interventions to promote private sector engagement and sustainable supply chains in the departments of Caquetá and Guaviare.

In this context, the first product for the development of this study is the prioritization of the Colombian Amazon region's supply chains that are best positioned to receive support for their technical-productive transformation, in order to achieve both production goals and Zero Net Deforestation.

The process of prioritization included the following steps:

¹ Ministerio de Ambiente y Desarrollo Sostenible Instituto de Hidrología, Meteorología y Estudios Ambientales. Actualización datos oficiales sobre deforestación Años 2011-2012. Presentación Omar Franco Torres Director General - IDEAM Bogotá, agosto 05 de 2013.

² Ministry of Environment and Sustainable Development. 2013. Colombia's Low Deforestation Development Vision for the Amazon. Document of the Amazon Vision Program.

1. Surveying agricultural and livestock supply chains in the departments of Caquetá and Guaviare
2. Reviewing secondary information on issues of public policy, current production, characteristics of supply chains, local and national governments' plans and programs, and characterization of productive systems
3. Defining a prioritization methodology
4. Prioritizing supply chains and analyzing the principal elements that could contribute to the priority supply chains' role in achieving the goal of reducing deforestation

This document presents the prioritization methodology defined by the Consortium team, which is based on criteria and attributes that guide a process of evaluating and rating each of the supply chains of Caquetá and Guaviare.

The results of the exercise highlight those products and supply chains that offer the greatest potential for generating measurable results within a framework of performance-based payments for reducing deforestation. We also present observations of a general nature regarding particular aspects of the target supply chains and the conditions of the regional geopolitical context.

The exercise of prioritizing allows for the characterization of production systems and the understanding of the configuration of their respective supply chains at the departmental level. This analysis is the basis for the subsequent mapping processes to identify strategies for ensuring production practices that improve efficiency and productivity, increase the chains' competitiveness in the market, and simultaneously generate results in terms of reducing deforestation.

2. Barriers to Private Sector Engagement in the Colombian Amazon Region

We preface the description of the supply chain analyses with a brief summary of the barriers to private sector engagement in the Amazon region of Colombia. It is no coincidence that the Amazon region of Colombia is half of the nation's land surface and one percent of its GDP. In general, the Amazon region is an extremely risky place to do business. Large areas of the region are influenced by armed guerillas, illicit crops are grown in many areas, land tenure status is highly uncertain, transportation, energy and other logistical infrastructure is precarious, and the capacity of the regional and local governments to implement laws and provide basic services is weak.

Most of the land that has been cleared for farming or livestock now supports cattle pasture. Cattle is a logical choice for small-scale producers with tenuous claims on their land because it provides several household benefits (such as milk, beef, traction and transport), it is portable (cows can walk to market), and cattle pasture is the easiest way to demonstrate productive use of the land—a pre-requisite for winning formal land titles.

Any program that seeks to harness the strength of the private sector to help slow deforestation in the Amazon must be accompanied by investments designed to strengthen the governance capacity of public institutions, mechanisms for accelerating land titling and recognition of community claims on land, for recognizing and supporting indigenous peoples, whose territories cover half of the Amazon region, and improvement in basic services for providing health care, education, and law enforcement.

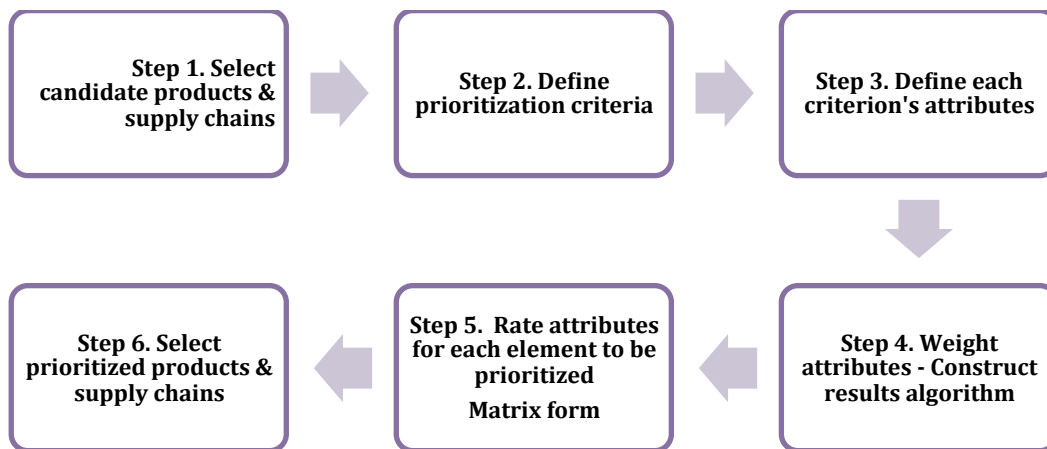
3. General considerations on the role of products and their supply chains in deforestation

This analysis is done with the assumption that products and their supply chains can influence deforestation in two primary ways. First are the products that are important drivers of deforestation today but that can be shifted towards production systems in which increases in output are achieved on existing cleared lands, through intensification. Private sectors actors, in this case, could become important agents in achieving this transition, through zero deforestation requirements imposed upon suppliers, through the terms of contracts with supplying farmers, and through investments and technical assistance to smallholder producers. The second major pathway by which a supply chain intervention could slow deforestation is through products and supply chains that do not depend upon deforestation, and have a high potential for providing jobs and economic opportunities to the region's population. These include perennial crops for which adequate processing and national or international markets exist that can overcome the logistical constraints doing business in the Amazon region. In the strongest strategy, both of these interventions will work synergistically, with one set of interventions addressing deforestation drivers and another set strengthening the crops that provide the most promising economic alternatives. It is important to note, however, that intensification and increases in profitability of production systems can also create revenues that can, in turn, be invested in deforestation promoting activities.

4. Qualitative methodology for prioritizing supply chains in Caquetá and Guaviare

We prioritized the products and supply chains of the Colombian Amazon that hold the greatest potential for private sector engagement that slows deforestation by developing a ranking system based upon five criteria using the following methodological path:

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Source: Camacho, A. 2014. This document.

The fundamental focus for prioritizing products and supply chains was the economic and areal importance in the territory. According to the analyses, monitoring, and evaluations undertaken by several actors in

the region, it is possible to find zones of high, medium, and low levels of deforestation or land degradation in the Amazon³.

Based on this view, four prioritization criteria were defined:

1. **Potential for slowing deforestation**
2. **Supporting Policies and Planning**
3. **Supply**
4. **Demand**

- **Step 1. Select the supply chains that will serve as e basis for prioritization**

The prioritization methodology was applied to all of the products and their supply chains identified in Caquetá and Guaviare, including the group of farm products that are not formally organized in a supply chain recognized by the Ministry of Agriculture and Rural Development, but which in practice behave as a supply chain that is enabled by market conditions and therefore has the potential for reducing deforestation in the region.

Table 1 shows the products for which we have production data the two departments that serve as the focus for this study.

Table 1. Products and supply chains that were considered in the prioritization exercise.

Group or Chain	Products
Late-Producing Crops	Cacao
	Natural rubber
	Macadamia nuts
	Cashews
Amazonian Fruit	Cocona
	Açaí
	Inchi
	Uva caimarona
	Arazá
	Copoazu
	Chontaduro [peach palm]
	Borojó
	Camu camu
	Amazonian soursop
	Canangucha
Forest	Wood
Livestock	Meat (bovine)
	Milk

³ Taller “Análisis de criterios para la promoción de cadenas y sistemas productivos que contribuyan a la reducción de la deforestación en la región amazónica” Bogotá D.C., 29 de mayo de 2014.

Group or Chain	Products
Special Coffees	Amazonian coffee
Biodiversity	Aromatic plants and essences
	Medicinal plants
	Vegetable fibers
Fish Farming	Ornamental fish
Annual Crops	Plantain

Step 2. Define the criteria

In order to be able to determine the priority products in the departments of Caquetá and Guaviare, we defined four criteria focused generally on public policy and planning instruments, market elements such as supply of and demand for the products at various levels, and the impact of the supply chains in terms of deforestation. Definitions of each of the criteria defined for the prioritization process are described in the paragraphs below:

1. **Contribution to decreasing deforestation:** This criterion evaluates the potential of supply chains to reduce deforestation by implementing strategies along the supply chains (e.g. traceability, implementation of good practices, intensification, no-deforestation agreements)
2. **Support through public policy and planning:** This criterion refers to the state of national and local policy instruments, as well as financial mechanisms or incentives, to support local producers or strengthen supply chains at the regional and national levels.
3. **Supply:** This criterion analyzes the existence of national, regional, or local mechanisms and institutions, which support the technical development of supply chains aimed primarily at improving the quality, productivity, and value-add of each of the products.
4. **Demand:** This analyzes the existence of demand for the products at the international, national, or local/regional levels.

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Step 3. Define the attributes of each criterion

For each criterion, we selected a group of variables that serve as indicators. The criteria and their variables are presented in Table 2.

Table 2. Description of criteria, attributes, and scores for the prioritization

CRITERION	ATTRIBUTE	SCORE
Potential for deforestation		WEIGHTING 40%
They implement sound practices	Existing alternatives are implemented for conserving the forests and reducing deforestation in the production systems	They exist and the beneficiaries implement them (40) They exist (20) They do not exist (0)

CRITERION	ATTRIBUTE	SCORE
Allows for the generation of agreements to reduce deforestation	Organizations exist that enable the development and implementation of agreements of a sectorial nature	They exist and the beneficiaries implement them (30) They exist (15) They do not exist (0)
Supply chain traceability	Mechanisms exist that allow for the monitoring of the product's supply chain, from farm to processor to retailer	They exist and the beneficiaries implement them (30) They exist (15) They do not exist (0)
CRITERION	ATTRIBUTE	SCORE
Support through Public Policy and Planning		WEIGHTING 30%
Infrastructure	Access routes and infrastructure that support the processing and distribution of the primary products	Not a limiting factor (20) Moderately limiting factor (10) Highly limiting factor (0)
Caquetá agenda	Included in the department's development plans and prospective agendas	Is a priority (15) Is mentioned (7) Is not (0)
Guaviare agenda	Included in the department's development plans and prospective agendas	Is a priority (15) Is mentioned (7) Is not (0)
Production incentive	Existence of and access to governmental instruments** or programs that promote the production of these products	They exist and the beneficiaries access them (15) They exist (7) They do not exist (0)
Established, legally compliant sector	Supply chain is formalized in accordance with national regulations	There is an established chain (15) No chain exists (0)
Formalization of ownership	The farmers in general have tenure and usufruct titles to the land	Have title (20) With usufruct rights (10) Do not have (0)
Supply (conditions favoring production)		WEIGHTING 15%
Technical assistance instruments	Organizations or institutions exist that provide technical assistance to the farmers	They exist and the beneficiaries access them (30) They exist (15) They do not exist (0)
Value-added	Level of industrial processing of raw materials	Processed products (30) Part of the production is processed (15) Only raw materials (0)
Type of production system	Characterization based on the size of the production system	Semi-business (20) Family-run business (10) Subsistence (0)
Technological packages developed and validated	Existence of technological packages aimed at improving the quality and productivity of the production systems	They exist and the beneficiaries implement them (20) They exist (10) They do not exist (0)
Demand (conditions favoring marketing)		WEIGHTING 15%
International demand	Under current conditions, the products from Caquetá and Guaviare	Exists (25) Does not exist (0)

CRITERION	ATTRIBUTE	SCORE
	can access international markets	
National demand	Under current conditions, the products from Caquetá and Guaviare can access national markets	Exists (35) Does not exist (0)
Local demand	Under current conditions, the products from Caquetá and Guaviare can access local/regional markets	Exists (40) Does not exist (0)

*UAF: Family Agriculture Unit.

**Subsidies, credit programs, cooperation programs or any other incentive.

Step 4. Weighting of the attributes – construction of a results algorithm

We developed a matrix whose rows contain a list of all of the chains and products considered within the production activities of Caquetá and Guaviare. Its columns contain the criteria and variables with their respective weights and scores, like this:

1. Contribution to decreasing deforestation (40%)
2. Support through public policy and planning (30%)
3. Supply (15%)
4. Demand (15%)

Each variable is assigned a notation (an identifying letter to facilitate the construction of a results algorithm). Greater weight was given to attributes that contribute to decreasing deforestation, as this exercise proposes to identify those supply chains with the greatest potential for reducing deforestation (Annex 1).

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Table 3. Description of scoring for each prioritization criterion and attribute

Contribution to Decreasing Deforestation	Variable Score	Weighting of Criterion
They implement sound practices	40%	40%
Allows for the generation of agreements to reduce deforestation	30%	
The chain is traceable	30%	
Focus on Policy & Planning	Variable Score	Weighting of Criterion
Infrastructure	20	30%
Caquetá agenda	15	
Guaviare agenda	15	
Production incentive	15	
Established supply chain	15	
Formalization of ownership	20	
Supply	Variable Score	Weighting of Criterion
Technical assistance instruments	30%	15%
Value-added	30%	
Type of production system	20%	

Technological packages developed and validated	20%	
Demand	Variable Score	Weighting of Criterion
International demand	25%	15%
National demand	35%	
Local demand	40%	

In this manner, the following yields the prioritization of the supply chains (PC):

$$PC = \sum [(C1) \times 0,4] + \sum [(C2) \times 0,15] + \sum [(C3) \times 0,15] + \sum [(C4) \times 0,3]$$

Wherein:

PC: prioritization of the supply chain

C1: summation of the columns corresponding to the variables of the criterion ‘Contribution to Decreasing Deforestation’

C2 : summation of the columns corresponding to the variables of the criterion ‘Supply’

C3: summation of the columns corresponding to the variables of the criterion ‘Demand’

C4: summation of the columns corresponding to the variables of the criterion ‘Focus on Policy and Planning’

Lastly, the prioritized supply chain must fulfill the condition $PC \geq 60$

5. Results

In accordance with the results of the exercise, the priority production systems that are scored greater than 60% are:

- Natural rubber: 77%
- Cacao: 70,25%
- Amazonian coffee: 69.5%
- Milk and meat: 60.5%

Table 4 contains a summary of the matrix found in Annex 1 of this document. As can be seen in this matrix, natural rubber is the crop with the best conditions. In addition to being prioritized in national and local agendas, the conditions related to infrastructure and land tenure are not determining factors for its production. On a related note, it is a product that has been broadly promoted in the departments, both by the State as well as cooperation programs.

The opportunity offered by Amazonian coffee is interesting. Although it is a product located in a specific area of Caquetá and is not a priority on local agendas, it emerges in the analysis as an ideal product both in terms of the market, as well as environmental sustainability that can be strengthened and boosted, particularly in piedmont areas where this crop is already a production alternative and can contribute to improving the landscape’s connectivity.

In terms of cattle ranching, it should be highlighted that it is a production system that offers the potential for promoting processes for reducing deforestation, however implementation will require strict criteria

related to the strengthening of sector – wide agreements and the expansion of sound practices for higher productivity and lower environmental impacts in the areas where it is already established. Also, forest conversion to cattle pasture as a mechanism for obtaining land titles must be addressed if this product/supply chain is shift from a driver of deforestation to an inhibitor of deforestation. In terms of enabling conditions, while it is a production system favored by its importance within local agendas and is positioned as the principal production activity both in Caquetá⁴ as well as Guaviare⁵ (Sinchi), it is constrained by elements such as the lack of infrastructure.

Table 4. General results of the prioritization

Group	Product or Crop	Policy & Planning Focus 30%	Supply Focus 15%	Demand Focus 15%	Contribution to Decreasing Deforestation 40%	Total Weight
Late-Producing Crops	Cacao	24	8.25	9	38	79.25
	Natural rubber	27	12	9	38	86
	Macadamia nuts	7.5	1.5	9	26	44
	Cashews	9	1.5	9	26	45.5
Amazonian Fruit	Cocona	12.6	3.75	6	14	36.35
	Açaí	12.6	3.75	6	14	36.35
	Inchi	12.6	3.75	6	14	36.35
	Uva caimaronona	12.6	3.75	6	14	36.35
	Arazá	9.6	3.75	6	14	33.35
	Copoazu	12.6	3.75	6	14	36.35
	Chontaduro [palm fruit]	12.6	3.75	6	14	36.35
	Borojó	12.6	3.75	6	14	36.35
	Camu camu	12.6	3.75	6	14	36.35
	Amazonian soursop	9.6	3.75	6	14	33.35
	Canangucha	9,6	3.75	6	14	33,35
Forest	Wood	16.5	2.25	15	20	53.75
Livestock	Meat (bovine)	21	8.25	11.25	26	66.5
	Milk	21	8.25	11.25	26	66.5
Special Coffees	Amazonian coffee	19.5	6	15	38	78.5
Biodiversity	Aromatic plants and essences	7.2	0	0	8	15.2
	Medicinal plants	7.2	0	0	8	15.2
	Vegetal fibers	7.2	0	0	8	15.2

⁴ Instituto Sinchi 2012. Línea base para el monitoreo de los sistemas productivos en el Departamento del Caquetá.

⁵ Instituto Sinchi 2013. Caracterización y tipificación de los sistemas productivos en el area intervenida del Departamento del Guaviare.

Group	Product or Crop	Policy & Planning Focus 30%	Supply Focus 15%	Demand Focus 15%	Contribution to Decreasing Deforestation 40%	Total Weight
Fish Farming	Ornamental fish	12.6	6	9	14	41.6
Annual Crops	Plantain	12.3	3.75	6	14	36.05

In general we can see that all of the supply chains are the beneficiaries in one way or another of State programs or existing incentives, which, while not widely utilized, offer the potential for being adapted to promote their implementation and eventually include criteria associated with sound practices and the reduction of deforestation.

The existence of technological packages is another relevant variable for prioritization. The cacao and natural rubber chains have technological implementation packages that are promoted by the trade institutions. In the case of cattle ranching, technological packages associated with intensive production, recuperation of meadows, and inclusion of silvopastoral arrangements need to be disseminated and implemented at a greater scale. In this way, this chain could be made to actually contribute to the restoration of degraded areas, sound soil management in areas where it has already been established, and income diversification.

According to the study by the Sinchi Institute (2012), in recent years the consolidation of supply chains such as those of natural rubber and cacao in Caquetá, together with the increase in the provision of services and technical assistance, has brought about changes in the typology of the farms in high-, medium-, and low-deforested/degraded zones. In this context, the inclusion of criteria for sustainability in supply chains offers a real opportunity for transformation of production systems toward low-emission rural development characterized by zero deforestation. This study also remarks that the level of deforestation or land degradation determines the types of farms, so any efforts to promote changes of production patterns should be carried out taking into account a comprehensive approach based on the land use dynamics. In this context, some production systems are more suitable in some areas than others, according to the level of deforestation or land degradation.

Natural Rubber

Natural rubber's plantations (*Hevea brasiliensis*) could become an important component of a regional development plan that is increasing production, tax revenues and jobs through long-lived tree crops. Rubber is one of the top candidates for providing an alternative to illicit crops. Investments in rubber take a long time to amortize. First production occurs five years after the establishment of the plantation. Nevertheless, this crop is productive for between 25 and 30 years.⁶ This crop offers other byproducts such as wood, so national programs should include strategies for the commercial use of all those derived products.

In Colombia the majority of the rubber producers have organized and unionized themselves in the *Federación Nacional de Cultivadores de Caucho* [National Federation of Rubber Cultivators] (FEDECAUCHO). In the case of Caquetá, the *Asociación de Reforestadores y Cultivadores de Caucho*

⁶ Espinal, Martínez Coaleda, & Ortiz Hermedia, *La cadena del cacao en Colombia. Una mirada global de su estructura y dinámica 1999-2005* [The Cacao Chain in Colombia: A Comprehensive View of its Structure and Dynamics, 1999-2005], 2005.

del Caquetá [Association of Reforesters and Rubber Cultivators of Caquetá] (ASOHECA) was established and in Guaviare, the *Asociación de Productores y Comercializadores de Caucho del Guaviare* [Association of Rubber Producers and Sellers of Guaviare] (ASOPROCAUCHO). The consolidation of these types of organizations, along with trade union support, represent principal strengths of this crop and offer opportunities for sectorial agreements that include commitments related to the reduction of deforestation.

Natural rubber is a crop characterized by its dispersion and small plots of land. Caquetá is reported to be the department with the greatest area cultivated with rubber on the national level, with 46% of its total national production, followed by Guaviare with 10% (Espinal G. et al 2005). According to the government of Caquetá, Caquetá is the biggest producer of natural rubber in the country, producing approximately 1.575 tons/year and representing more than 75% of national production.⁷

This crop is generally associated with other species, including subsistence species that contribute to local populations' food security. This type of association in agroforestry and silvopastoral arrangements permits this crop, together with cacao, to constitute buffer zones between deforested areas and the natural forest that could prevent the advance of deforestation, principally in landscape matrices where the forest still is the predominant cover.

Natural rubber is included as one of the products considered by the *Apuesta Exportadora Agropecuaria* to be a promising export at the national level;⁸ consequently, it is a part of the Caquetá⁹ and Guaviare¹⁰ development agendas. This condition determines a certain level of priority in terms of resources for technical support, establishment, and promotion of markets favoring the development of comprehensive plans for strengthening supply chains that include low emission rural development criteria characterized by zero deforestation and are appropriate for the conditions of the Colombian Amazon. However it is important to take into account the oscillation of rubber's prices that could have an important impact on the supply chains.

The cultivation of natural rubber has been promoted as a part of international cooperation programs and national programs to combat illicit crops, which has resulted in dispersed production arrangements comprised of small patches of rubber associated with other production systems such as cattle ranching and cacao. The dispersion of these patches of natural rubber makes it difficult to establish a continuous supply, provide technical assistance, traceability of the raw materials, and access to markets with greater added value. As such, it is important to consolidate the rubber production areas in order to improve efficiency.

The industrialization of natural rubber has encouraged the development of technological packages and the establishment of facilities such as the processing plant in Caquetá. This progress represents an

⁷ <http://www.caqueta.gov.co/index.php/nuestro-departamento/economia>

⁸ Apuesta Exportadora Agropecuaria. Ministerio De Agricultura Y Desarrollo Rural 2006 – 2020.

⁹ Gobernación del Caquetá. Plan de Desarrollo Departamental. Gobierno de Oportunidades. 2012 – 2015

¹⁰ Gobernación del Guaviare. Plan De Desarrollo Departamental “Así Marcamos Huella, 2012-2015” Ordenanza No. 011 (Mayo 22 de 2011)

opportunity for strengthening the supply chain, improving processing, and scaling up experiences. It should be noted that in the case of Guaviare, strengthening local social processes among smallholder producers are needed for ensuring the sustainability of the long-term production processes. Although rubber production has reached some level of industrialization, natural rubber offers opportunities for developing projects with greater value-add, which require the development of more advanced facilities and technological packages.

Cacao

The second long-lived perennial crop that could contribute to a regional low-deforestation development strategy is cacao. It is grown primarily in mixed species agroforestry systems, and the potential for increasing production through improved practices is high.

Cacao, similar to other crops in Colombia, is characterized by having most of its production occurring within the framework of small-scale agriculture, with most production areas measuring five to 20 hectares.¹¹ According to the Sinchi study (2012), cacao in the departments of Caquetá and Guaviare is associated with other semi-industrial or familial farming systems located in zones of high-, medium-, and low-level of anthropic disturbance (Sinchi 2012, 2013). This configuration provides an opportunity to influence the existing farm arrangements and potentially achieve a greater impact by promoting more efficient production arrangements with the specific purposes of promoting improved management of Amazonian soils, including other Amazonian species, connecting the landscape, and reducing deforestation.

Similar to natural rubber, cacao is produced for export and is part of the Caquetá and Guaviare's development plans, even though the most representative cultivation areas are located in the department of Caquetá.¹²

In particular, cacao has specific policies and programs targeting national production that are included within the Cacao Cultivator Plan. This plan includes credits for new plantings and the renovation of crops, improvement of processing plant systems, a campaign for improving the phytosanitary condition of the crops, and a research agenda for improving crop genetics and management.¹³ Given the particular conditions of the Amazon and the possibility of accessing markets with special varieties of cacao that contribute to reducing deforestation, plans for strengthening the supply chains in Caquetá and Guaviare can be coordinated with the national Cacao Cultivator Plan to ensure processes that support the access to differentiated niche markets for Amazonian cacao. Cacao production in Caquetá and Guaviare is a part of what is supplied to the *Federación Nacional de Cacaoteros* [National Federation of Cacao Cultivators]

¹¹ Calderon, N. 2007. Construyendo Agenda 21 para el Departamento de Caquetá: Una construcción colectiva para el Desarrollo Sostenible de la Amazonía Colombiana. Obtenido de Corpoica:

¹² 526 hectares were reported in Guaviare in 2010; this increased to 685 in 2013 according to the farming evaluation. <http://guaviare.gov.co/apc-aa-files/64383837663531313135613632303736/informe-de-coyuntura-eva-2013-revisado.pdf>. In the case of Caquetá, figures from the Guaviare government report an area 1,169 hectares through 2009. <http://www.caqueta.gov.co/index.php/documentos-agropecuario/file/788-documentos-agropecuarios>

¹³ Ministerio de Agricultura, 2012. Cartilla de Política Agropecuaria 2010 – 2014. Segunda Edición. Documento elaborado en la Dirección de Política Sectorial del Ministerio de Agricultura y Desarrollo Rural

(FEDECACAO) and as such, cooperation could be improved within this sector in order to promote special types of cacao that reduce deforestation.

The National Cacao Fund is a specific instrument for providing credit and technical assistance to cacao producers. This fund could potentially be an ally in strengthening the processes and promoting better practices throughout the supply chains.

Given the opportunity this product offers in promoting agroforestry arrangements and recuperating degraded areas, the cacao industry can also serve as an alternative for promoting sectorial agreements to not deforest and to implement sound practices.

Amazonian coffees

Coffee is a third crop with high potential to contribute to a regional low-deforestation, high-production development model. Well-established, consolidated and differentiated markets already exist for coffee, as well as a base of producers and solid demand from national and international markets. However, it must be kept in mind that this production system is geographically restricted in Amazonian mountainous and piedmont areas of Caquetá,¹⁴ particularly in the municipality of Puerto Rico. According to the department's farming evaluation, in 2011 Caquetá had more than 3,500 hectares planted.

According to government figures, the *Cooperativa de Caficultores del Caquetá* [Cooperative of Coffee Producers of Caquetá] has 1,281 registered members, 234 of whom are skilled members and 845 of whom are documented members. It is estimated that 50% of the production is comprised of special or Amazonian coffee that is sold at a premium price due to the fact that it is of export quality. This coffee is already well positioned in international markets; this has also determined the preference for diverse biodiversity-friendly production arrangements with organic production systems.

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Interventions in this chain could have significant impacts on deforestation-reduction initiatives. Given the fact that the sector is already sensitive to deforestation issues and has experience in processes related to specialty coffees, coffee production could in particular present solid opportunities for providing spatial connectivity at the territorial level if biodiversity-friendly production systems are expanded. The industry could also offer the opportunity for sectorial agreements and private sector participation processes including goals to reduce deforestation.

Bovine milk and meat

As the main driver of deforestation today—for both subsistence uses, for sale to market, and as a mechanism for gaining title to land, beef and milk are high priorities for private sector interventions. Forest conversion to pastures is the major driver of deforestation today, particularly in the northwestern areas of the departments of Caquetá, Guaviare, Meta, and Putumayo.¹⁵ Cattle ranching, in terms of the surface area, is the principal supply chain in Caquetá and Guaviare and likewise is the principal driver of

¹⁴ Instituto Sinchi 2012. Línea base para el monitoreo de los sistemas productivos en el Departamento del Caquetá..

¹⁵ Murcia, U., Huertas C.M., Rodríguez, J. M., Castellanos, H. 2010. *Monitoreo de los bosques y otras coberturas de la Amazonia colombiana, datos del año 2007* [Monitoring the Forests and Other Covers in the Colombian Amazon, Data from 2007]. Instituto Amazónico de Investigaciones Científicas Sinchi [Sinchi Amazonian Institute of Scientific Research]. Bogotá, D.C.

deforestation; as such, it is a priority sector which should be strengthened in the areas where it is already established, and mechanisms should be created for preventing its expansion.¹⁶

Although the production of livestock holds greater importance in the department of Caquetá, the production patterns are similar in the two departments and can have similar impacts in terms of transforming natural land cover. According to farming evaluation figures from the department of Caquetá through 2011, there were more than 1,500,000 hectares of grasslands, not all of which were in use. In 2011, there was a total of 1,837,000 head of cattle in the department of Caquetá, representing 7.1% of the national total.¹⁷ Cattle-ranching holds less importance in the department of Guaviare at the national level, given that this department had 264,300 head of cattle in 2011, representing just 1% of the national total.

Although cattle ranching stands out as the principal element in the department's economy, it presents several deficiencies related to sanitation and food safety practices, low or no value-add for meat, milk, and bi-products, inappropriate use of the soil, and loss of productivity.¹⁸ Logistics and infrastructure are also limiting factors in the local development of value-added products.

Cattle ranching in these departments can be of three kinds: for meat, milk, and both purposes. It is thus necessary to differentiate the type of production that predominates in each of the zones to be studied. The cattle ranching that has developed in Caquetá is a traditional extensive low-tech model characterized by simple techniques, which has in many cases caused the deterioration of pastures due to the impoverishment of the soils. In general, strategies aimed at enriching the soils with organic materials and nutrients are not implemented. Instead, the most common form of cattle production is extensive, with low inputs (Calderón 2007, Sinchi 2013).

According to personal interviews, the farmers highlight that one of the favorable aspects of production is the presence of established breeds that are highly resistant to environmental conditions and as such, require few antibiotics and hormones. This in turn holds the potential for exploring differentiated markets. The milk produced in Caquetá is of a nationally recognized quality, which has favored the expansion of the familial model of cattle ranching for the production of milk and cheese.

While the quality of the milk has attracted the formation of milk districts such as the one in which Nestlé operates (Nestor Gacharná, personal communication), infrastructure conditions, especially roads and electricity, restrict the development of and the adding of value of this sector and value-added milk products, therefore increasing the associated costs by limiting the entry of other private sector companies.

¹⁶ Murcia, U., Rodríguez, J. M., Castellanos, H., Medina, R., Herrera, E, and Hernández, A. 2013. *Monitoreo de los bosques y otras coberturas de la Amazonia colombiana, a escala 1:100.000. Cambios multitemporales en el periodo 2007 al 2012* [Monitoring the Forests and Other Covers in the Colombian Amazon at a scale of 1:100.000: Multi-Temporal Changes during the Period 2007-2012]. Instituto Amazónico de Investigaciones Científicas Sinchi. Bogotá, D.C.

¹⁷ Ministerio de Industria y Comercio. 2013. Informe para el Departamento de Caquetá. On line..

¹⁸ Calderón, N. 2007. *Construyendo Agenda 21 para el Departamento de Caquetá: Una construcción colectiva para el Desarrollo Sostenible de la Amazonía Colombiana* [Constructing an Agenda 21 for the Department of Caquetá: A Collective Construction for the Sustainable Development of the Colombian Amazon]. Accessed from Corpoica: http://www.corpoica.org.co/sitioweb/archivos/publicaciones/caquetanov_22007.pdf.

Although ‘Caquetá Cheese’ is well known for its origin, it still is not well positioned in national markets; its quality and distinguishing characteristics are recognized and represent factors that offer a real market opportunity for the region’s dairy sector.

There is interest in these two departments on the part of local governments and research and technology-transfer entities in designing and including sustainability practices into cattle-ranching systems as a strategy for improving farmers’ living conditions and reducing cattle ranching’s negative impacts on the environment.

In accordance with the prioritization, the cattle ranching chain offers opportunities to the extent that it is included in national and departmental policies, there are specific incentives for the farmers, and it is strongly unionized. Such conditions would permit the design of incentives for preventing deforestation that are associated with programs that promote intensification and good practices. Existing institutions can facilitate access to technical assistance and technology transfer aimed at increasing productivity and product quality.

Amazonian fruit trees

Amazonian fruit trees in general were weighted an average of 30%; nonetheless, it is important to point out that these production systems constitute the most fitting option for promoting production systems in low-intervention areas. These production systems are likewise a part of proposed silvopastoral and agroforestry arrangements within the natural rubber, cacao, and cattle ranching supply chains. In this context, the formation and strengthening of Amazonian fruit supply chains is necessary for ensuring the sustainability of production arrangements in the medium and long terms and providing options for the sustainable management in areas where forest is the dominant land cover.

It is important to highlight that at the level of the *Asociación Nacional de Empresarios de Colombia* [National Association of Manufacturers and Entrepreneurs] (ANDI) there exists particular interest in these types of products, considering the possibilities that they offer for the cosmetic and pharmaceutical industries. However, it is necessary to ensure appropriate conditions for promoting chains based on these products, principally in terms of clear regulatory frameworks regarding the use of wild products, access to genetic resources, informed consent, and others that today constitute barriers to its establishment.

In a scenario of deforestation reduction, these products constitute the principal alternative for productive development in low- and medium-intervention areas. As such, even though the chains do not currently hold great importance, they should be included in short- and medium-term development plans for the Amazon.

6. Conclusions

- Rubber and cacao hold the greatest potential for leveraging private sector interventions to provide a substantial regional alternative to deforestation-driving activities. The milk and beef sectors represent the greatest potential for directly intervening in forest clearing, since they are the major driver of deforestation.

- The prioritized supply chains offer opportunities for strengthening production and efficiency, including possibilities for sector-wide agreements focused on the implementation of sustainable production practices and arrangements favoring the reduction of deforestation.
- As the predominant production system, cattle ranching systems are in need of programs that improve production practices, favor alliances with the private sector, and create the appropriate conditions for this system to be consolidated in areas where it is already established and prevent its expansion into areas of low and medium rates of deforestation.
- The natural rubber and cacao supply chains represent an alternative in areas of high and medium intervention. These crops can contribute to deforestation reduction through sector-wide agreements to promote agroforestry arrangements, avoid the cutting down of the forests, and establish buffer zones between cattle ranching and forest areas.
- Technical assistance and accompaniment represent limiting factors for all supply chains. Therefore, any support will need institutional cooperation in order to achieve common objectives, including agreements to reduce deforestation and promote territories free from deforestation in the departments of Caquetá and Guaviare.
- Public order and illegal activities such as the cultivation of coca, illicit extraction of materials, and the trafficking in wild fauna and flora, as well as the presence of illegal groups, constitute limiting factors for the development of any of these productive chains.
- Land tenure is a limiting factor for accessing public incentives and programs. As such, it is necessary to identify specific systems for attending to the population settled in these territories and offering options for the development of lawful activities that are coordinated with formal production chains.
- While the road and electricity infrastructure has been highlighted as a limiting factor for cattle ranching, this is a crosscutting element in the development of any of the supply chains identified.

Annex 1. Prioritization matrices for supply chains in Caquetá and Guaviare



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Annex 1. Prioritization matrices for supply chains in Caquetá and Guaviare

TOTAL SCORE		
GROUP	PRODUCT OR CROP	TOTAL WEIGHT
Late-Producing Crops	Cacao	70,25
	Natural rubber	77
	Macadamia nuts	35
	Cashew	36,5
Amazonian Fruit	Cocona	27,35
	Açaí	27,35
	Inchi	27,35
	Uva caimarona	27,35
	Arazá	27,35
	Cupuazu	27,35
	Chontaduro [palm fruit]	27,35
	Borojó	27,35
	Camu camu	27,35
	Amazonian soursop	27,35
	Canangucha	27,35
Forest	Wood	44,75
Livestock	Meat (bovine)	60,5
	Milk	60,5
Special Coffees	Amazonian coffee	69,5
Biodiversity	Aromatic plants and essences	4,2
	Medicinal plants	4,2
	Vegetal fibers	4,2
Fish Farming	Ornamental fish	32,6
Annual Crops	Plantain	27,05

GROUP	PRODUCT OR CROP	CONTRIBUTION TO REDUCING DEFORESTATION			
		GOOD PRACTICES [THEY IMPLEMENT THEM (40); THEY EXIST (20); THEY DO NOT EXIST (0)]	PERMITS THE GENERATION OF AGREEMENTS TO REDUCE DEFORESTATION [THEY ARE IMPLEMENTED (30); THEY EXIST (15); THEY DO NOT EXISTS (0)]	CHAIN IS TRACEABLE [IS IMPLEMENTED (30); EXISTS (15); DOES NOT EXIST (0)]	SUBTOTAL
		N	O	P	
		100			40%
	WEIGHTING	40	30	30	
Late-Producing Crops	Cacao	20	30	30	32
	Natural rubber	20	30	30	32
	Macadamia nuts	20	15	15	20
	Cashew	20	15	15	20
Amazonian Fruit	Cocona	20	0	0	8
	Açaí	20	0	0	8
	Inchi	20	0	0	8
	Uva caimarona	20	0	0	8
	Arazá	20	0	0	8
	Cupuazu	20	0	0	8
	Chontaduro [palm fruit]	20	0	0	8
	Borojó	20	0	0	8
	Camu camu	20	0	0	8
	Amazonian soursop	20	0	0	8
Canangucha	20	0	0	8	
Forest	Wood	20	15	0	14
Livestock	Meat (bovine)	20	15	15	20
	Milk	20	15	15	20
Special Coffees	Amazonian coffee	20	30	30	32
Biodiversity	Aromatic plants and essences	0	0	0	0
	Medicinal plants	0	0	0	0
	Vegetal fibers	0	0	0	0
Fish Farming	Ornamental fish	20	0	0	8
Annual Crops	Plantain	20	0	0	8

GROUP	PRODUCT OR CROP	POLICY AND PLANNING FOCUS						WEIGHT SUBTOTAL
		REGIONAL INFRASTRUCTURE	CAQUETÁ AGENDA [IT IS A PRIORITY (15); IT IS MENTIONED (7); IT IS NOT (0)]	GUAVIARE AGENDA [IT IS A PRIORITY (15); IT IS MENTIONED (7); IT IS NOT (0)]	PRODUCTION INCENTIVES [HAVE ACCESS (15); THEY EXIST (7); THEY DO NOT EXIST (0)]	ESTABLISHED CHAINS [CHAIN EXISTS (15); CHAIN DOES NOT EXIST (0)]	FORMALIZATION OF OWNERSHIP [HAS TITLE (20); WITH USUFRUCT RIGHTS (10); DOES NOT HAVE (0)]	
		A	B	C	D	E	F	
		100						
WEIGHTING		20	15	15	15	15	20	
Late-Producing Crops	Cacao	10	15	15	15	15	10	24
	Natural rubber	10	15	15	15	15	20	27
	Macadamia nuts	10	0	5	0	0	10	7.5
	Cashew	10	0	10	0	0	10	9
Amazonian Fruit	Cocona	10	7	15	0	0	10	12.6
	Açaí	10	7	15	0	0	10	12.6
	Inchi	10	7	15	0	0	10	12.6
	Uva caimarona	10	7	15	0	0	10	12.6
	Arazá	0	7	15	0	0	10	9.6
	Cupuazu	10	7	15	0	0	10	12.6
	Chontaduro [palm fruit]	10	7	15	0	0	10	12.6
	Borojó	10	7	15	0	0	10	12.6
	Camu camu	10	7	15	0	0	10	12.6
	Amazonian soursop	0	7	15	0	0	10	9.6
	Canangucha	0	7	15	0	0	10	9.6
Forest	Wood	10	15	15	15	0	0	16.5
Livestock	Meat (bovine)	0	15	15	15	15	10	21
	Milk	0	15	15	15	15	10	21
Special Coffees	Amazonian coffee	10	15	0	15	15	10	19.5
Biodiversity	Aromatic plants and essences	10	7	7	0	0	0	7.2
	Medicinal plants	10	7	7	0	0	0	7.2
	Vegetal fibers	10	7	7	0	0	0	7.2
Fish Farming	Ornamental fish	10	15	7	0	0	10	12.6
Annual Crops	Plantain	10	7	7	7	0	10	12.3

GROUP	PRODUCT OR CROP	SUPPLY FOCUS (PRODUCTION SYSTEM)				WEIGHT SUBTOTAL
		TECHNICAL ASSISTANCE [THEY RECEIVE (30); EXISTS (15); DOES NOT EXIST (0)]	VALUE-ADD [VALUE IS ADDED (30); PART OF THE PRODUCTION IS PROCESSED (15); ONLY RAW MATERIALS (0)]	TYPE OF PRODUCTION SYSTEM [SEMI-BUSINESS (20); FAMILIAL (10); SUBSISTENCE (0)]	TECHNOLOGICAL PACKAGES DEVELOPED AND VALIDATED [ARE IMPLEMENTED (20); EXIST (10); DO NOT EXIST (0)]	
		G	H	I	J	
		100				
WEIGHTING		30	30	20	20	
Late-Producing Crops	Cacao	30	15	10	20	8.25
	Natural rubber	30	30	20	20	12
	Macadamia nuts	0	0	10	10	1.5
	Cashew	0	0	10	10	1.5
Amazonian Fruit	Cocona	15	0	10	10	3.75
	Açaí	15	0	10	10	3.75
	Inchi	15	0	10	10	3.75
	Uva caimarona	15	0	10	10	3.75
	Arazá	15	0	10	10	3.75
	Copoazu	15	0	10	10	3,75
	Chontaduro [palm fruit]	15	0	10	10	3.75
	Borojó	15	0	10	10	3.75
	Camu camu	15	0	10	10	3.75
	Amazonian soursop	15	0	10	10	3,75
	Canangucha	15	0	10	10	3.75
Forest	Wood	15	0	0	0	2.25
Livestock	Meat (bovine)	30	15	10	20	8.25
	Milk	30	15	10	20	8.25
Special Coffees	Amazonian coffee	30	0	10	20	6
Biodiversity	Aromatic plants and essences	0	0	0	0	0
	Medicinal plants	0	0	0	0	0
	Vegetal fibers	0	0	0	0	0
Fish Farming	Ornamental fish	30	0	10	20	6
Annual Crops	Plantain	15	0	10	10	3.75

GROUP	PRODUCT OR CROP	DEMAND FOCUS MARKETING SYSTEM			
		INTERNATIONAL DEMAND	NATIONAL DEMAND	LOCAL/REGIONAL DEMAND	SUBTOTAL
	K	L	M		
	WEIGHTING			100	15%
Late-Producing Crops	Cacao	25	35	0	9
	Natural rubber	25	35	0	9
	Macadamia nuts	25	35	0	9
	Cashew	25	35	0	9
Amazonian Fruit	Cocona	0	0	40	6
	Açaí	0	0	40	6
	Inchi	0	0	40	6
	Uva caimarona	0	0	40	6
	Arazá	0	0	40	6
	Cupuazu	0	0	40	6
	Chontaduro [palm fruit]	0	0	40	6
	Borojó	0	0	40	6
	Camu camu	0	0	40	6
	Amazonian soursop	0	0	40	6
	Canangucha	0	0	40	6
Forest	Wood	25	35	40	15
Livestock	Meat (bovine)	0	35	40	11.25
	Milk	0	35	40	11.25
Special Coffees	Amazonian coffee	25	35	40	15
Biodiversity	Aromatic plants and essences	0	0	0	0
	Medicinal plants	0	0	0	0
	Vegetal fibers	0	0	0	0
Fish Farming	Ornamental fish	25	35	0	9
Annual Crops	Plantain	0	0	40	6