GOBIERNO DE COLOMBIA

DNP DEPARTAMENTO NACIONAL DE PLANEACIÓN

Global Green Growth Institute

Norwegian Ministry of Climate and Environment

MISIÓN DE CRECIMIENTO VERDE

ONF Andina

Forest economy studies in the framework of the Green Growth Taskforce in Colombia

Executive Summary

09/06/2018

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September 2018, Colombia

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1 Introduction

Colombia is one of the richest countries in the world in terms of biodiversity, and is generously endowed with forests, water and mineral resources. Exploitation of its natural capital has been and still is a crucial part in the developmental success of the country. However, the analysis conducted by the World Bank in the Colombia Systematic Country Diagnosis (World Bank, 2016)[1] highlights, among its main challenges, the ability to promote non-extractive activities to reduce the load of oil activity on the national economy and the focus on environmental and resilience subjects that will condition the development of the country in the future. It particularly emphasizes that in the context of a peace agreement that could facilitate the access to underutilized rural areas, either mismanagement of the forests, lands and natural resources or non-efficient territorial planning could increase vulnerability against natural hazards, deforestation and soil degradation risks.

For the reasons mentioned above, sustainable management of its natural capital and the reversal of the current natural resources exhaustion rate have become priorities for the Colombian Government. One of the responses to this situation is the definition of a Green Growth Strategy, which was incorporated as a goal in the 2014-2018 National Development Plan: "All for a new country".

This summary presents the main results of the Forest Economy Studies in the framework of the Green Growth Taskforce in Colombia, carried out following the Taskforce's request and with the support of the Global Green Growth Institute. These studies are presented in five reports (one focusing on the forestry sector diagnosis and its barriers and opportunities; another one focusing on the recommendations for a larger engagement of the sector in Colombian green growth; and three focusing on regional action plans in the Caribbean, *Medio Atrato* and the *Popayán* Plateau areas). These studies sought to identify the driving factors that have prevented the development of the forestry sector in Colombia (understood as the group of activities related to both native and planted forests) so far, in spite of numerous efforts to activate it, in order to make proposals for the strengthening of the forest economy as an important contribution to green growth dynamics.

Elements covered by Forest Economy Studies in the framework of the Green Growth Taskforce in Colombia:

- Current situation diagnosis of the commercial forestry sector;
- Identification of the barriers and opportunities for its development;
- Development of Action Plans on three regional forest clusters;
- Recommendations for the creation of a more beneficial policy, legal and funding framework for the sector's development;
- Synergies between the development of the commercial forestry sector and Colombian commitments on the international level (MDG, UNCCC), and post armed conflict context.

[1] Colombia Systematic Country Diagnostic for the period FY16-21, World Bank, 2016

2 Diagnosis

Colombia has an important forestry potential represented in 17 million hectares with a high potential for commercial reforestation[2] and more than 59 million hectares of natural forests. However, there are only about 310 thousand hectares with commercial plantations[3], and there is not enough information to define the actual productive potential of natural forests and existing plantations. Likewise, statistic information about forestry industry is scarce; the information about the volume of processed wood, its source of origin and the number of jobs created by the sector is only partial.

2.1 State of the Resource

In global terms, the forestry sector contributes to 0.9% of the GDP and 0.4% of job creation (FAO, 2015), showing a steady trend, correlated with the real estate and construction sectors. The productive percentage of 3,721 million hectares of forests and 278 million hectares of plantations (of which 6% are in Latin America) is not entirely clear due to lack of information. In Colombia, the sector contributed to 0.79% of the total GDP in the year 2017[4].

Natural forests cover up to 52% of the total surface area of Colombia. It is mainly distributed among the Amazon and Pacific regions, and 63% of it is within territories of ethnic communities. According to records of the MADS, there are currently 74 drafted Regional Forestry Management Plans (POF), of which 19 are approved. In most cases, this resource is hard to access in legal and sustainable conditions due to lack of information, lack of road structures, and complex administrative processes. **Forestry use in Colombia presents very low technical quality and high levels of informality and illegality.** There are over 200[5] commercialized forest species, and there are even some official reports that indicate more than 500 exploited species[6], although almost **70% of the total of commercialized volume represent 20 of such species**.

Commercial forestry plantations in Colombia, as registered in the ICA in October of 2016, cover up to **310,138 ha**, which are mainly concentrated in *Antioquia*, *Meta*, *Vichada*, *Cauca* Valley and *Córdoba* Departments. Main planted species are of Pinus, Eucalyptus, Acacia and Teak (*Tectona Grandis*) genera. Plantations present a high level of fragmentation: out of 11,789 planted farms, up to 68% cover an area of under 15 ha. Table 1 shows the distribution of plantations and total forest area divided by region in Colombia.

[2] UPRA. 2015. *Zonificación para plantaciones forestales con fines comerciales – Colombia. Escala 1:100.000.*

[3] This information relates to forestry plantations registered in the ICA, according to the database ICA-FINAGRO, October, 2016. There are other information sources which differ from such data; this can be explained by several reasons, such as: non-existent or non-registered plantations, protected plantations, producers registered in the CARs, unregistered used plantations, among others. In Colombia, a commercial plantation must register in the ICA in order to obtain the mobilization permit, so, in practical terms, only registered material would be available for the industry.

[4] DANE. 2018.

[5] IDEAM.2013, *Boletín Forestal 2011*

[6] IDEAM. 2011, *Boletín Forestal 2008-2011*

Table 1. Forest Plantations and Natural Forest Areas in Colombia (ha)*

Region	Natural Forest (ha)	Plantations (ha)
Amazon Region: Amazonas, Caquetá, Guainía, Guaviare, Putumayo and Vaupés	35,529,829	0
Pacific Region: Cauca, Chocó, Nariño and Cauca Valley	7,791,309	39,076
***Orinoquía* Region:** Arauca, Casanare, Meta and Vichada	8,183,926	67,868
Andean Region: Antioquia, Boyacá, Caldas, Cundinamarca, Huila, North of Santander, Quindío, Risaralda, Santander and Tolima	5,994,578	125,549
Caribbean Region: Atlántico, Bolívar, Cesar, Córdoba, Guajira, Magdalena, San Andrés and Sucre	1,812,612	67,081
Unregistered or unreported areas		10,564
Total (ha)	**59,312,254**	**310,138**

*Source: Plantations according to reports in the ICA in October 2016. Natural Forests according to the Forest and Carbon Monitoring System (SMBYC) Information updated until 11-18-2017 (IDEAM, 2017)

2.2 Actors of the Forestry Sector

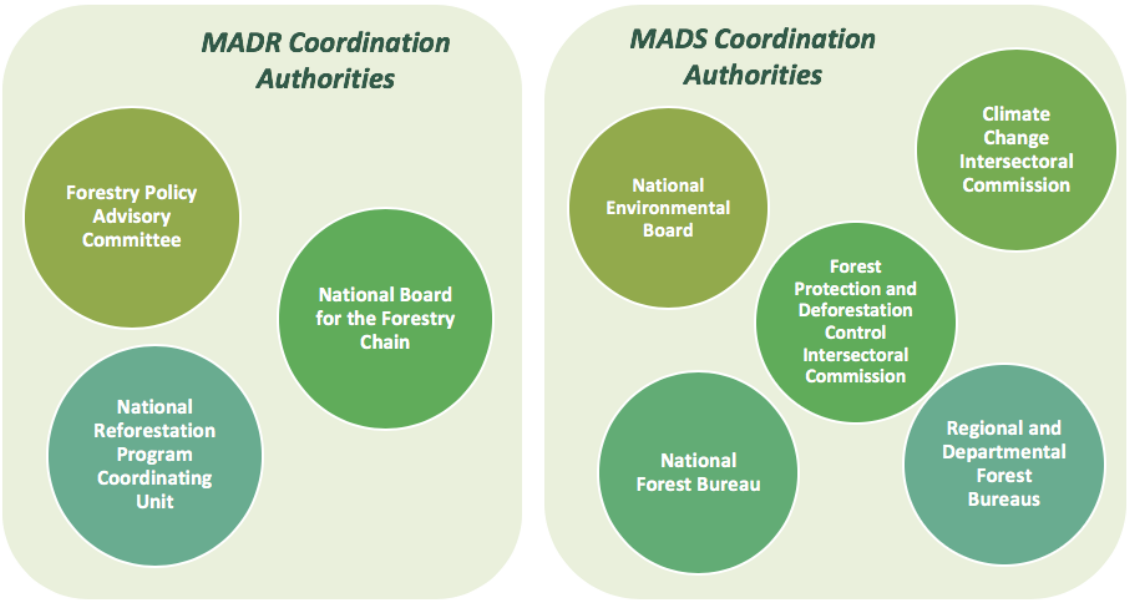
Identification of all actors involved in the forestry sector was done considering and adjusting the typology of actors used for the REDD national strategy. Categories are as follows:

- Government: State, nationwide entities and Regional authorities;
- Environmental authorities and other entities in charge of control, surveillance and sanction;
- The Academy and research institutions;
- Funding agencies;
- Training institutions;
- Private sector (corporations, firms, guilds);
- NGOs and cooperation agencies;
- Illegal actors.

The current condition of the forestry sector guild, FEDEMADERAS, is worth noting. After being constituted by beneficiaries of forestry concessions (from the 70s up to the mid-80s), and then by big reforestation agents (from the 90s up to 2005), the guild currently encompasses the entirety of the productive chain. It still manages very limited resources, thus having a restricted capacity for influence and intervention in favor of its members.

Orientation and articulation authorities created over the years were identified as well. Some of them were constituted within the Ministry of Agricultural and Rural Development (MADR); others within the Ministry of Environment and Sustainable Development (MADS), as shown in **Figure 1.** In most cases, members of one authority also participate in another. However, higher articulation between authorities and higher efficiency in their functionality is still required. Otherwise, activities of each authority remain isolated.

Figure 1. Coordination and Orientation Authorities in the Forestry Sector.



Source: Prepared by the authors.

Some of the conclusions drawn upon the identification of these actors were:

- There are more actors related exclusively with natural forests than with plantations, and a substantial number of actors encompass both matters.
- There is no systematic correlation between the technical level of the actors and their current influence over the forest economy: some of the most skilled actors (particularly the *Academy and Research Institutions* category) don't have a strong influence over production, processing and commercialization of forestry products, while other actors with poor technical ability have significant impact over these activities.
- Most of plantation and natural forest owners present a low technical ability (this general rating should be qualified by the forestry culture existing in certain regions like the Pacific -natural forests-, or the Coffee Belt -forestry plantations-), and there are very few institutions with the mission and ability to provide the required technical advice to achieve the rightful participation of the communities of forest owners.
- A similar phenomenon can be perceived in small companies (it also occurs albeit in smaller proportions among medium-sized companies), posing great challenges in production formalization, traceability, technification and standardization.

2.3 Policy and Strategic Framework

In summary, forestry policy in Colombia can be considered to be defined by elements presented in 11 main documents:

i) Forestry Policy (1996), CONPES 2834;
ii) National Forestry Development Plan (PNDF), (2000), including the strategy for its consolidation in the document CONPES 3125 (2001);
iii) National Strategy for Prevention, Control, Monitoring and Forest Watch (2010);
iv) Action Plan on Commercial Reforestation, (2011);
v) The Competitiveness Agreement for the Forestry, Wood, Furniture and Timber Productive Chain (last updated in 2011);
vi) National Policy for the Integral Management of Biodiversity and its Ecosystemic Services, (2012);
vii) Pact for Legal Timber in Colombia – PIML 2015-2018;
viii) National Policy Against Deforestation (Law No. 1753 from 2015);
ix) Comprehensive Strategy to Control Deforestation and Forest Management, MADS;
x) Policy Guidelines for Forestry Plantations with Commercial Purposes and Wood Extraction and Productive Chain, 2016-2038, MADR-UPRA; and
xi) Green Growth Strategy.

The general framework (Forestry Policy, National Forestry Development Plan), reflects a proper identification of the forestry sector's potential in Colombia, and of its areas of improvement in order to achieve an effective assessment of such potential. Notwithstanding the continuous advancements since the formulation of these documents (approximately 20 years ago), many of the challenges remain active. Therefore, these guidelines must not be perceived as outdated.

Nevertheless, the long list of reference documents for the forestry sector reflects the degree of difficulty to identify broad strategic guidelines to be followed by the numerous public and private entities that take part in forestry management, recovery and preservation. Consequentially, the forestry sector must first update current forestry policies and establish them as national policies, leading the way for the entire sector and for the rightful use of forestry resources. Proper adjustments to Forest Law must be conducted according to such baselines.

2.4 Normative Framework

Since the first half of the past century, several regulations have been issued in forestry matters, aiming to complete the current legal framework (See Annex 1). The main legal references, extracted from the abundant regulation regarding the sector are the following:

- On Natural Forests: Law No. 2 from 1959, in which seven great Forest Reserve Areas were established for the development of forest economy, and soil, water and wild life protection; the Renewable Natural Resources Code (Decree-Law No. 2811 from 1974); and the Decree 1791 from 1996, which contains the legal framework for the use of wild flora products or non-wood products.
- On Planted Forests: Law No. 101 from 1993 (General Law for the Development of Agriculture and Fisheries), in which forest exploitation and commercial reforestation where

defined as agricultural activities essentially; Law No. 139 from 1994, which introduced the Certificate of Forestry Incentive; and the Decree 1498 from 2008, which regulates forest crops or agroforestry systems with commercial purposes.

Law No. 1021, "Law on forests" was issued in 2006. This law sought to promote the sustainable development of the Colombian forestry sector, establishing certain administrative structure and regulation on the activities related to natural and planted forests. After the declaration for its non-enforceability, that gap was sought to be partially filled through the expedition of the Law No. 1377 from 2010, known as the commercial reforestation law, which aimed to define and regulate forestry plantations and agroforestry systems with commercial purposes. However, this Law was also ruled non-enforceable. In the year 2011, the MADR attempted to rectify these legal gaps through another proposed legislation, which was not approved, and was filed in the year 2013. Legal voids in forestry law have not yet been solved, and Ministries have failed to prepare and present a new set of bills to the Congress of the Republic.

To this day, the MADR has a Decree project about forestry crops with commercial purposes and forestry plantations already prepared, which aims to reduce the use and commercialization of illegal wood in Colombia.

2.5 Technical Assistance

In general, the sector has relied on very few technology transmission and technical orientation mechanisms, in all stages. In the raw material stage, technical assistance has been occasionally provided, mainly through international cooperation projects for natural forests, and through the intervention of large companies for planted forests. Law No. 1876 from 2017, from which the National Agricultural Innovation System (SNIA) was created, defined the new functions, competences and articulation mechanisms for the entities and coordination bodies comprising the SNIA at regional and national level. In addition, the public service for agricultural extension was created, replacing the previous direct rural technical assistance. According to this law, agricultural extension is a permanent and decentralized public service, and it encompasses comprehensive follow-up aimed to diagnose, recommend, update, form, transfer, assist, empower and generate skills in agricultural producers to benefit their performance, skill set and sustainability. Reforesters are part of the users of the technical assistance service. However, effective coverage of this production sector is not ensured, since very few local technical assistance actors are proficient in this area. In addition, it is not clear whether sustainable use of natural forests is subject to this kind of assistance.

2.6 Research and Development

Forestry research in Colombia is scattered, and a great deal of it has been lost in administrative transfers and institutional changes. Furthermore, in many cases, publication channels hinder access to the results. That is why it is not always possible to build upon previous advances in research and technology, to work on the industry's growth and the sector's development. The first set of forestry research studies was the result of monitoring the use of natural forests under forestry permits and concessions. During the period from 1974 through 2007, the National Forest Research and Development Corporation (CONIF), a mixed enterprise, was in charge of research advances, aiming

to zone forest types, and to improve forest statistics and the use of the tropical rain forest. In 2007, the State decided to change its status, turning it into a non-profit private institution. Many of the information developed up to that point ceased to be available for the general public.

The Research Program on Native Forest Species Seeds (INSEFOR) made significant progress in seed research, and genetic and forestry improvement. This initiative was replaced with calls from the MADR, then by COLCIENCIAS, and finally was assigned to CORPOICA, where forestry matters are not relevant enough to produce substantial improvements for the development of the industry and the sector.

In addition, research from the Academy presents numerous but scattered projects and these initiatives do not comply with a single strategic guideline, and often fail to consider the requirements of the industry. Funding of these lines of research is very scarce (i.e. only 2% of investment in agricultural or environmental research was funded by Science, Technology and Innovation funds in 2017), and is mainly oriented to agroforestry systems, rubber and non-wood products.

2.7 Forestry Sector Funding

The commercial forestry sector relies mainly on the Certificate of Forestry Incentive (CIF, created by Law No. 139 from 1994). Through this incentive, 258,076 hectares have been reforested between 1995 and 2015, investing a total of 385,000 million of Colombian Pesos (COP) in CIF resources. According to the results of the PROFOR (2017), discussed among several producers, the CIF is perceived as an important and effective instrument, and the execution team is seen as efficient. However, this incentive has had varying results among small producers who lack the ability and required technical knowledge for forestry use, causing many reforested hectares to end up with no production lines, connection to forest industries or concrete business plans. In addition, the CIF only covers the first five years of plantation maintenance, in spite of the long-term nature of such type of plantation, and after that period, small producers often stop performing the required forestry activities that ensure product quality and general success of the plantation. These conditions result in many hectares of poor-conditioned or lost plantations, with low quality products and an overall performance below the sustainable average, besides small plantations isolated from access routes and industry proximity.

Other current funding elements in the sector are: tax exemption on some of the income earned through the use of forestry plantation; deduction of some costs; and reduced VAT for equipment and resources.
At the moment, there are no funding instruments specifically designed for the sustainable use of natural forests.

2.8 Market

Both globally and locally, forestry industry is increasingly dependent on planted forests. These represent only 3.5% of the global forestry areas, but contribute 20% of total wood supply[7]. In Colombia, natural forests were the main raw material source for the wood industry, since its beginning until the late twentieth century[8], (Tecniforest, 1999); Recent studies show that current wood consumption has been shifting toward forestry plantation wood and other products such as plastic or even metal (MADS and ONFA, 2016[9] and PROFOR,2017)[10].

Wood coming from natural forests found in the market derives from selective forestry use in the Pacific, *Magdalena Medio* and *Puerto Asís* regions, and from the *Antioquia* North-east, in lesser proportion.

Due to its biodiversity, Colombia has tremendous potential regarding Non-Wood Forest Products (NWFP). However, commerce is mainly informal, and lacks technical studies to ensure a sustainable use and the proper identification of chain value in terms of volume, added value distribution, job creation, etc. Among the main NWFPs are: food products (fruit, honey, beeswax), crafts, dyestuff, ornamental products (flowers and living plants) and products derived from different palm tree species found across the country (fibers, latex, rubber and fruits).

The industrial part of the forestry sector is mainly constituted by micro-enterprises and small businesses. Most of the jobs can be found in the pulp and paper business, followed by micro-enterprises, which generate a great number of jobs in the sector as well. Forestry Industry is located in major cities, such as Bogotá, Cali, Medellín and Barranquilla. However, this does not correlate with major cities fostering natural or planted forests, with the exception of some companies that hold their own raw material sources like Smurfit Kappa, Cipreses and Tablemac, located in the Andean Region, and Refocosta, located in the Caribbean and *Orinoquia* Regions.

In Colombia, the most important products are paper, cardboard and its derivatives, which represent a total demand of 14,596 billion COP, in contrast with the 7,534 billion COP for furniture and 4,424 billion COP for timber products, cork, hay and braiding materials.

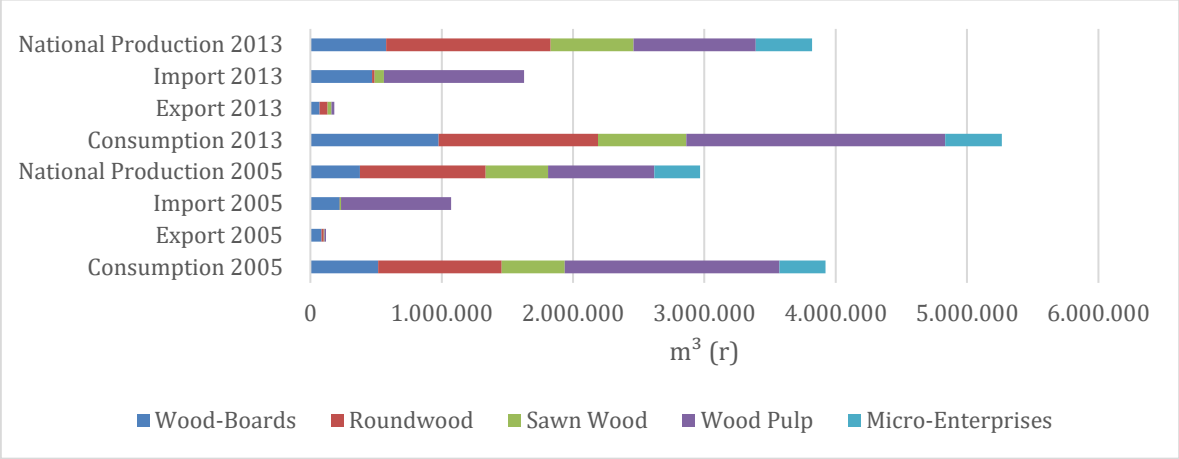
[7] Commercial Logging/Global Forest Atlas. 2015

[8] TECNIFOREST. 1999. *Evaluación de la oferta y la demanda nacional de productos forestales maderables y no maderables. Ministerio del Medio Ambiente – Tecniforest Ltda.*

[9] MADS & ONFA. (2016). *Estimación y Caracterización del Consumo de Madera en la Industria del Mueble y Descripción de la Industria de Transformación de Madera en Colombia.* Bogotá, D.C.: Ministerio De Ambiente y Desarrollo Sostenible; ONF Andina, 2016

[10] PROFOR (2017) *Plantaciones Forestales con fines comerciales en Colombia*: Oportunidades y Desafíos. Bogotá, Colombia.

Figure 2. Production, export, import and consumption of wood and wood products in the years 2005 and 2013.
Amounts in m3 of roundwood.



Source: Prepared by the authors based on PROFOR (2017)

General production of wood products has failed to grow at the same rate of its consumption. This has caused a surge in imports and a negative commercial balance for the sector. For instance, in the case of wood-boards: while consumption jumped from 516,598m³ in 2005 to 807,081m³ in 2013, production went from 378,236m³ in 2005 to just 407,081m³ in 2013, with the resulting increase of wood-board imports from 224,160m³ in 2005 to 470,000m³ in 2013. Data for sawn wood, roundwood and wood pulp are similar. This analysis shows that there's a tremendous unfulfilled potential in domestic consumption in Colombia which ought to be supplied by the market before competing internationally, where Colombia shows a low competitive level in infrastructure, production costs, transportation and growth rates, as shown in the market diagnosis (Figure 2).

2.9 Employment in the Forestry Sector

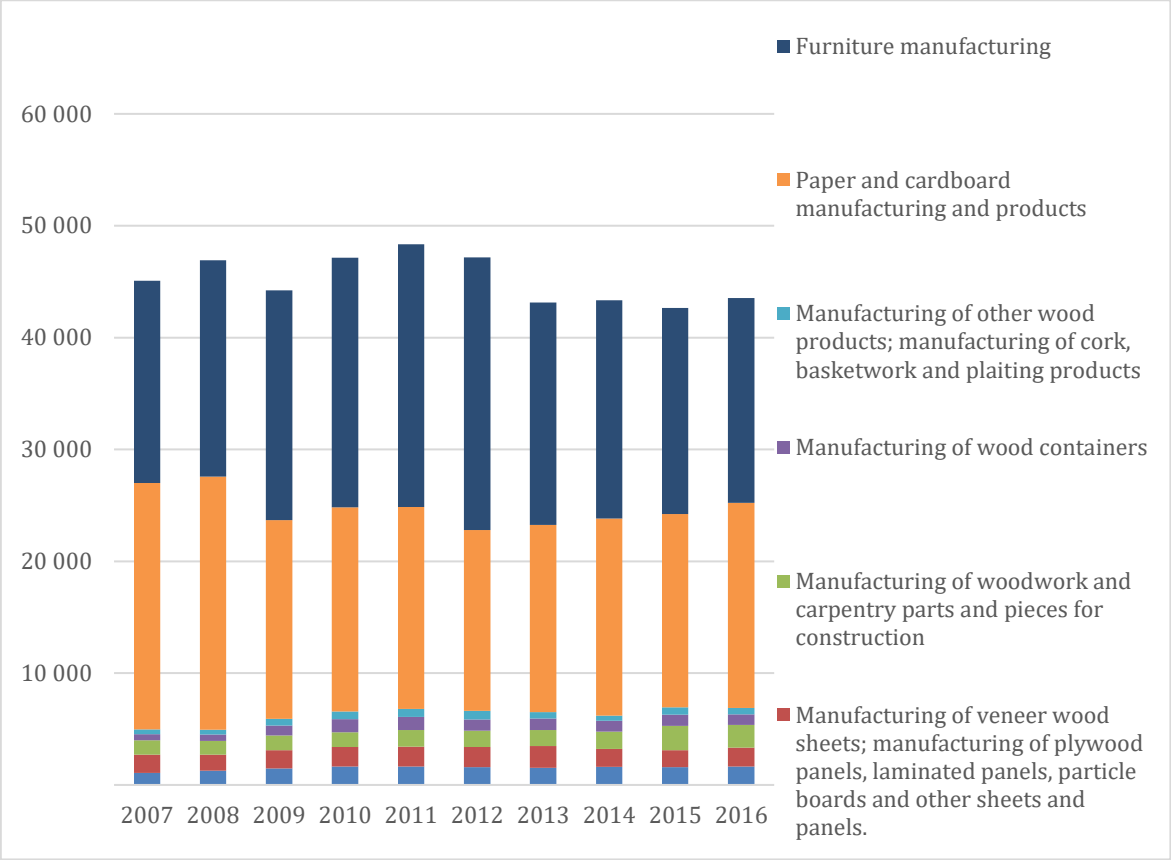
Up until now, the forestry sector has had a low impact in job creation in Colombia. Shortcomings in contributions by the forestry sector in the social field are reflected in the low rate of job creation among the different levels in the forestry chain. This is also reflected for the workers themselves who face a low level of stability and job security (UPRA, 2016). Forestry activity, ranging from forest production to product manufacturing, generates around **74,956 direct employment positions** [11] (Source: CONFECAMARAS, 2016)[12] and 280,000 indirect employment positions (MADR, 2011)[13].

The lowest contribution among the jobs mentioned above comes from silviculture (16,135 jobs for 310,000 ha registered in the ICA, based on data from PROFOR (2017), and 7,000 according to CONFECAMARAS (2017). Moreover, many of the jobs created by this activity are informal and are not officially recorded. In regard of the industry, subsectors generating the greater amount of jobs

[11] These numbers relate to formal Jobs.
[12] CONFECÁMARAS. Data-base 2016.
[13] MADR. (2011). *Plan De Acción Para La Reforestación Comercial. Ministerio de Agricultura y Desarrollo Rural*. Bogotá, August, 2011.

are: furniture manufacturing (18,332 jobs in 2016)[14], and cardboard manufacturing (18,300 jobs in 2016). See Figure 3.

Figure 3. Development of Total Staff Employed by the Sector (2007-2016) Source: DANE-EAM



Source. DANE – EAM

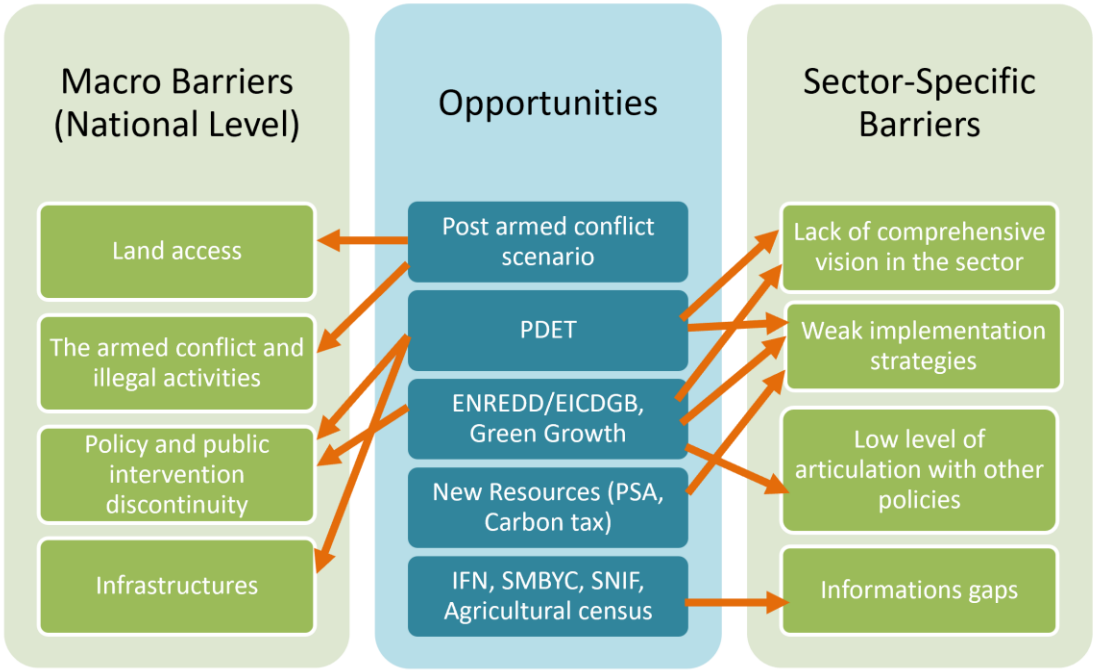
In the past 4 years, the biggest companies have generated employment because of their growth rate; medium-sized companies have tended to employ fewer workers; whilst the number of small and micro companies multiplied, resulting in more employment, particularly during the highest growth rate in the sector, between 2008 and 2010.

[14]These numbers do not discriminate between the wood furniture industry and furniture built from other sources, but since it does not include the total amount of furniture manufacturing facilities, one can be presumed that it is less than the jobs created in wooden furniture.

3 Barriers and Opportunities for the Forestry Sector

The analysis of the sector's barriers shows macro constraints at the national level, which are not necessarily dependent on the sector. However, they do confine its development, as they do for other sectors as well. That's the case for barriers such as: land access, the armed conflict and illegal activities, policy and public intervention discontinuity, and infrastructure deficiency. Solutions to these types of barriers ought to be implemented at the national level, fostering subsequent development not only for the forestry sector, but also for the social and economic spheres of the country as a whole. See Figure 4.

Figure 4. Main Barriers and Opportunities for the Forestry Sector.



Source: Prepared by the authors.

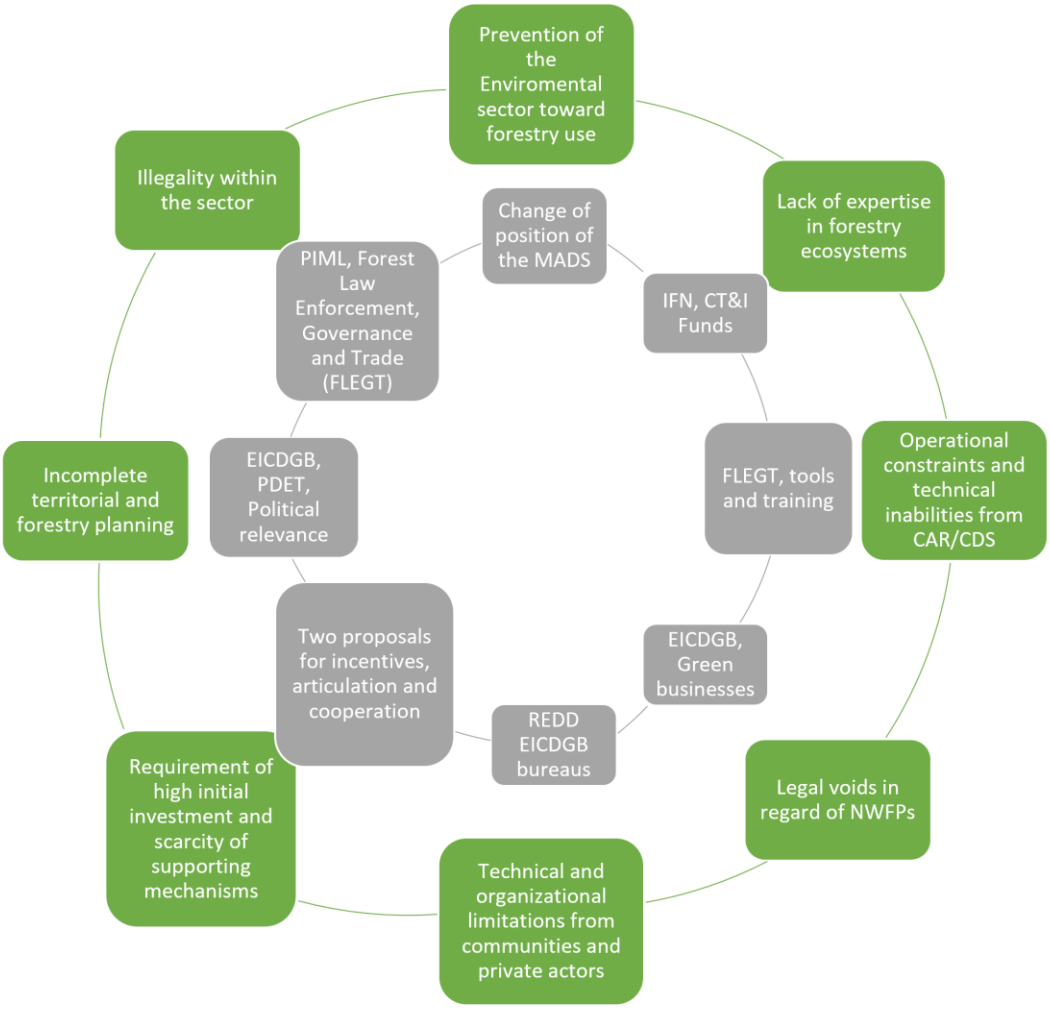
In respect of the sector-specific barriers, there are general constraints for the natural and planted forests, as there are specific ones for each of these sub-sectors.

Natural forests: one of the main barriers limiting the development of the natural forest sector has been the **prevention of forest utilization.** The creation of the Ministry of Environment in 1993 consolidated the strategic differentiation for commercial plantation, entrusted to the MADR, and for natural or protected forests, entrusted to the MADS. Created during a global rise of ecological awareness (Rio Summit in 1992), the MADS was devoted to protect ecological cycles and to preserve the forests biodiversity. Cooperation resources, crucial for the functioning of the Ministry, were directed toward these environmental duties, as several international entities expressed distrust over forestry utilization, minimizing its inclusion in funded projects. Furthermore, **the lack of technical ability and operational constraints of the CAR/CDS** to support utilization and sustainable management of these ecosystems has been noted. These regional authorities - which operate with

great autonomy - are vulnerable to the influence of local interests. Also, public officials show insufficient understanding of the regulations, thus generating uncertainty in issues like permit acquisition, required licenses, and the schedules of such processes. At the economic level, **high initial investment and scarcity of economic instruments** are another decisive barrier. Natural forests in Colombia are restricted to areas of difficult access and, due to continuous selective extraction, present a low volume of species with commercial value in the market. These conditions, added to the fact that institutional standards are very high, make the sustainable use of natural forests require governmental fund aid, at least in the first stages, for it to be cost-effective for the communities that own such forests. However, there is not one existing government mechanism that supports this necessity for initial investments. Private banking does not offer any financial products in this regard either.

Other set of barriers were identified besides these three decisive circumstances limiting the development of sustainable forestry management: technical and organizational limitations in both private and communitarian actors; lack of territorial and forestry planning; lack of forestry ecosystem expertise; and, finally, the level of illegality within the sector. See Figure 5.

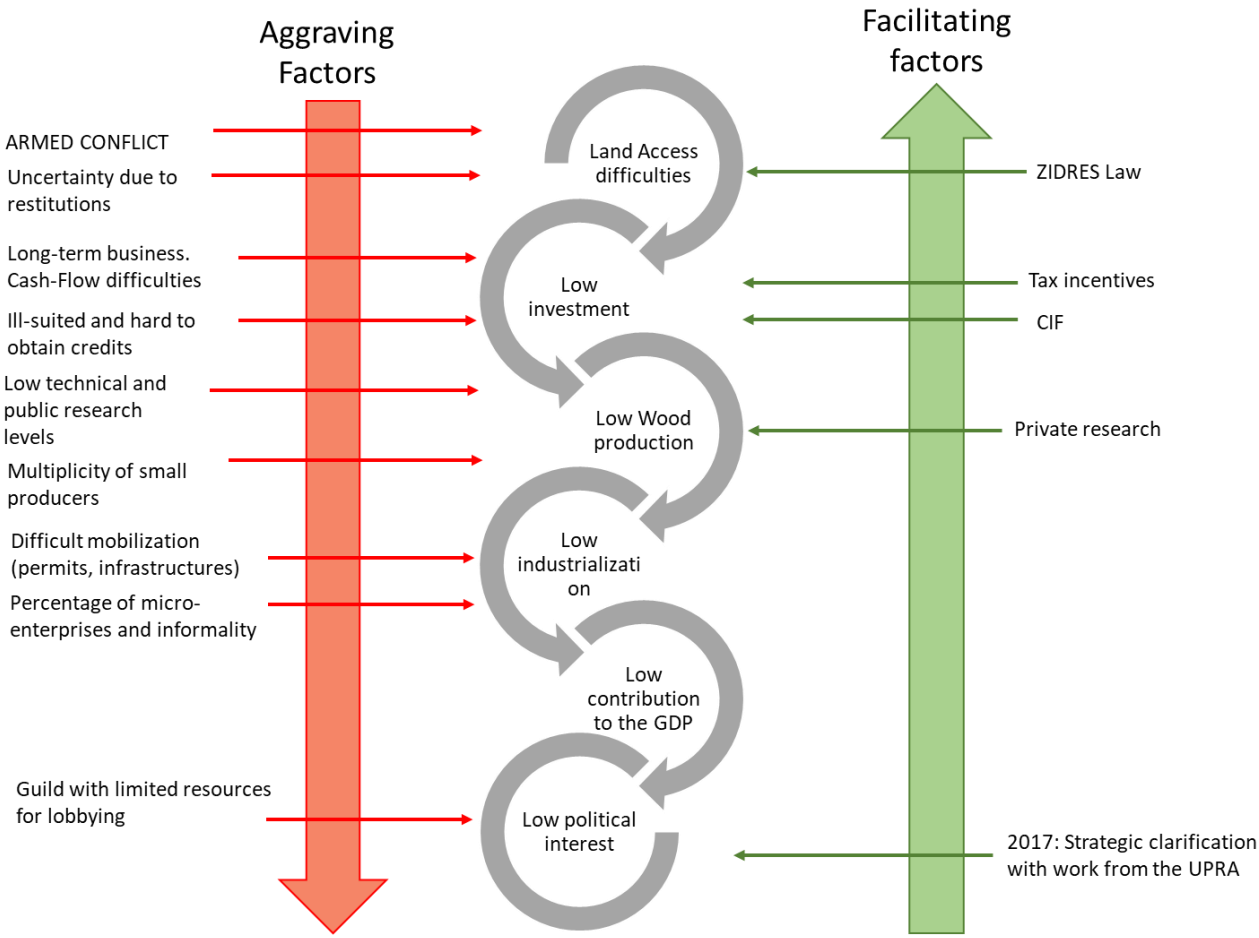
Figure 5. Barriers and Opportunities for Natural Forests



Source: Prepared by the authors
(Barriers appear in green and opportunities in gray)

Planted forests: Actors in the agricultural sector, such as the Departmental Governments and their respective Secretariats of Agriculture, have not fully perceived planted forests as a productive option. The MADR work agenda has always been heavily influenced by guilds, in direct proportion of both the agricultural GDP generated by each sub-sector and the resources managed by each guild, the most powerful ones being those that manage sector-specific funds collected through parafiscal taxes. Notwithstanding its determination and technical abilities, the forestry sector guild has failed to achieve those levels of visibility and influence, due to scarce resources. Main constraints and enabling factors are shown in Figure 6.

Figure 4. Barriers and Opportunities for Planted Forests



Source: Prepared by the authors

Intervention points to begin solving identified barriers and unlock the development of the sector were identified along the forestry chain, in the stages of raw material supply, transportation and commercialization. Transversally, research, training, technical assistance, review of the legal and normative framework, the assurance of legality, and finance and economic tools must also be considered.

4 Proposal for Action and Recommendations for Green Growth Policy in Colombia regarding the Forestry Sector.

4.1 Work Methodology

Development of the forestry sector is a joint challenge which implies overcoming the different barriers constraining it. It is not easy to build primary actions and recommendations that would allow to overcome such challenge. Considering this, the methodology for the elaboration of proposals for action and recommendations started from the diagnosis realized in the first stage of the study, then socialized it through meetings and workshops with several actors of the sector, to gather new information, contributions and standpoints, which were taking into account for the final version.

During those working sessions, six regional workshops were conducted: In the cities of Barranquilla and Popayán for forestry plantations and in Quibdó for natural forests. Round-tables including businessmen of the sector and the guild, represented by FEDEMADERAS were conducted as well. One primary workshop was conducted in Bogotá, in March 15 2018. Participants of this event included the primary institutions of the sector, such as the Ministry of Environment and Sustainable Development (MADS), and the Ministry of Agriculture and Rural Development (MADR). The Green Growth Taskforce was also involved in the monitoring and support committees.

The results, divided by subject, are: recommendations within the policy, normativity and institutional framework; recommendations for economic instruments in support of the forestry sector; recommendations for technical elements in productivity and competitiveness; and recommendations for research, education and innovation. Within each subject, recommendations respond to a General Objective, which consists of a General Goal and Specific Objectives. For each Specific Objective, a set of factors is described: proposed strategy; main goal and indicators; actions to be implemented, identifying authorities in charge; schedule for implementation; and cost estimate.

In addition, the recommendation incidence level over the green growth strategy was evaluated, establishing a prioritization. Such incidence level was estimated considering:

- Increasing the amount of jobs creates by the utilization of natural forests (wood and non-wood products);
- Increasing the supply of legal wood available for the Colombian Industry from natural and planted forests;
- Promoting efficient consumption and diversification of the utilization of forestry products;
- Promoting the consumption of forestry products[15].

Three levels of incidence were established: high, medium and limited. However, it must be stated that this differentiation was aimed at pointing out the most urgent and most effective interventions

[15] Considering that in Colombia many of the industrial sectors and final consumers prefer other kinds of products such as plastic, metal or even polystyrene. Wood products are thought to be harmful to the environment, are hard to find in the market, and their legal precedence is often not ensured.

to invigorate the forest economy, on the basis of studies and strategies that considered the difficulties of the sector in a comprehensive manner. Therefore, actually all proposed actions are necessary and of a high priority level. The suggested prioritization intends to facilitate an ulterior selection effort in the case of limited resources preventing the proposed schedule to be implemented as advised.

4.2 Recommendations

Table 2 below presents a summary of the proposals for action and recommendations, organized by subject and prioritized by color, according to the evaluation of its incidence level. It also shows the code assigned for every general and specific objective, which is used later when presenting an outlined version of the proposed implementation schedule and the costs related to each recommendation.

Table 2. Summary of Recommendations and their Incidence Level on Green Growth strategy

Code	Theme	
P	**POLICIES**	
P1	General Objective	Consolidate a single, clear and ambitious forestry policy for Colombia.
	General Goal	Establish clear guidelines, in all scopes, for forests in Colombia by the year 2020, in order to allow every party involved to act within a favorable and stable framework.
P1-1	Specific Objectives	Formulate a unified vision for the forests (both natural and planted).
P1-2		Link this vision with formulated strategies in each sub-sector.
P1-3		Set out goals and indicators related to forestry policies and their respective strategies.
P2	General Objective	Reinforce the elements in forestry policy which strengthen sector contributions to the green growth of the country.
	General Goal	Establish clear policy guidelines toward the economic development of the forestry sector by the year 2020, contributing to the green growth of the country.
P2-1	Specific Objectives	Establish related policy and strategy issues to promote the involvement of the forestry sector with the green economy.
P2-2		Establish quantifiable goals in key issues for the forest economy.
N	**NORMATIVITY**	
N	General Objective	Establish a clear, complete and harmonized forestry normative framework that would deliver the best conditions for the green growth of the forest economy.
	General Goal	Establish an adjusted, harmonized, complete and updated forestry regulatory framework by 2022, in order to achieve legal clarity, favoring the green growth of the sector.
N1	Specific Objectives	Issue a Forestry Law that would offer greater legal security for investors and help develop national public policies, allowing the participation of the community in a post armed conflict scenario and in a context of fight against deforestation.
N2		Adjust the regulation regarding forestry use system, non-wood product use, communal forestry use, forestry crops with commercial purposes and forestry plantations, and zoning of Forest Reserve Areas (Law No. 2 from 1959)
N3		Update the rate of forestry use and the Certificate of Forestry Incentive.
I	**INSTITUTIONAL**	
I	General Objective	Consolidate the forestry administration to maximize the sector contribution to green growth.
	General Goal	Establish institutionalism in the forestry sector, in order to maximize benefits for the country.

Code	Theme	
I1	Specific Objectives	Harmonize and consolidate both national and regional authorities, which offer orientation in forestry policies.
I2		Strengthen forestry administration.
F	FINANCIAL INSTRUMENTS	
F	General Objective	Fund required investments in order to distribute more forestry products legally and to achieve optimal processing.
	General Goal	Create or update the required economic instruments by 2020, in order to strengthen the economic development of the Colombian forestry sector.
F1	Specific Objectives	Create a national forestry fund in order to make the required investments to achieve a legal and sustainable forestry use.
F2		Generate a funding offer for sustainable forestry management plans.
F3		Create tax-advantaged areas for forestry clusters.
F4		Generate funding instruments for small and medium-sized businesses in forestry clusters.
F5		Reform the Certificate of Forestry Incentive
T	TECHNICAL ASPECTS	
T	General Objective	Reinforce the technical elements of productivity and competitiveness in the forestry sector through the implementation of technical assistance, traceability systems, improvement and articulation of training programs, forestry planning of natural forests and promotion of wood consumption.
	General Goal	Hold the technical, production and competitiveness aspects in the forestry sector in the short term, by 2022; and to improve and strengthen such aspects in the long term, by 2030.
T1	Specific Objectives	Implement technical assistance tasks in order to facilitate the development of quality forestry plantations, considering their ultimate use.
T2		Extend the technical assistance service to the sustainable use of natural forests.
T3		Achieve forestry planning for natural forests.
T4		Promote the consumption of legal wood.
T5		Implement a national forestry traceability system, which would allow to build historical records, and monitor the locations and track records of first-stage processing wood products through all stages of the supply chain: From the origin through its ultimate destination.
T6		Promote the use of Non-Wood Forest Products (NWFP), provided with management plans and value chains to ensure sustainable use.
Iv	INNOVATION, RESEARCH AND EDUCATION	
Iv	General Objective	Strengthen forestry research and innovation, contributing to improve productivity and competitiveness in the forestry sector, in both forestry plantations with commercial purposes and natural forests.
	General Goal	Improve research and innovation in the forestry sector by 2022, contributing to improve productivity and competitiveness in the forestry sector, in both forestry plantations with commercial purposes and natural forests.
Iv1	Specific Objectives	Extend and reinforce the scope of forestry information in the country.
Iv2		Reinforce knowledge creation, research and scientific production regarding the forestry sector.
Iv3		Boost the articulation between the Academy and the requirements of the forestry chain.

Source: Prepared by the authors. Color legend: dark green, strong incidence; mild green: medium incidence; light green: limited incidence.

Albeit, as mentioned above, all recommendations are urgent and necessary in order to boost the development of the forestry sector, the ones considered to be of strong incidence are:

a. **Normativity – N2:** The Decree n.1791 from 1996 (compiled in the Single Decree n.1076 from 2015), about the regulation of the forestry use, must be updated. At the time, it was issued as a provisional regulation, as it clearly presents both conceptual and procedural gaps and inconsistencies which must be reviewed. That's the case for the use of species and Non-Wood Forest Products, since up until today the same regulation regarding wood products is being enforced. In fact, this has been identified as a burden to overcome, among others, by the SINCHI Institute. It is also necessary to complement the dispositions about communitarian forestry use. Decree n.1791 from 1996 and Law No. 70 from 1993 are flawed in that respect. In regard of black communities, discussions could occur in the framework of the current regulation of the Law No. 70 from 1993. There are other required adjustments related to the zoning and planning of Forestry Reserve Areas (Law No. 2 from 1959), which represent the greater area of public forests in the country, and are therefore strategic to sustainable forestry use. In the corresponding resolutions of the MADS, the possibility of undergoing persistent forestry use activities in Type A areas must be explicit.

b. **Normativity – N3:** It is required to update the regulation of the CIF according to adjustments made in corresponding laws. Regarding the forestry use rate, measurement of the impact of the new Decree n.1390 from August 2, 2018, must be measured. Analysis of this decree was not included in the current study since its publication date was subsequent.

c. **Institutional – I2: Strengthening of forestry administration:** In order for the forestry sector to grow, the State must be able to: i) Define clear policies; ii) Ensure a complete normativity, both stable and technically accurate; iii) Implement this specific regulation, and in particular, to meet planning, authorization, control and monitoring processes related to the sector. Current performance in respect of this last aspect is not satisfactory. It is recommended to strengthen public operational abilities in forestry matters. This can be achieved in a variety of ways. The current study poses three scenarios of raising aspiration:
    i. Strengthening of the current organization; consolidation of the abilities for intervention of the CARs through the creation of permanent forestry units, and of the MADS, with a national coordination unit; reinforcement of the ICA capacity for intervention in plantations;
    ii. A new forestry institutionalism based on an existing authority; integration of the forestry activity through a single entity, which in turn may be able to integrate functions related to natural and planted forests (technical assistance in addition to the functions of the ICA). This single entity may be the Rural Development Agency, for example (constitution of a new dedicated management)
    iii. Creation of a National Forestry Service as a proper authority, associated to the MADS and the MADR, with central and regional offices.

d. **Financial Instruments – F1: Creation of a National Forestry Fund**, formed by an equity fund and a sinking fund. Annually available resources would be used in the funding of: annual operation of the National Forestry Inventory (IFN); Development or update of the Forestry Ordination Plans; Credit bonuses for sustainable forestry management Plans; The National

Forestry Service (technical assistance), and the constitution of seed capital or backing for the formalization of communitarian companies.

e. **Financial Instruments – F2. Generation of a funding offer for Sustainable Forestry Management Plans (PMF):** In order to achieve sustainable forestry management, well-built PMFs are required. This implies high costs which can't often be met by forest owners. A "reimbursable grant" is recommended: through the National Forest Fund (FFN), the National Forestry Service grants the single or communitarian owner with the required amount for the plan development. This grant must then be reimbursed within 10 years, starting from the second year of use. This way, the FFN can use repayments from previous plans to fund new ones, reducing the annual liquidity required for this kind of intervention. It must be noted that even if this is a costly instrument, it stabilizes over time, and allows to solve one of the main issues of the sector.

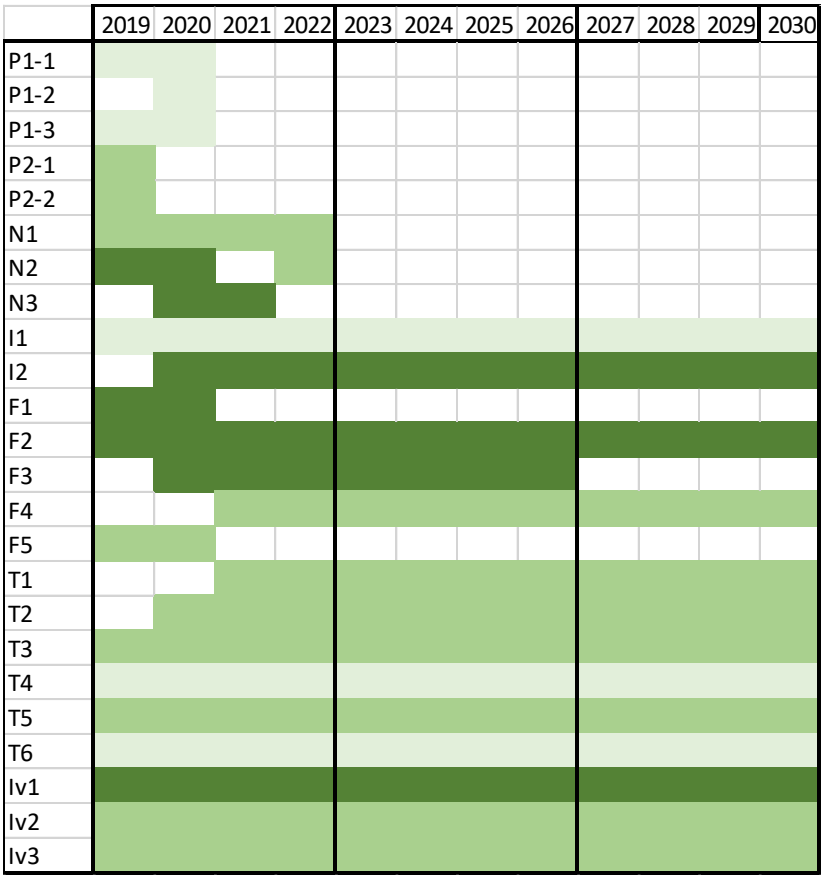
f. **Financial Instruments – F3. Creation of tax-advantage areas for forestry clusters.** Promotion of clustering models for the forestry sector is advised. One way of achieving the concentration of economic actors is to generate competitive advantages for specific production and processing geographical areas. One way of accomplishing this is through taxation instruments. The suggestion to create forest clusters considers the use of two already existing devices in Colombia: the ZOMAC and the permanent customs-free zones.

g. **Innovation, Research and Education – Iv1. Reinforcement and increase of the scope of forestry information in the country.** In order for research and innovation to contribute to the improvement of the productivity and competitiveness of the forestry sector, both in natural and planted forests, the following basic requirements must be met: i) The consolidation of the National Forests Inventory; ii) Reinforcement of the National Forestry Information System (SNIF). The IDEAM should rely on enough resources to support the coherence and consistency of the information supplied by the CARs, and to extend its scope in order to incorporate traceability matters and the type of information needed by the SNIF. This would contribute to generate information such as forest surfaces data, the volume of use of forestry timber and non-wood products, identification of species mostly used on regional and national levels, among others; iii) The harmonization of cartographic information related to the forestry sector. Cartographic information must be frequently complemented and updated in a sufficient manner, particularly for forestry plantations, types of forests (relying on the results of the IFN), forest ownership, and effective use of lands suitable for forestry (including occupation of idle areas and forestry reserves); and iv) Identification of the differentiated consumption between wood originated from natural and planted forests.

4.3 Implementation Schedule

This proposal was made considering a global implementation period of 12 years (from 2019 to 2030), segmented in three 4-year periods, matching the subsequent national development plans: 2019-2022, 2013-2016, 2017-2030. Some of the activities are permanent, and should continue beyond 2030. See Figure 7.

Figure 5. Proposed Recommendation Implementation Schedule.



Source: Prepared by the authors.

4.4 Cost Summary and Funding Sources

Cost implementation was evaluated for each recommendation. Details of the calculations can be found in the document: Deliverable 4 – *Proposal for Action and Recommendations for Green Growth Policy in Colombia.* In addition, in each case, the most suitable funding source was identified. The required investment to implement identified actions in 12 years is 519,705 COP (See Tables 3 and 4).

It must be noted that this cost does not include:

- the impact of tax exemptions aimed at forest clusters on the national budget, given that the measures to be implemented already have legal basis, meaning that its effect over the national budget has been already assessed and approved;
- the effect of a reduction of 2 points for the VAT applied on legal and national wood;
- private investments required to extend planted areas and to reinforce industrial infrastructures in forest clusters, which explain the low participation level of the private sector in the recommendations. However, regional business plans attached to the current

study provide information about the magnitude of these private investments required for the invigoration of the sector.

Table 3. Distribution of Recommendation Funding by Source (in millions of COP)

National General Budget	27,880	5.4%
Forestry Fund	387,546	74.6%
National Royalties System (CT&I)	82,800	15.9%
Cooperation	19,234	3.7%
Private Sector / Banks	1,845	0.4%

Source: Prepared by the authors

Table 4. Annual Implementation Cost Evaluation for Each Recommendation and Identification of Potential Funding Sources

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
P1-1	50	50										
P1-2		60										
P1-3	60	150										
P2-1	50											
P2-2	60											
N1	1.000	1.000	4.000	1.000								
N2	50	50		50								
N3		50	50									
I1	120	120	120	120	120	120	120	120	120	120	120	120
I2		9.753	9.753	9.753	9.753	9.753	9.753	9.753	9.753	9.753	9.753	9.753
F1	75	75										
F2	4.062	3.476	3.090	2.703	10.042	8.883	7.724	6.566	16.993	14.676	12.359	10.042
F3		140	280	420	140	140	140	140				
F4			400									
F5	1.500	1.000										
T1												
T2												
T3	3.325	3.125	2.775	2.775	2.394	2.394	2.394	2.394	993	993	993	993
T4	895	485	346	70	60	70	346	70	346	245	70	70
T5	1.168	1.051	924	927	370	370	1.205	1.205	996	927	370	370
T6	500	520	170	445	170	445	170	445	170	445	170	445
Iv1	14.018	14.918	12.665	12.665	11.915	11.915	11.915	11.915	11.915	11.915	11.915	11.915
Iv2		7.550	7.525	7.525	7.525	7.525	7.525	7.525	7.525	7.525	7.525	7.525
Iv3	250	750	1.250	1.750	1.650	2.150	2.150	2.650	2.650	2.650	2.650	2.650
Total Costo (millones COP)	**27.183**	**44.323**	**43.348**	**40.203**	**44.139**	**43.765**	**43.442**	**42.783**	**51.461**	**49.249**	**45.925**	**43.883**

Source: Prepared by the authors. It must be noted that cooperation resources allocated to the IFN, forestry and sustainable management plans are included within the Forestry Fund. Colors used reflect financing sources shown in Table 3.

4.5 Relation between Recommendations, Colombian International Commitments and the Final Agreement to End the Armed Conflict and Build Stable and Lasting Peace

Natural and planted forests fulfill several functions of ecological, economic and social nature. Given this particular feature, proposed recommendations have an impact not only on forest economy, but also on other scopes of public policy. These interactions were examined considering how these recommendations could contribute to international commitments (and their respective national policies) in three dimensions: sustainable development, biodiversity and climate change. The result of these examination show positive relations in every case, contributing to the fulfillment of these commitments.

Proposals in forest economy have a direct influence over the following Sustainable Development Goals: Zero Hunger, Good Health and Well-Being, Quality Education, Gender Equality and Clean Water and Sanitation.

In respect of the United Nations Convention of Biological Diversity (Aichi Targets 2011-2020), proposed recommendations relate to: Strategic Goal A – Targets 1, 2 and 3; Strategic Goal B – Targets 5 and 7; Strategic Goal C – Target 13; and Strategic Goal D – Target 19.
In the case of the National Policy for the Integral Management of Biodiversity and its Ecosystem Services, Biodiversity Action Plan 2016-2030, which fulfills the commitment of having "National Biodiversity Strategy and Action Plans – NBSAPs", proposed recommendations articulate sections I.6, I.9, I.16, II.1, II.2, II.5, III.3, III.5, IV.2, IV.3 and IV.5. It must be noted that forest economy pursues economic benefits through the sustainable use of the natural forests, incorporating the communities living in them, therefore many of its actions and recommendations are articulated with strategies for the conservation of biodiversity.

Finally, in respect of international commitments, the Paris Agreement (UNFCCC) was evaluated, and articulation was found among the implemented strategies in Colombia in order to achieve mitigation, adaptation and means for implementation.

Likewise, the Final Agreement to End the Armed Conflict and Build a Stable and Lasting Peace was examined, since, as it was outlined in the diagnosis on the forestry sector (Section 1 of the current study), there is a strong correlation between forestry areas and regions most affected by the conflict. That is why the invigoration of the forestry sector and its diverse productive chains has a direct relation with several aspects of the Peace Agreement, particularly with Article 1 on Comprehensive Rural Reform.

Section 1.1.1 (Comprehensive Rural Reform Land Fund), represents a great challenge for the forestry sector, since it anticipates that Forest Reserve Areas be the source to constitute the Land Fund, while indicating that subtraction will be conditioned to the elaboration of plans for the use of these environmentally and socially sustainable territories. Therefore, to keep forestry use of these regions implies to be able to define productive models that include forest resources.

Planning and giving a sustainable use for these native forests in the country, through the communities that own or live near these forests, may be decisive for the goal of closure of the agricultural frontier, determined in Section 1.1.10 of the Agreement.

In a symmetrical manner, achievement of goals in sections 1.3.1 (Infrastructure and land improvement) and 1.3.3 (Stimuli for agricultural production and the solidarity and cooperative economy) will facilitate the development of the forest economy, and will also be benefited by the proposed recommendations.

Complete analysis of these relations and contributions can be found in the document: Deliverable 4 – *Proposal for Action and Recommendations for Green Growth Policy in Colombia.*

4.6 Impact of the Recommendations on the Employment in the Forestry Sector in Colombia

The selected methodology to plan the evolution of employment in the forestry sector as a result of the implementation of the recommendations for its development, is developed in the ILO study covering the foresight of the European forestry sector (Blombäck, Poschen and Lövgren, 2003). The assumption underlying this methodology is that future employment levels can be predicted considering past and current trends in work productivity. This methodology was applied in Colombia using available data and adjusting it with assumptions when information was scarce. Two scenarios were considered for future trends: the first one considered job creation continuing the current trend, and the second considered job creation if proposed recommendations were to be implemented. Table 5 summarizes the additional production in cubic meters of wood which the industry would receive as a result of new plantations and the sustainable forestry use of the natural forests, as considered in the proposals of the current study.

Table 5. Additional Production Resulting From the Implementation of Recommendations in Forest Economy, and Use Distribution among Processed Wood and Furniture Manufacturing Sub-Sectors (m^3)

Year	Additional production for the processed wood sub-sector (m^3)	Additional production for the furniture manufacturing sub-sector (m^3)
2022	50 000 (native forests)	50 000 (native forests)
2026	200 000 (native forests)	200 000 (native forests)
2030	500 000 (native forests) + 100 000 (commercial plantations)	500 000 (native forests)

Source: Prepared by the authors based on the hypothesis from the study.

It must be noted that sustainable management and use of natural forests will have a faster impact on the industry than the extension of commercial forestry plantation areas, since the latter need the production cycle to be fulfilled in order to generate wood.
The total of the results obtained by each sub-sector allows an increase of 80% of the jobs currently created by the forestry sector on the whole, and, mainly, to invigorate the sector's growth rates, as seen in Table 6.

Table 6. Development of the Amount of Jobs in the forestry Sector. Current Trend Evolution and Additional Jobs Created by Recommendations

Año	Total aggregate of jobs created in the forestry sector chain	Trend development of jobs in the sector (not considering recommendations)	Additional jobs created by the implementation of recommendations.
2017	74 956	74 956	
2022	77 956	72 739	+ 4 284
2026	105 466	85 158	+ 20 308
2030	161 550	101 553	+ 59 996

Source: Prepared by the authors based on data from FAO and DANE – EAM.

Distribution of jobs among rural and urban areas: In relation with the national goals in terms of rural jobs, the respective fraction for rural and urban jobs created was estimated. It was considered that 50% of jobs from the furniture sub-sector is located in rural areas, as is 25% of the jobs in the paper and cardboard sub-sector and all of the jobs in silviculture, non-wood products harvesting and wood processing. The rest corresponds to urban jobs. Results of the distribution of jobs among rural and urban areas are shown in Table 7.

Table 7. Estimate of the job distribution among rural and urban areas

Year	Total creation of rural jobs	Total creation of urban jobs
2022	50 631	26 392
2026	70 191	35 275
2030	105 984	55 566

Source: Prepared by the authors.

4.7 Main Monitoring Indicators in Forest Economy

Each recommendation is related to a certain goal (which is global -for the 2019-2030 term- or broken down -for each of the three quadrennial terms -2022, 2026 and 2030) and a corresponding indicator, which includes compliance monitoring in each case. In order to keep track of the Colombian forestry sector's dynamism and progress, and particularly its ability to contribute to the country's economy, a set of 44 indicators is proposed, organized according to the chain logic, in addition to a transversal view of the country's forestry capital.

Proposed indicators (see Annex 2), which are essential to conduct such monitoring, and to be able to adjust the various policy and management instruments proposed in the recommendations, are related to: forestry capital (forestry areas and pressure); raw material production (productive potential, wood utilization, non-wood products utilization, jobs); processing (total volume processed, jobs), and finally, commercialization. A specific description of each indicator, responsible authority, publication site and frequency is available in the Deliverable 4 – *Proposal for Action and Recommendations for Green Growth Policy in Colombia.*

A series of explanatory notes must be made about these set of indicators:

- Data currently collected was used as much as possible, in order to avoid creating new processes for gathering information, which are complex and costly by nature;

- However, very few indicators are fully and currently available. This is because information is often collected or transmitted only partially (cases such as data on native forests in charge of the CARs, for example) or lacking distinction between products originated in natural or planted forests (data from the DANE);
- In some cases, new indicators are suggested, noting the most suitable authority for the gathering of the information and the publication that may fit best. Clearly, these indicators could be reviewed at the time of effective implementation;
- Economic data is generally incomplete as it does not cover the entirety of companies of the sector (i.e., the exclusion of businesses with less than 10 employees by the EAM and the DANE). However, it can play the part as an indicator, as it allows to measure trends in the sector more efficiently throughout the years, and to compare it to other activity sectors;
- Authorities labeled as “responsible” are the ones in charge of gathering and structuring information, not necessarily the ones in charge of publishing such information in accessible format for the general public. For example, all indicators that may appear in the SNIF will be published by the IDEAM, but the latter does not generate all of them.

5 Action Plans and Business Plans

As a supplement to the Forest Economy studies in the framework of the Green Growth Taskforce, three forestry clusters have been identified where the development of the forestry sector can be ignited through the activation of different regional actions. These regional actions have an action plan for each of the clusters, and focus on the implementation of two forestry businesses plans as part of each action plans. The three selected clusters are:

- the Caribbean Region in the *Magdalena Bajo Seco* area;
- the Andean Region in the Cauca Department as commercial forestry plantation clusters;
- the North-Pacific Region in the *Urabá* area as the natural forest cluster.

These clusters were selected based on previous studies of the MADR, the PROFOR (2017) and the UPRA in the cases of planted forests, and the prioritization of areas made by the MADS in the case of natural forests. Tables 8, 9 and 10 summarize the main actions identified as priorities in each cluster, in order to activate the forestry development.

Table 8. Proposed Content and Implementation Schedule for the Action Plan on the *Popayán* Plateau Forest Cluster

Proposed Action	Implementation Period		
	Short- Term	Mid-Term	Long-Term
1. Governance and institutional leadership			
1.1 Create a forest unit within the **Departmental** Government			
1.2 Maintain and strengthen the activities of the forestry bureau			
1.3. Implement the National Forest Service proposals for the Cauca region			
1.4 Reinforce the intervention ability of the ICA within the cluster			
1.5 Implement wood traceability tools			
2. Business networks			
2.1 Create a new industrial unit within the cluster (based on proposed business plans)			
2.2 Define and implement strengthening plans for forestry service provider companies			
2.3 Maximize formality in the sector			
3. Applied research and training			
3.1 Define an applied research strategy for 10 years for the Cauca forest cluster			
3.2 Conduct three studies co-directed by a private company and a research entity			
3.3 Maintain a permanent offer in the SENA for training in technical forestry trades			
4. Transportation			
4.1 Maintain the CIF with bonus within the cluster area			
4.2 Create a “custom-free forestry zone” within the cluster			
4.3 Provide medium-sized public-private investment mechanisms.			

Source: Prepared by the authors based on results of regional workshops.

Table 9. Proposed Content and Implementation Schedule for the Action Plan in the Caribbean Forest Cluster

Proposed Action	Implementation Period		
	Short- Term	Mid-Term	Long-Term
1. Management and organizational capacity			
1.1 Create a forest unit within the Departmental Government			
1.2 Reactivate and strengthen the Forestry Productive Chain of the *Magdalena Bajo*			
2. Resource constitution or profiling			
2.1 Ensure technical assistance for forestry producers			
• Develop information activities for the entities responsible for the effective creation of the SNIA, in order to ensure that the National Subsystem of Agricultural Extension be comprised of skilled personnel (and financial resources) to properly provide the service to forestry producers.			
• Define partnership models among small reforesters and companies interested in its production. This action contributes to finance and implements permanent technical assistance and product commercialization.			
2.2 Define a research strategy which would include the technical packages adjustments to the condition of the region, species selection, and genetic improvement.			
2.3 Establish forest nurseries.			
3. Use and transformation of the resource			
3.1 Create and support a training offer for the SENA in forest programs, mainly in transformation, and machine and equipment management**.**			
3.2 Conform a new forestry business in the cluster, based on prepared business plans.			
4. Transportation			
4.1 Maintenance of tertiary access routes			
5. Resource commercialization			
5.1 Market research for obtained products.			
5.2 Strengthen the involvement of forestry chain actors, including producers, in national exhibitions related to wood and non-wood forestry products.			

Source: Prepared by the authors based on results of regional workshops.

Table 10. Proposed Content and Implementation Schedule for the Action Plan in the *Chocó* forest cluster

Proposed Action	Implementation Period		
	Short-term	Mid-term	Long-Term
1. Governance and Legality			
1.1 Create a forestry unit within the **Departmental** Government.			
1.2 Support and strengthen activities from the Forestry Bureau.			
1.3 Implement the National Forestry Service proposal in *Chocó*.			
1.4 Reinforce the intervention abilities from the UMATAs and Municipalities in forestry issues.			
1.5 Implement more advanced tools for wood traceability.			
2. Planning tools			
2.1 Propose a revised methodology to conduct the PGOF.			
2.2 Adjust the requirements for forestry management plans.			
2.3 Provide more flexibility and visibility on annual logging units (UCA)			
3. Business networks			
3.1 Create a new industrial unit within the cluster (transformation service provider).			
3.2 Maximize formality in the sector.			
4. Applied research and training			
4.1 Define an applied research strategy for 10 years.			
4.2 Implement a permanent plot scheme to define the natural offer of the forest (wood and NWFP).			
4.3 Along with COLCIENCIAS, design a specific guideline to fund PhD theses related to natural forests (silviculture, biodiversity, forest economy, etc.)			
4.4 Maintain a permanent offer in the SENA for training in technical forestry trades.			
5. Sector Funding			
5.1 Implement a Sustainable Forestry Management incentive as a pilot project within the cluster area.			
5.2 Develop appropriate credit instruments for natural woods and communitarian actors.			
5.3 Provide medium-sized public-private investment mechanisms.			

Source: Prepared by the authors based on results of regional workshops.

6 Annexes

6.1 Timeline of the Norms Related to the Forestry Sector

Timeline

Policy and legal forestry framework

1959

- Law N.2, 1959. Establishes 7 main forest reserve areas for the development of forest economy as well as soil, water and wildlife protection.

1974

- Decree 2811, 1974. Renewable natural resources code. Regulates forests and their use, forest reserves and special management areas.

1976

Decree 877, 1976. Priorities given to various uses of forest resource and concession and permit grants.

1977

- Decree 622, 1977. Regulates the National Parks System.
- Decree N. 1449, 1977. Obligations of rural property owners over forest conservation and protection.

1982

- Law N. 17, 1982 whereby the CITES Convention is approved.
- Inderena 1982 Agreement 48, sets the use rates in natural forests.

-1983: Tropical Wood Convention

1989

- Law N.37, 1989, foundations to structure the National Forestry Development Plan, which then creates the Forestry Service.

1990

- Law N.29, 1989. Support for scientific research and technological development.

1991

- Political Constitution of 1991. Sustainable development, social and ecological function of property, priority given to comprehensive development for agricultural and forest activities.

- Law N. 21, 1989, on indigenous and tribal communities. Most of the Colombian forests are located on lands belonging to black and indigenous communities.

1993

- Law N. 101, 1993. General Act on agricultural and fishing development. Logging and commercial reforestation are considered to be primarily agricultural activities.

- Law N. 70, 1993. Law on black communities. The collective title includes both soil and forest.
- Law N. 99, 1993. Creates de Ministry of the Environment and organizes the SINA.

1994

- Law N.139, 1994 creates the Certificate of Forestry Incentive (CIF).
- Law N.160 Agricultural Reform and Rural Development Law.
- Law N. 164, 1994. United Nations Framework Convention on Climate Change (UNFCCC).

- Law N. 165, 1994. Convention on Biological Diversity.
- 1994, Tropical Wood Convention.
-Decree N.1824, 1994 regulates the CIF for commercial purposes.

1996

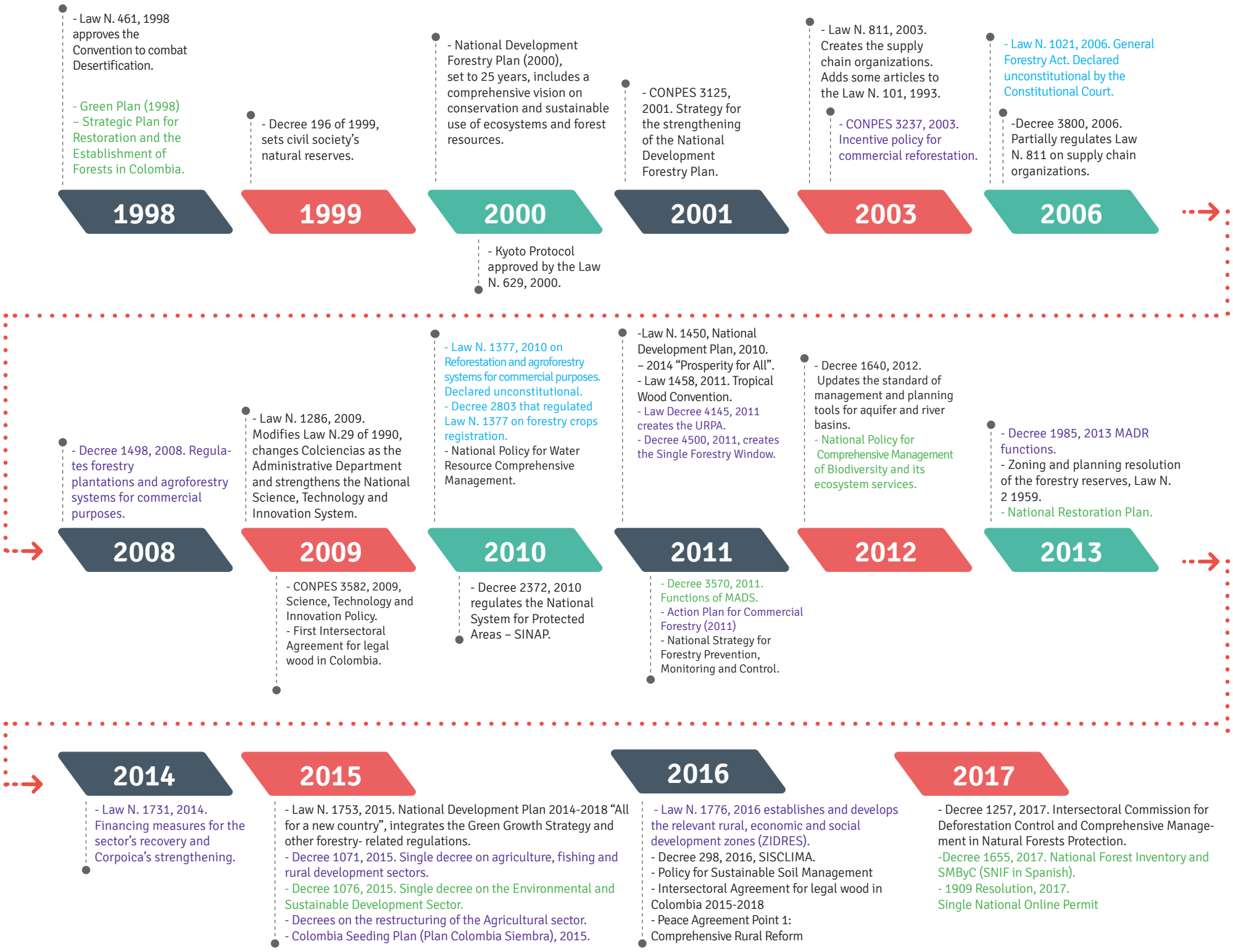
- CONPES 2834. Forest policy. Sustainable use of forests in order to conserve them, strengthen the integration of the forestry sector within the national economy and contribute in improving the peoples' quality of life.

- Decree 1791, 1996. Forestry use framework. Regulates the use, management and conservation of forests and wild flora. Includes non-timber products.

1997

- Decree 900, 1997. Regulates the CIF for conservation.

Color legend: Green, related to natural forests. – Purple, related to commercial forest plantations. – Blue, policies yet to be regulated. – Black, what can be applied to natural forests and commercial forest plantations.


1998
- Law N. 461, 1998 approves the Convention to combat Desertification.
- Green Plan (1998) – Strategic Plan for Restoration and the Establishment of Forests in Colombia.
1999
- Decree 196 of 1999, sets civil society's natural reserves.
2000
- National Development Forestry Plan (2000), set to 25 years, includes a comprehensive vision on conservation and sustainable use of ecosystems and forest resources.
- Kyoto Protocol approved by the Law N. 629, 2000.
2001
- CONPES 3125, 2001. Strategy for the strengthening of the National Development Forestry Plan.
2003
- Law N. 811, 2003. Creates the supply chain organizations. Adds some articles to the Law N. 101, 1993.
- CONPES 3237, 2003. Incentive policy for commercial reforestation.
2006
- Law N. 1021, 2006. General Forestry Act. Declared unconstitutional by the Constitutional Court.
-Decree 3800, 2006. Partially regulates Law N. 811 on supply chain organizations.
2008
- Decree 1498, 2008. Regulates forestry plantations and agroforestry systems for commercial purposes.
2009
- Law N. 1286, 2009. Modifies Law N.29 of 1990, changes Colciencias as the Administrative Department and strengthens the National Science, Technology and Innovation System.
- CONPES 3582, 2009, Science, Technology and Innovation Policy.
- First Intersectoral Agreement for legal wood in Colombia.
2010
- Law N. 1377, 2010 on Reforestation and agroforestry systems for commercial purposes. Declared unconstitutional.
- Decree 2803 that regulated Law N. 1377 on forestry crops registration.
- National Policy for Water Resource Comprehensive Management.
- Decree 2372, 2010 regulates the National System for Protected Areas – SINAP.
2011
-Law N. 1450, National Development Plan, 2010. – 2014 "Prosperity for All".
- Law 1458, 2011. Tropical Wood Convention.
- Law Decree 4145, 2011 creates the URPA.
- Decree 4500, 2011, creates the Single Forestry Window.
- Decree 3570, 2011. Functions of MADS.
- Action Plan for Commercial Forestry (2011)
- National Strategy for Forestry Prevention, Monitoring and Control.
2012
- Decree 1640, 2012. Updates the standard of management and planning tools for aquifer and river basins.
- National Policy for Comprehensive Management of Biodiversity and its ecosystem services.
2013
- Decree 1985, 2013 MADR functions.
- Zoning and planning resolution of the forestry reserves, Law N. 2 1959.
- National Restoration Plan.
2014
- Law N. 1731, 2014. Financing measures for the sector's recovery and Corpoica's strengthening.
2015
- Law N. 1753, 2015. National Development Plan 2014-2018 "All for a new country", integrates the Green Growth Strategy and other forestry- related regulations.
- Decree 1071, 2015. Single decree on agriculture, fishing and rural development sectors.
- Decree 1076, 2015. Single decree on the Environmental and Sustainable Development Sector.
- Decrees on the restructuring of the Agricultural sector.
- Colombia Seeding Plan (Plan Colombia Siembra), 2015.
2016
- Law N. 1776, 2016 establishes and develops the relevant rural, economic and social development zones (ZIDRES).
- Decree 298, 2016, SISCLIMA.
- Policy for Sustainable Soil Management
- Intersectoral Agreement for legal wood in Colombia 2015-2018
- Peace Agreement Point 1: Comprehensive Rural Reform
2017
- Decree 1257, 2017. Intersectoral Commission for Deforestation Control and Comprehensive Management in Natural Forests Protection.
-Decree 1655, 2017. National Forest Inventory and SMByC (SNIF in Spanish).
- 1909 Resolution, 2017. Single National Online Permit

6.2 Suggested Monitoring Indicators for the Forestry Sector

Suggested Monitoring Indicators for the Forestry Sector										
Color legend		Fully available								
		Partially Available								
		To be developed								
Stage / Informed Theme	**Indicator Number**	**Native Forest**				**Indicator Number**	**Plantations**			
1. Forestry Capital			Publication	Frequency	Responsible			Publication	Frequency	Responsible
Forest area	1.1	Native forest area	SNIF	Annually	IDEAM	1.2	Total planted area	SNIF	Annually	IDEAM
Pressure on forests	1.3	Deforested hectares	SNIF	Quarterly	IDEAM					
	1.4	IFN % of implementation	SNIF	Annually	IDEAM	1.5	Plantation Inventory Implementation %	SNIF	Annually	IDEAM, ICA
	1.6	Amount of burnt hectares	SNIF	Annually	IDEAM	1.7	Amount of burnt hectares	SNIF	Annually	IDEAM
2. Raw Material Production			Publication	Frequency	Responsible			Publication	Frequency	Responsible
Productive potential	2.1	Amount of forest hectares with POF	SNIF	Annually	CARs (SFN)	2.3	Amount of hectares of commercial plantation	SNIF	Annually	ICA
	2.2	Amount of forest hectares with PMFS	SNIF	Annually	CARs (SFN)	2.4	Amount of hectares harvested	SNIF	Annually	ICA
Harvested Wood	2.5	Annual authorized volume for commercial utilization	SNIF	Annually	CARs (SFN)	2.6	Annual volume authorized for mobilization	SNIF	Annually	ICA
Harvested NWFPs	2.7	Amount of species authorized for commercial utilization	SNIF	Annually	CARs (SFN)	2.8				
Jobs	2.9	Amount of jobs created for Wood and NWFPs utilization	Cuenta satélite ambiental	Quadriennial	DANE	2.10	Amount of jobs created in plantation maintenance and planted wood utilization	Cuenta satélite ambiental	Quadriennial	DANE
	2.11	Amount of jobs in forestry technical assistance	Cuenta satélite ambiental	Quadriennial	DANE	2.12	Amount of jobs in forestry technical assistance	Cuenta satélite ambiental	Quadriennial	DANE

3. Transformation			Publication	Frequency	Responsible			Publication	Frequency	Responsible
Volumes transformed	3.1	Amount of m3 transformed in the furniture subsector	Cuenta satélite ambiental	Annually	DANE	3.2	Amount of m3 transformed in the furniture subsector	Cuenta satélite ambiental	Annually	DANE
	3.3	Amount of m3 transformed in wood boards, panels, veneers, etc.	Cuenta satélite ambiental	Annually	DANE	3.4	Amount of m3 transformed in wood boards, panels, veneers, etc.	Cuenta satélite ambiental	Annually	DANE
	3.5	Amount of m3 used in construction	Cuenta satélite ambiental	Annually	DANE	3.6	Amount of m3 used in construction	Cuenta satélite ambiental	Annually	DANE
						3.7	Amount of m3 used for pulp and paper	Cuenta satélite ambiental	Annually	DANE
Jobs in processing	3.8	Amount of jobs in the furniture sector	EAM	Annually	DANE	3.9	Amount of jobs in the furniture sector	EAM	Annually	DANE
	3.10	Amount of jobs in industry of wood boards, etc.	EAM	Annually	DANE	3.11	Amount of jobs in industry of wood boards, etc.	EAM	Annually	DANE
							Amount of jobs in pulp and paper industry	EAM	Annually	DANE

4. Commercialization			Publication	Frequency	Responsible			Publication	Frequency	Responsible
	4.1	Total demand value for native forest wood furniture, in purchase prices	BOU Cuentas Nacionales	Annually	DANE	4.2	Total demand value for planted forest wood furniture, in purchase prices	BOU Cuentas Nacionales	Annually	DANE
	4.3	Total demand value for wood boards, panels, veneers, in purchase prices	BOU Cuentas Nacionales	Annually	DANE	4.4	Total demand value for planted forest wood boards, panels, veneers, in purchase prices	BOU Cuentas Nacionales	Annually	DANE
	4.5	Total demand value for native forest wood furniture used for construction, in purchase prices	BOU Cuentas Nacionales	Annually	DANE	4.6	Total demand value for planted forest wood furniture used for construction, in purchase prices	BOU Cuentas Nacionales	Annually	DANE
						4.7	Total demand value for pulp and paper, in purchase prices	BOU Cuentas Nacionales	Annually	DANE
	4.8	Per capita consumption of wood products						Cuenta satélite ambiental	Annually	DANE
	4.9	Per capita consumption of NWFPs	Cuenta satélite ambiental	Annually	DANE	4.10	Per capita consumption of NWFPs	Cuenta satélite ambiental	Annually	DANE
	4.11	Amount of hectares with PSA contracts	SNIF	Annually	MADR	4.12	Amount of hectares with PSA contracts	SNIF	Annually	MADR
	4.13	Amount of teqC in relation to sold forests	SNIF	Annually	MADR	4.14	Amount of teqC in relation to sold plantations	SNIF	Annually	MADR