

Annual Report 2022 V











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Notes on methodology and the glossary for the 2022 Ibá Annual Report can be found in the Annex or at <u>www.iba.org</u>

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Opening Letter Message from the Board President & Executive President



Photo Credit: Bracell

Opening Letter

MESSAGE FROM THE

Board President & Executive President



"The future is not a place we are going, but a place we are constructing."

Antoine de Saint-Exupéry

ADVANCES IN THE PRESENT, INVESTMENT IN THE FUTURE

As the writer Saint-Exupéry so aptly warned, "the future is not a place we are going, but a place we are constructing." Along these lines, the agenda for social and economic transformation of the present to ensure a future for our planet has expanded and gained strength in recent years.

Whether in the private arena or the public sector, the prescriptive directives that lay the foundations for this path are found in the concept of ESG, which addresses environmental, social, and corporate governance.

The planted tree sector has incorporated this paradigm, and with intelligent land use, care for nature, and respect for people, has transformed itself into a recognized global benchmark.

Ibá, as it accompanies the firm strides taken by its associates, has also advanced its own analyses, modernizing its Annual Report and providing Brazilians with a portrait of work in this segment that is as accurate as possible.

Along these lines, for example, we report on sustainability in cultivation standards, noting that the total area of planted trees in the country reached 9.93 million hectares. Importantly, growth in the sector often takes place on land that was previously degraded.

Another piece of information that is extremely important right now is that eucalyptus productivity has attained its highest level since 2014, reaching 38.9 m³/ha/year in 2021, and pine reached 29.7 m³/ha/ year. These numbers exceed global averages, and through Brazil's experience demonstrate that knowledge and technology drive modern agriculture.







eucalyptus productivity in 2021, the highest level since 2014.



increase in certified area in 2021.



direct and indirect jobs generated up to the close of 2021.

The product of differentiated efforts, the sector maintains 6 million hectares of conservation areas. In a modern management technique known as forest mosaics, plantation areas are connected with native vegetation to create ecological corridors that help maintain soil fertility, preserve springs, and protect biodiversity. Companies in the planted tree sector have already recorded over 8,000 species of flora and fauna in their lands.

Considering the urgent need to remove carbon dioxide (one of the main greenhouse gases) from the atmosphere, the fact that production and conservation areas store 4.5 billion tons of carbon dioxide equivalent is increasingly relevant.

Another fact that demonstrates these companies' commitment is certification, which makes it possible to track their raw materials, attesting to sustainable management and dialog with communities. In 2021, 7.37 million hectares were certified through FSC or PEFC/Cerflor an advance of 8.3% over the previous year.

It is notable that at the very same time that the country is going deindustrialization, this sector has one of the largest investment portfolios in Brazil. Investments totaling R\$ 60.4 billion are underway or planned for forests, R&D, and new industrial plants between 2022 and 2028, representing an average of one new factory each year.

All these efforts result in direct benefits for society. Job generation is one of the largest positive impacts. The sector closed the year with over 2 million direct and indirect job posts. When induced job posts are also considered, the number of people employed rose to nearly 3 million.

The planted tree sector also helps drive local economies. Trees are cultivated for industrial purposes in over 1,000 municipalities throughout Brazil, mostly in regions far from large urban centers, driving regional development. The Human Development Index (HDI) in municipalities where the sector works is higher than the state averages.

Additionally, small-scale producers gain new opportunities. The number of outgrowers in the sector has also advanced, with 2 million farmers who have diversified their land use and earned extra income by planting eucalyptus and pine.

This solid scenario constructed over the long term has helped the sector have a record year, in which production of pulp, paper, and wood panels reached the highest levels in history. The year 2021 also marked the highest income for the sector on record, reaching R\$ 244.6 billion. An internationally competitive sector present in various global chains, the planted tree sector was responsible for foreign exchange on the order of US\$ 11.8 billion, exceeding the results for 2020.

Because sustainability is in the DNA of this sector, it is not just the financial results that are notable. The planted tree industry is emerging as a case study amid the global race toward a clean energy grid. Companies in this sector are responsible for generating 74.6% of the electricity they use. And there's more: 88% of the energy generated by the sector comes from renewable sources like biomass and black liquor, putting the concept of the circular economy into practice.

With innovation catalyzing everyday operations, the planted tree industry is already able to offer society environmentally friendly alternatives beyond the 5,000 bioproducts that have become essential parts of our everyday lives, like paper packaging, fabrics, diapers, books, wood panels, and laminate flooring. One example is cellulose pulp, which is utilized for a variety of purposes including viscose fabrics used in the textile industry, creating an alternative to polyester.

Nanotechnology is also present in the companies' research and development laboratories. Textile fibers can also be created from nanocellulose, using up to 90% less water and fewer chemicals. This technology also will make it possible to create barriers for liquids and fats in products like shelf-stable packaging for milk and juice, for example, eliminating the need for plastic or aluminum layers and making these packages more recyclable and biodegradable. These are only some of the many achievements we will present in the following pages. These advances highlight the solid adoption of ESG principles by the sector, helping to establish a new model for production and consumption. In this sense, this Annual Report goes beyond a mere compilation of data and represents an agenda to inspire other sectors and drive sustainable practices, for today and for tomorrow.

WITH BEST REGARDS,



Horacio Lafer Piva Chairman of the Ibá Deliberative Council



Paulo Hartung Executive President of Ibá





Ibá, the Brazilian Tree Industry



Photo Credit: Celulose Irani

THE PLANTED TREE SECTOR EMBODIES THE CONCEPT OF THE CIRCULAR ECONOMY

The planted tree industry has invested and worked to make caring for nature and people a value that is present in every step of its trajectory.

The planted tree sector has investments of R\$ 60.4 billion (2022-2028) in forests, R&D, operations, and modernizing factories or installing new units. These investments will boost efficiency, technologies, and sustainable advances.



9.93 million hectares of planted areas (trees planted, harvested, and replanted

in previously degraded areas)



6.05 million hectares of conservation areas (an area larger than the state of Rio de Janeiro)

This sector is proof that producing while preserving is possible. There are 9.3 million hectares of planted forests, which are often located on land that was previously degraded.

Over 6 million hectares are set aside for conservation. Using a modern technique known as mosaic planting, planted trees are interspersed with preservation areas, helping to preserve water and biodiversity.

International institutions like FSC and PEFC/Cerflor have attested to sustainable management and dialog

5.9 million people who benefit from social and environmental programs



+ R\$300 million invested in industrial and

forest innovations

88% renewable energy used in the industry comes from biomass and black liquor 66.7% of paper

is recycled in Brazil (the highest recycling rate in the world) with communities for over 20 years. Working alongside society creates shared value and mutual growth.

In manufacturing, the commitment to the environment has yielded positive results; 88% of the energy generated by this sector comes from renewable sources, and water usage has dropped by 75% since the 1970s.

All of this results in over 5,000 renewable, biodegradable, and mostly recyclable bioproducts that store carbon.





CHAPTER 1

IBÁ, the Brazilian Tree Industry



Mission

Ibá strives to make the sector more competitive, bringing member companies into line with the highest standards of science, technology, and environmental responsibility throughout the entire forest production chain, in the search for innovative solutions for the Brazilian and global markets.

Vision

Planted trees are the future of raw materials that are renewable, recyclable, and friendly to the environment, biodiversity, and human life. The planted tree industry is the industry of the future.

Values

Competitiveness | Durability | Innovation | Responsibility

ABOUT IBÁ

The Brazilian Tree Industry (Ibá) is the association responsible for institutional representation of the planted tree production chain, from the fields to the factory. In order to promote products derived from pine, eucalyptus, and other species that are directed toward industrial purposes, Ibá works to defend the interests of the sector to officials and government agencies, entities from the planted tree production chain, and significant sectors of the economy, social and environmental organizations, universities, schools, consumers, and the press — in Brazil as well as abroad.

The association represents approximately 50 companies and 10 state forest entities. Planted trees have made Brazil a global reference in the production of pulp and paper, as well as for the raw materials used in a variety of laminate products and charcoal (used in the steel industry), bioproducts like fabrics, waxes, and grease, paper for printing and hygiene purposes, diapers, packaging, furniture, pallets, packing crates, and viscose.

With advances in innovation and major investments in research and development, there will be a plethora of new products from planted trees, making the bioeconomy a reality.

Photo Credit: Bracell | Gleison Rezende





IBÁ MEMBER COMPANIES MANUFACTURING COMPANIES

- 1. Adami S.A. Madeiras
- 2. Ahlstrom Munksjö Ltda.
- 3. Amata S.A
- **4.** Arauco do Brasil S.A.
- Berneck S.A. Painéis e Serrados 5.
- Blendpaper Security Papéis Especiais S.A. 6.
- BO Paper Indústria de Papéis Ltda. 7.
- Bracell 8.
- 9. Brookfield
- 10. Caieiras Indústria e Comercio de Papéis Especiais Ltda.
- 11. Celulose Nipo Brasileira S.A. Cenibra
- 12. CMPC Celulose Riograndense Ltda.
- 13. Copapa Cia. Paduana de Papéis
- **14.** Dexco S.A.
- 15. Eldorado Brasil Celulose S.A.
- 16. Eucatex S/A Indústria e Comércio
- 17. Floraplac MDF Ltda.
- 18. Gerdau Aços Longos S.A.
- 19. Greenplac Tecnologia Industrial Ltda
- 20. Guararapes Painéis S.A.
- 21. Ibema Cia. Brasileira de Papel
- 22. Iguaçu Embalagens Industriais Ltda.
- 23. Irani Papel e Embalagem S.A.
- 24. Klabin S.A.
- 25. Lacan Florestal



Photo credit: Bracell | Gleison Rezende

- 26. MD Papéis Ltda.
- 27. Melhoramentos Florestal Ltda.
- 28. Norflor Empreendimentos Agrícolas S.A.
- 29. Oji Papéis Especiais Ltda.
- **30.** Papirus Indústria de Papel S.A.
- 31. Penha Papéis e Embalagens Ltda.
- **32.** Placas do Brasil S.A.
- 33. Plantar
- 34. RMS do Brasil Administração de Florestas Ltda.
- 35. Santa Maria Cia. de Papel e Celulose
- 36. Santher Fábrica de Papel Santa Therezinha S.A.
- 37. Softys Brasil Ltda.
- 38. Sonoco do Brasil Ltda.
- 39. Stora Enso do Brasil Ltda.
- 40. Suzano S.A.
- 41. Sylvamo do Brasil Ltda
- **42.** Tanac S.A.
- 43. Teak Resources Company TRC
- 44. TTG Brasil Investimentos Florestais Ltda.
- 45. Unilin do Brasil Revestimentos Ltda.
- **46.** Veracel Celulose S.A.
- 47. WestRock Celulose, Papel e Embalagens Ltda.

STATE ASSOCIATIONS

Associação Baiana das Empresas de Base Florestal/Forest Plantation Producers Association of Bahia | ABAF Associação Mineira da Indústria Florestal/Forest Industry Association of Minas Gerais | AMIF Associação Sul-Mato-Grossense de Produtores e Consumidores de Florestas Plantadas/Mato Grosso do Sul Planted Forest Producers and Consumers Association | Reflore MS Associação Gaúcha de Empresas Florestais/Rio Grande do Sul Forest Companies Association | Ageflor Associação Paranaense de Empresas de Base Florestal/Paraná Forest Companies Association | APRE Associação Catarinense de Empresas Florestais/Santa Catarina Association of Forest Enterprises | ACR Associação Paulista de Produtores de Florestas Plantadas/São Paulo State Forest Plantation Producers Association | Florestar São Paulo

Associação de Reflorestadores de Mato Grosso/Association of Planted Forests Mato Grosso | AREFLORESTA Centro de Desenvolvimento do Agronegócio (ES)/Agribusiness Development Center (ES) | CEDAGRO





Economic aspects of the sector

Photo credit: Unsplash | Venti Views

CHAPTER 2

Economic aspects of the sector



FIGURE 01 in current prices (billion R\$)¹





gross production by the forest production chain in 2021.

ECONOMIC BENEFITS FOR THE BRAZILIAN ECONOMY FROM THE PLANTED TREE INDUSTRY

The year 2021, particularly the second quarter, was marked by the second wave of Covid-19, a very difficult and challenging time. Progress in vaccination improved prospects. In economic terms there was the beginning of a recovery, most notably in those sectors that were most affected by the pandemic like services provided to households, but consumption of goods slowed. At the start of the second quarter, the Brazilian economy performed as expected, but inflationary pressures were more intense than predicted: drought, a very depreciated exchange rate, continuing supply shocks for industrial inputs, and high oil prices had drove inflation. Brazilian gross domestic product (GDP) rose 4.6% in 2021 after retreating 3.9% in 2020 after Covid-19 arrived in the country. Unlike many other Brazilian economic segments, the forest production chain maintained robust production, helping Brazil at this very important time. The value added by the forest production chain grew 7.5% in 2021, exceeding growth in domestic GDP to reach a record R\$ 244.6 billion in gross production value.

FIGURE 02

Real annual variation in the Brazilian economy (%)

Photo credit: Westrock

Prepared by FGV IBRE | Source: IBGE



In terms of participation, the value added by this production chain accounted for 1.2% of the Brazilian economy in the average for 2010–2021, the highest percentage seen in the last decade.

1 Data revised according to improvements in methodology.

Value of production in the sector, 2019–2021

17

Prepared by FGV IBRE | Source: IBGE

Share of value added to the Brazilian economy by the planted tree production chain (%)



FIGURE 04

Real change in the planted tree production chain and in Brazilian GDP, series (2010=100)

Prepared by FGV IBRE | Source: IBGE





2010 to 2021.

Over the past decade, average performance by the planted tree production chain has significantly exceeded Brazilian GDP in real terms. While Brazil's GDP grew 7.4% from 2010 to 2021, the value contributed by this production chain rose 20.5% during this same period. This excellent performance was most visible from 2016 onward (Figure 3).

To provide some context about the importance of this production chain in the Brazilian economy, Figure 5 presents data on the activities that added the most value. Of a total of 50 activities that represent the entire Brazilian economy, the planted tree production chain ranked 22nd in terms of contributing value to Brazil's GDP, with data estimated for the 2010–2021 average. Note that the activities that contributed the most to the economy

FIGURE 05

Industrial activities adding the most value to the economy mean 2010-2021 (%)

Prepared by FGV IBRE | Source: IBGE



In the traditional analysis of 12 economic activities, the planted tree production chain is included in two different areas: agriculture/ ranching (forest production) and manufacturing (of wood products and of pulp, paper, and paper products). This production chain accounted for 4.2% of the agriculture/ranching sector in 2021. The real increase in value added by planted tree production exceeded that for agriculture and ranching as a whole (54.7% during 2010-2021 versus 34.3%, respectively). The lower share of planted tree production in total activity is explained by higher prices for agriculture and ranching compared to prices for forest production.

are generally in the service sector. In the analysis of a total of 34 different industrial activities, the planted tree production chain rose to 6th place after only the construction sector (5.1%), electricity/ gas/water/sewer/urban sanitation (2.6%), food and beverages (2.3%), oil and gas (1.8%), and machinery and equipment (1.3%).

Share of value added to agriculture/ranching activity by planted tree production (%)

Prepared by FGV IBRE | Source: IBGE





of value added by the sector to national manufacturing. In contrast with deindustrialization currently taking place in Brazil, the planted tree industry has been growing, and accounted for 7.3% of manufacturing value in 2021. This was the second record percentage in a row since 2010, as shown in Figure 7. This expansion has been observed over the past decade and is the result of several factors, including export performance for the products that comprise the forest chain. While wood product and pulp, paper, and paper product manufacturing grew 11.8% and 5.5%, respectively, in real terms of value added during 2010-2021 the value added to manufacturing as a whole decreased 11.8%. It is important to note that 2021 specifically was a critical point due to the sharp real increase in value added by wood product manufacturing during this period, since in the last year alone this activity added 12.0% in real terms. Exports of typical products from the planted tree sector made a more significant contribution than the total for manufacturing, which explains the increase seen.

Note the significant decrease in products typical of the Brazilian planted tree production chain. In 2010 these products accounted for 1.2% of the country's total imports; in 2021 this number dropped to 0.6%.

FIGURE 07

Share of value added to overall manufacturing by wood products, pulp, paper, and paper products

Prepared by FGV IBRE | Source: IBGE



FIGURE 08

Share of products from the planted tree production chain in Brazilian production and imports (%)

Prepared by FGV IBRE | Source: IBGE

PRODUCTION IMPORTS



In terms of demand, Figure 9 shows the performance of products typical of this production chain among total Brazilian exports from 2010 to 2021. The share of exports has been notable since 2010, as the planted tree sector has been an important component of demand and accounted for 4.4% in 2021. As mentioned earlier, significant growth in cellulose pulp exports is the main reason for this increase over the past decade.

Intermediate consumption of products from the planted tree sector accounted for 2.4% of total intermediate consumption for the country in 2021. Finally, household demand for these products and gross capital formation accounted for 0.7% of these components combined in 2021.



Photo credit: AdobeStock



Share of products from the planted tree production chain in the components of Brazilian demand

Prepared by FGV IBRE | Source: IBGE & SECEX



CHANGES IN DATA FOR THE PLANTED TREE PRODUCTION CHAIN AND VARIATION RATES

Figure 10 presents estimated data on the value added by Ibá's production chain.

FIGURE 10

Value added by the production chain in current values (billion R\$)

Prepared by FGV IBRE | Source: IBGE



CONTRIBUTION TO THE TRADE BALANCE

In 2021, the trade balance for the sector was US\$10.7 billion, growth of 20% compared to 2020. This result was the product of increased exports as well as imports, which registered a total value of US\$11.8 billion (20%) and US\$1.1 million (23%), respectively. This sector accounted for 4.2% of all Brazilian exports in 2021.

FIGURE 11

Trade balance (total)

Prepared by FGV IBRE | Source: SECEX



CHAPTER 2. ECONOMIC ASPECTS OF THE SECTOR



US\$**6.7 BILLION**

of pulp exported in 2021, passing the US\$6 billion mark in 2020.



The greatest growth in forest products was seen in laminate flooring and plywood. Pulp remained the leading export from the sector, rising from US\$ 6.0 billion in 2020 to US\$ 6.7 billion in 2021.

FIGURE 12 Trade balance by product in 2021

Prepared by FGV IBRE | Source: SECEX



China and the United States continued as the two leading destinations for goods exported from Brazil in 2021, totaling US\$ 5.7 billion in exports, US\$ 0.6 million higher than the previous year, again accounting for over 50% in the sector. The data by region show that over 80% of exports from the planted tree sector are shipped to Asia, North America, and Europe, with expansion in exports to North America, which rose from 22% in 2020 to 28% of the total exported from the sector in 2021.

Among the world's top ten producers of cellulose pulp, Brazil has remained the largest in the global market in 2021, when it exported approximately US\$1.9 billion more than the second-ranking country.²

2 Export values for the other countries are for 2020, the most recent data available from the Food and Agriculture Organization (FAO).

FIGURE 13

Leading export destinations for the planted tree sector (billion US\$)

Prepared by FGV IBRE | Source: SECEX



FIGURE 14 Leading global pulp exporters (billion US\$)

Prepared by FGV IBRE | Source: FAO (2020) & SECEX (2021)



The leading destinations for pulp exports in 2021 remained China and the United States with 43% and 17%, respectively.

Cellulose pulp accounts for 59% of the products exported by the planted tree industry. There was an increase in the shares of sawn lumber, plywood, and other types of wood exported. Three of the

24

S\$	US\$	US\$	US\$	US\$
.7 ві	0.5 BI	0.5 ві	0.4 BI	0.4 BI
RMANY	NETHERLANDS	NEW ZEALAND	BELGIUM	FRANCE

five main destinations for paper are in Latin America, and together account for 41% of exports. The United States and Mexico continued to be the main destinations for wood panels, lumber, and plywood in 2021.

Top five destinations for exports from the planted tree sector, by product

Prepared by FGV IBRE | Source: SECEX







LUMBER AND PLYWOOD 50 40 30 20 10 48% 0 United Mexico United China Vietnam States Kingdom



Photo credit: Unsplash | Chuttersnap

TAX COLLECTION

The forest production, wood product manufacturing, and pulp and paper and paper product manufacturing segments (which are all part of the domestic planted tree sector) generated an estimated R\$ 28 billion in federal and state taxes.

According to data from the Brazilian Revenue Service, R\$16.7 billion were federal taxes, a 37.3% increase in comparison with 2020. This increase came from forest production as well as wood product manufacturing, which rose 1.0 percentage point (p.p.) and 2.0 p.p., respectively.

FIGURE 16

Federal tax revenue from the planted tree industry production chain



FIGURE 18

Share of federal revenue from each segment

Prepared by FGV IBRE | Source: Brazilian Revenue Service





Taxes in 2021

Prepared by FGV IBRE Source: Brazilian Revenue Service







ECONOMIC ASPECTS OF THE SECTOR

JOB GENERATION

Despite the difficulties seen in the job market throughout Brazil, especially after the Covid-19 pandemic, during 2020 and 2021 the planted tree production chain made a positive contribution to job generation. The sector closed the year with 553,000 new direct job posts and 1.59 million indirect jobs. Considering induced job posts, the number of people employed rose from 2.88 million in 2020* to 2.97 million in 2021.

For each person working directly in the Brazilian planted tree sector, another 5.3 job posts are generated throughout the production chains for products that come from or include raw materials from Brazilian planted trees.

* Data revised in 2022.

FIGURE 19 Industrial investments, 2021

Prepared by FGV IBRE | Source: FGV IBRE & Ibá





PRODUCTIVE INVESTMENTS

In 2021, productive investments by Ibá's member companies totaled R\$ 15.1 billion, 19.9% higher than in 2020. The majority of this amount (around 56.4%) went toward industry, which invested R\$ 8.5 billion; 44.7% of investments in this segment were earmarked to renovate machinery and equipment. Expanding productive capacity accounted for 32.5%, 8.3 percentage points higher than in 2020.

Meanwhile, investments in the area of forestry totaled R\$ 6.6 billion, an increase of nearly 41% over 2020. The main focus in this sector was renewal of machinery and equipment, accounting for 83.3% (3.8 p.p. higher than in 2020).

FIGURE 20

Forest investments, 2021

Prepared by FGV IBRE | Source: FGV IBRE & Ibá



PRODUCTION COSTS

During 2021, difficulties obtaining raw materials raised production costs in some chains, and this global scenario even interrupted production in various segments. In the planted tree sector, prices of the raw materials used in production rose throughout the year, but the largest impact came from urea and chemical fertilizers; shortages of these products affected production of trees as well as many other crops. The index of wood production costs accumulated a gain of 94% in 2021, after a drop of 0.6% in 2020. This index, constructed by FGV using information from the IPA producer price index, was much lower than the 10.06% inflation measured by the Expanded Consumer Price Index (IPCA) in 2021.

FIGURE 21 Wood production cost index

Source: FGV IBRE







direct jobs and 1.59 million indirect jobs generated by the sector in 2021.

Photo credit: Berneck



CHAPTER 2. ECONOMIC ASPECTS OF THE SECTOR







Photo credit: Sylvamo

Photo credit: Berneck



Pulp production grew 7.4% in 2021 to 22.5 million tons, maintaining Brazil's position as the second-largest producer of this material in the world. Because of its important role in the economy, the quality and environmentally sustainable origin of pulp maintained this segment's position among the most important in the world in 2020, when the pandemic was at its worst. When economies began to resume in 2021, even despite the ongoing effects of Covid-19, the sector reaffirmed its resilience by expanding its capacity in the external and internal markets. Nearly 70% of all pulp production was exported, totaling 15.7 million tons.³ The domestic market consumed 6.8 million tons, an increase of nearly 30% over the previous year.

FIGURE 22 Pulp production in Brazil (million tons)

Source: Ibá | Prepared by FGV IBRE

SHORT FIBER LONG FIBER HIGH-YIELD PULP



3 See methodological note.

FIGURE 23

Leading global pulp producers (million tons)

Source: FAO (2020) & Ibá | Prepared by FGV IBRE



FIGURE 24

Destinations for pulp production (million tons and market share, %) Source: SECEX & Ibá



2022 ANNUAL REI BÁ



Photo credit: CMPC



PAPER

Brazilian paper production grew 4.2% in 2021 to 10.7 million tons. This growth was driven principally by printing and writing paper, which grew more than 10% during the year after retreating in 2020. Production of packaging paper followed the same trend and grew 3.9% in 2021, while the other segments moved in the opposite direction, recording losses during the year.

The domestic market remained the main focus of paper sales (81%), with 9.2 million tons traded internally (both production and imports): 8.6 million tons of this product were manufactured in Brazil. Paper exports reached 2.1 million tons in 2021, a drop of 1.4% compared to 2020.

FIGURE 25

Brazilian paper production (million tons)

Prepared by FGV IBRE | Source: Ibá



Brazil remains FIGURE 26 Brazilian paper production, by type

Prepared by FGV IBRE | Source: Ibá



ANNUAL VARIATION **PRODUCTION | TONS** 12 11.7% 10 5.7 мі 3.9% 1.3 мі **0.8** MI 0.5 мі 2.3 м 0.1 мі -0.4% -2 -3.8% -1.0% -1.3% -4 Newsprint Printing & Packaging Sanitary Paperboard Other writing

paper paper



FIGURE 27

2021

2020

0%

FIGURE 28

(million tons)

Prepared by FGV IBRE | Source: Ibá

INTERNAL MARKET

Leading paper producers worldwide, 2021 (million tons)

EXTERNAL MARKET

8.6

8.1

40%

60%

Prepared by FGV IBRE | Source: Ibá & FAO (2020)

20%









tons of paper were exported in 2021.

Photo credit: Pexels | Vlada Karpovich

WOOD PANELS AND LAMINATE FLOORING

After growth in domestic sales of wood panels in 2020 driven by the start of the pandemic and new home working arrangements, in 2021 the sector grew 14.6%, a volume of 8.2 million cubic meters. Remote work gradually shifted from a temporary solution to a permanent reality in companies, affecting consumption of items to provide a more suitable working environment within homes. Sales of MDF and MDP totaled 4.9 and 3.2 million m³, respective gains of 15.7% and 13.1%.

Globally, Brazil is among the 10 largest producers of wood panels in the world.

FIGURE 29

Domestic sales of wood panels, 2021 (million m³)

Prepared by FGV | Source: Ibá & SECEX



FIGURE 30 Leading producers of wood panels worldwide, 2021 (million m³)

Prepared by FGV IBRE | Source: FAO (2020)



Consumers invested in home improvements to adapt to new home office arrangements. As a result, sales of laminate flooring totaled 13.8 million m³, growth of 16.4% in 2021, after the sector posted strong growth of 14% in the previous year. This is the strongest gain in the sector since 2014, when it grew 14.1%.

FIGURE 31

Domestic sales of laminate flooring, 2021



SOLID WOOD PRODUCTS

Estimates indicate that lumber production remained constant in 2020, according to data from the United Nations Food and Agriculture Organization (FAO). More than 90% of Brazilian production is sold on the domestic market. In 2021, exports and imports rose sharply by 41% and 64%, respectively, according to data from SECEX.

In 2021, the wood sector obtained very positive results for exports, even despite the difficult situation worldwide that included economic and health-related uncertainties and higher production costs.

According to the Brazilian Association for Mechanically Processed Timber (ABIMCI), these results are in line with global wood demand seen since the start of the pandemic. In the domestic market, production was primarily directed toward the construction sector, packaging, and furniture, and the main foreign markets for the sector were countries in North America, Europe, and Asia.

The results from the first guarter of 2021 showed an increase in exported volume over the same period in 2020 for most wood items.



flooring in 2021, the strongest growth in the sector since 2014.

FIGURE 32 Brazilian lumber production, 2021 (million m³)

Prepared by FGV IBRE | Source: FAO (2020) & SECEX







Destination for lumber production, 2021 (million m³)

Prepared by FGV IBRE | Source: FAO (2020) & SECEX

INTERNAL MARKET EXPORTS 2020 10.2





Photo credit: Pexels | Thirdman

Results for the first quarter of 2021 show an increase in export volumes compared to the same period in 2020 for most wood items. Export volumes of pine lumber, for example, grew 6% during this period, and the United States was the main market for this product (34%).

Meanwhile, the volume of pine plywood traded grew 22% from 498,000 m³ during the first quarter of 2020 to 608,000 m³ during the same period of 2021. Shipments of eucalyptus plywood rose 7,000 m³ in 2021, with most of these exports also going to the United States.

TABLE 01Exports of solid wood products, 2021

Source: ABIMCI | Data compiled by Ibá

Product	Volume exported in 2021
Pine plywood	2.6 million m ³
Pine lumber	3.2 million m ³
Profiled pine wood (moldings)	179,000 t
Wooden doors	182,800 t
Pellets	345,200 t
Pine logs	825,000 m ³

FIGURE 34

Production of pine lumber (million m³)

Source: ABIMCI





Change compared to 2020
4%
6%
8%
8%
-5%
121%



growth in export volumes of pine lumber in 2021.

FIGURE 35

Leading global lumber producers, 2021 (million m³)

Prepared by FGV IBRE | Source: FAO (2020))



CHAPTER 3. MANUFACTURING



Photo credit: Unsplash | Emerson Peters





increase in production of wood charcoal from leading states in 2021.

_

CHARCOAL

Brazil is the world's leading producer of charcoal from wood, providing an important raw material for other production chains. This material from planted trees replaces other fossil-based materials, reducing greenhouse gas emissions from steelmaking, for example. This is one way the sector reinforces its commitment to the environment and benefits other industries.

According to data from SINDFER/Ibá, charcoal production in leading states such as Minas Gerais and Espírito Santo reached 3.6 million tons in 2021, an increase of 9.4% compared to 2020.

Data from the Brazilian Energy Research Corporation (EPE) indicate that charcoal consumption by the steelworks, pig iron, and steel sector reached 4.25 million tons. The planted tree sector is responsible for 94% of charcoal production (PEVS, 2020). Consumption of this renewable product fell slightly from 4.19 to 4.01 million tons in 2021 compared to the previous year.

FIGURE 36

Charcoal consumption in steelworks, 2021 (million tons)

Prepared by FGV IBRE | Source: EPE & IBGE



FIGURE 37

Share of global charcoal production, 2020

Prepared by FGV IBRE | Source: FAO (2020)





Planted forests



Photo credit: Duratex

Photo credit: Klabin | Zig Koch

CHAPTER 4 Planted forests



trees in Brazil.

1.9% growth over revised data from 2020.

PLANTED AREA

In 2021, the area of planted trees totaled 9.93 million hectares, growth of 1.9% over the revised data from 2020 (9.75 million hectares). This year, the methodology was improved since the planted areas were also mapped using satellite imagery in a partnership with Canopy Remote Sensing Solutions. In terms of species, 75.8% of the planted area contained eucalyptus, with 7.53 million hectares, and pine species accounted for 19.4% with approximately 1.93 million hectares. Besides these forests, there are an additional 475,000 hectares planted with other species including rubber, acacia, teak, and parica.

The states of Minas Gerais, São Paulo, Paraná, Mato Grosso do Sul, Santa Catarina, and Rio Grande do Sul continue to be the country's leading producers of planted forests.

Nearly 88.9% of pine plantations are found in the south of the country, with Paraná and Santa Catarina leading production. For other species, São Paulo is notable for rubber production, Pará stands out for teak, and Rio Grande do Sul has significant production of acacia.

FIGURE 38 Area of planted trees, 2021 (million hectares)

Source: FGV IBRE, Ibá, & Canopy Remote Sensing Solutions

	2021 (Revised data)
EUCALYPTUS PINE OTHER	

FIGURE 39

Area of planted trees in Brazil by state and by species, 2021 (million hectares)

Source: FGV IBRE, Ibá, & Canopy







8

FIGURE 40 Distribution of and changes in areas planted with eucalyptus by state, 2021

Source: FGV IBRE, Ibá, & Canopy



FIGURE 42

Distribution of and changes in areas planted with pine by state, 2021

Source: FGV IBRE, Ibá, & Canopy





FIGURE 41

Change in area of eucalyptus plantations by state, 2014–2021

Source: FGV IBRE, Ibá, & Canopy





FIGURE 43

Change in area of pine plantations by state, 2014–2021

Source: FGV IBRE, Ibá, & Canopy

PARANÁ SANTA CATARINA RIO GRANDE DO SUL SÃO PAULO MINAS GERAIS OTHER





Photo credit: Veracel | Nilton Souza

PRODUCTIVITY OF EUCALYPTUS AND PINE FORESTS AND FOREST ROTATIONS

Investments in technology and professional training, which permit advances in forest plantation management, pest and disease control, and soil fertilization, work together with Brazil's natural features as fundamental aspects for improving productivity in planted areas.

In Brazil, the productive potential of eucalyptus plantations exceeds that of any other region in the world. Average productivity for eucalyptus plantations has grown substantially over the years, from 10 m³/ha/year in 1970 to 38.9 m³/ha/year in 2021. Pine productivity totals 29.7 m³/ha/year.





of the total area of planted forests is composed of eucalyptus.

The states of Minas Gerais, São Paulo, Paraná, Mato Grosso do Sul, Santa Catarina, and Rio Grande do Sul remain the leading producers of planted forests in the country.





of the total area of planted trees is composed of pine.

Change in eucalyptus and pine productivity in Brazil, 2014–2021 (m³/ha/year)

Source: FGV IBRE & Ibá







hectares were included in permanent preservation areas (APP), legal reserves (RL), and private natural heritage reserves (RPPN) during 2020 and 2021.

AREAS PRESERVED BY THE PLANTED TREE SECTOR

With two feet planted firmly in the bioeconomy, the planted tree sector produces and preserves without any false dichotomies. The sector stands out for going beyond what the law requires in terms of preservation. The modern technique known as forest mosaic planting connects plantation areas with preservation areas, creating ecological corridors with benefits for biodiversity, soil, and water.

Between 2020 and 2021, the total amount of areas in Permanent Preservation Areas (APP), Legal Reserves (RL), and Private Natural Heritage Reserves (RPPN) remained stable at 6.05 million hectares. Of this total, RL totaled 3.8 million hectares in 2021, while APP reached 1.61 million hectares and RPPN expanded from 50,000 to 99,100 hectares. High Conservation Value Areas total 535,000 hectares; these are forest areas with a wealth of biodiversity, with rare, threatened, or endangered ecosystems, areas that meet the basic needs of local communities, and critical forest areas that the traditional cultures of these communities depend on. Identifying these areas makes decision making about forest management even more sustainable, protecting important social and environmental values.

FIGURE 45

Distribution of areas preserved by the planted tree industry: 2019, 2020, and 2019 (thousand hectares)

Source: FGV IBRE & Ibá



Photo credit: Adami



OCHAPTER 4. PLANTED FORESTS

In 2021, forest-based companies worked to recover 25,800 hectares. Of this total, 50% are areas in the Pampa biome, 22.3% Atlantic Forest, 15% in the Amazon, and 12.7% in the Cerrado drylands.

Furthermore, 94.2% of areas belonging to Ibá members have updated their Rural Environmental Registers (CAR), the main tool created by the Forest Code to preserve the environment, bring properties into compliance with environmental requirements, fight illegal deforestation, and monitor restoration areas, helping to achieve national and international goals for maintaining native vegetation and ecological restoration of ecosystems.



FIGURE 46

Distribution of areas preserved by the planted tree industry by region: 2020 and 2021 (thousand hectares)





INTEGRATED CROP, LIVESTOCK, AND FOREST SYSTEMS

Areas with integrated crops, livestock, and forestry systems have been gaining recognition and visibility for sustainably promoting intensification of land use and diversification of products in a single area.

Over the past 20 years these integrated systems have made considerable gains, the results of major research and development efforts together with technology transfer activities.

To encourage actions throughout the planted tree sector, the Sectoral Chamber on Forestry was created by the Brazilian Ministry of Agriculture in 2008 to establish a strategic agenda on this topic, helping to develop this activity to strengthen the forest sector and ensure extra income for producers while reducing carbon emissions.

Integrated crop-livestock-forestry systems are one of the pillars of the ABC Plan and the ABC+ Plan, and the Low Carbon Emissions Agriculture Plan has a target to expand the areas with these integrated systems throughout the country by 9 million hectares by 2030.

The ILPF Network⁴ estimates that for the 2020/2021 harvest, integrated planting areas in Brazil expanded to 17.4 million hectares; 40% of these areas are located in the Center-West region of the country.

4 ILPF em Números – Safra 2020/2021 (redeilpf.org.br)



hectares of areas in integrated crop-livestock-forestry systems estimated for the 2020/2021 harvest.



CHAPTER 4. PLANTED FORESTS



R&D, innovation, and new uses



Photo credit: Pexels | Ron Lach

CHAPTER 5

R&D, innovation, and new uses



in investments in forest and industrial innovations in 2021.



The planted tree sector has allied sustainability with research, development, and innovation to promote real biosolutions for society and for the environment.

Innovation has also been decisive in combating shortages in the supply chain for imported chemical inputs; companies developed 15 new raw materials to ensure production and delivery of special papers for their clients.

These are only a few of an enormous range of disruptive innovations underway within the planted tree sector.



INVESTMENT IN RESEARCH AND DEVELOPMENT

Investment in research and development is the foundation for improving processes and production, which in turn are linked to science and technology. Investments on the order of R\$ 301.2 million were directed toward innovations in manufacturing and forests in 2021, 17.0% higher than during 2020, and corresponded to 2.0% of annual investments.

In 2021,⁵ investments in industrial innovations accounted for 2.4% of companies' total revenues, while investments in forests added up to 1.6%. Most of the financial input for innovation went towards new technologies (2.2% and 1.0%, respectively), while 0.2% and 0.6% were invested in research and development.

5 Revised data



Photo credit: AdobeStock





of companies' total revenues is invested in industrial innovations.



of Ibá member companies cited investments in developing new processes or improving existing processes as an innovation strategy.

FIGURE 47

Investment in innovation, R&D, and new technologies, 2021

Source: FGV IBRE & Ibá







have already implemented genetic improvements in their planted forests.



of companies are already developing processes or products in partnerships with universities or startups.

INNOVATION ACTIVITIES

In 2021 advances were made in the development of new processes or improvement of existing processes, with 48% of Ibá member companies citing these as part of their innovation strategies. Additionally, 48% stated that they are undertaking acquisitions of machinery and equipment and activities related to improved productivity.

One notable point in this area is that 44% of the companies have already implemented genetic improvement in their planted areas. There are also partnerships between companies and universities/startups: 32% of the companies are developing some process or project, and 28% have already implemented some type of process or project. This sector is proof that combining sustainability and science can make unparalleled contributions to the sector.





TABLE 02

Actions taken by member companies, 2021

Prepared by FGV IBRE | Source: FGV IBRE & Ibá

Innovation activities

Developing new products or improving existing products

Developing new processes or improving existing processes

Use of Industry 4.0

Mechanization

Development of new technology routes for the bioeconomy based on natural resources (ex.: lignin, fuels/ biofuels, chemicals, biochemicals, bio-oils etc.)

Investment in biotechnology

Acquisition of machinery and equipment

Investment in socio-environmental sustainability (recycling, etc.)

Partnerships with universities or startups

Training, workshops, and developing the culture of innovation among staff focused on innovation

Forestry (genetic improvement and GMOs)

Productivity Gains

Photo credit: Bracell | Gleison Rezende

Undefined strategy	Isolated initiatives and pilot projects	Development	Implementation	Implemented (concluded)
4%	21%	29%	21%	25%
0%	10%	49%	17%	24%
19%	11%	33%	22%	15%
11%	11%	22%	34%	22%
32%	35%	14%	5%	14%
50%	15%	10%	5%	20%
0%	20%	16%	48%	16%
4%	12%	31%	15%	38%
11%	14%	32%	29%	14%
14%	21%	29%	18%	18%
0%	0%	38%	19%	43%
0%	3%	21%	48%	28%







Photo credit: Veracel



CHAPTER 6

Sustainability



If we want to leave future generations a planet they can inhabit, the world can no longer follow the same business model we have been using since the Industrial Revolution. In fact, humanity has a mission to cut emissions of greenhouse gases (GHG) and sequester carbon dioxide from the atmosphere in an effort to stop the Earth's temperature from rising 1.5°C over the next two decades, according to the Intergovernmental Panel on Climate Change (IPCC).

For years, the planted tree sector has made sustainability a strategic pillar of its business plan. There is no false dichotomy between production and conservation. Environmental preservation is a basic prerequisite for forest-based industry, and dialog with neighboring communities and generation of shared value are ongoing practices. This is clearly seen in the Human Development Index (HDI) results for states where this sector works, and these companies focus on the health and safety of their employees.

All of these efforts culminate in the production of bioproducts that meet the demands of increasingly conscious consumers who are looking for renewable, biodegradable, and recyclable alternatives that store carbon.

This chapter addresses all the sustainable contributions made by the planted tree sector for future generations as well as to meet national climate and biodiversity targets and the UN Sustainable Development Goals.

CLIMATE CHANGE

Climate changes resulting from global warming are a major challenge to the global economy, and pose grave risks for natural as well as economic systems. Slowing these changes and mitigating their effects have become the subject of public policies around the world, and the current Paris Agreement calls for transformations in our behavior that can only be attained with broad and sustained public support.

Four pillars are fundamental for the sector on the path to this sustainable future: storing carbon in natural and productive forests, removing carbon in natural and productive forests, avoiding emissions from industries/ using renewable energy, and storing carbon in forest products. Carbon is removed from the atmosphere via the process of photosynthesis and is transformed into biomass.

Within this scenario, inventories represent an important step to measure the scale of emissions and the gases being removed. And companies in this sector are already doing just that: 73% have conducted inventories, and 50% of these publish and report their results (and some have even been doing this since 2006). We can see an increase in the number of companies conducting inventories compared to 2020, showing a growing commitment to climate-related performance.

CO₂ STORAGE

The Brazilian planted tree sector plays an essential role in helping to reduce the impacts of climate change with its 9.93 million hectares of productive forests, which store 1.79 billion tons of carbon dioxide equivalent. The planted tree sector also has over 6 million hectares of natural forests for preservation purposes that store nearly 2.67 billion tons of CO2eq.

According to calculations adapted from the IPCC, around 45% of the mass of a book or a shelf-stable milk carton is made up of carbon; a wooden table or laminate flowing can contain up to 47%, while charcoal made from wood contains 85%.



of companies in the planted tree sector have inventories to measure carbon emissions and removal.



tons of CO2eq.

BIODIVERSITY

Biodiversity monitoring is a fundamental tool to understand potential impacts from forest activities and to identify ways to make corrections and protect flora and fauna.

Sustainable management in the planted tree sector brings the work involved in this care into the spotlight. For many years, these companies have invested in monitoring programs (some starting as early as the 1970s), generating important data to monitor improvements and develop more sustainable forest management techniques while also contributing to biodiversity conservation.

According to the Biodiversity in the Planted Tree Industry report, 100% of companies with forest assets monitor their biodiversity. This monitoring is conducted in the areas set aside for preservation as well as in the commercial plantations, since some identified fauna species use planted forests to sleep or to move through areas.

This survey covers 12 states, over 220 municipalities, and five biomes: the Atlantic Forest, Cerrado, Pampa, Amazon Forest, and Caatinga.

The main findings were:



A total of over **8,000** fauna and flora species were recorded.





For the Cerrado and Atlantic Forest biomes, 26 species (birds, mammals, and flora) were classified as bioindicators, species which are very sensitive to changes in the environment and thus considered indicators of environmental quality. In these same two biomes, 7 species of flora and 14 species of fauna were classified as rare.



endangered species were recorded in areas belonging to the industry.

38% of threatened mammals and 48% of threatened birds were registered in areas pertaining to forest-based companies.



MANAGEMENT OF WATER RESOURCES

The planted tree sector has been implementing good practices in conservation and responsible water use for over 30 years. Since 2016, Ibá has collected data from its members on a series of indicators for corporate, forest, and industrial performance with regard to water management. This survey produced the first Performance Report on Water Management in the Planted Tree Sector in 2021. Some of the most notable practices include:

Forestry sphere

100% of companies adopt some type of practices to preserve soil and water in their forests, such as leaving leaves, bark, and branches on the ground after harvesting, monitoring and taking measures to avoid erosion, and recovery of natural vegetation in Permanent Preservation Areas when necessary, or taking action to physically protect these areas. Another essential point in water management involves monitoring: 86% of companies monitor qualitative aspects and 77% quantitative aspects.

MANAGEMENT OF INDUSTRIAL AND FOREST WASTE

Another very important practice for sustainability and the circular economy is reuse of waste from production processes, a target of significant investments by the planted tree sector.

In 2021, 63.6% of Ibá member companies utilized their industrial and forest waste to generate energy. This is an increase of 6.4 p.p. compared to the previous year. Besides energy generation, 17.2% of producers leave byproducts in the forest stands to protect soil from erosion, improve rainwater infiltration, and boost nutritional quality, a growth of 4.7 p.p. compared to 2020. Meanwhile, 6.6% of producers opted for other uses for this waste, such as coprocessing.

• Manufacturing sphere

the sector invests in science, technology, and innovation to make the circular economy viable, optimizing water use in the various processes. Evidence of these efforts is the fact that 82% of the water captured by most manufacturers in the pulp and paper sector is returned to the body of water from which it is taken. This shows that the sector is a major user of water but not a major consumer, since most of this water is returned after treatment, making it available for other uses in the watershed. In the flooring and panel segments, this rate of return is 53%, since most of the processes are dry and involve almost no water.

Corporate sphere:

100% of companies have public relations channels for complaints and suggestions. Of all the interactions collected, only 0.3% are related to water, which reflects the good management practices adopted by these companies.



of Ibá member companies directed their industrial and forest waste toward energy generation in 2021. CHAPTER 6. SUSTAINABILITY



Photo credit: Dexco | João Bispo

TABLE 03

Waste generated by type, according to final destination, in % of total waste

Source: FGV IBRE & Ibá

Waste generated during the production process	% of tons	Final disposal
Bark, branches, leaves, lime sludge, boiler ash, others	17.2%	Kept in the fields to protect and fertilize the soil, composted
Drags, grits, sludge, ash, scrap, plastic, cardboard, bark, sawdust, filtrage from sewage treatment stations, etc.	2.1%	Recycling
Bark, branches, leaves, woodchips, sawdust, and black liquor	63.6%	Used for energy generation
Sawdust, paper scraps, lime sludge, and boiler ash	3.9%	Reused as raw materials by companies in the planted tree sector
Paper scraps, lime sludge, non-hazardous waste, others	1.8%	Reused as raw materials by other manufacturing sectors
Grits, dregs, and mud from recovery processes, non-hazardous waste, others	4.8%	Sent to landfills
Various types of waste already described above and other non-specified	6.6%	Other destinations, including coprocessing

POST-CONSUMER WASTE

The Brazilian paper sector has one of the highest recycling rates in the world. Over the years, companies have invested in partnerships with cooperatives and waste pickers, as well as in modernizing processes. Even blockchain technology has been applied to reduce waste. As a result, 5.02 million tons of scrap were collected in 2021, reaching a recycling rate of 66.7% according to data from IBRE/FGV.

ENERGY

The electricity grid is one of the largest worldwide challenges in the race toward decarbonization. Leaving fossil fuels behind is one of the prerequisites for us to make the leap to a model with less environmental impact. The planted tree sector has positioned itself as a reference on this topic: over the last five years (2017–2021), production of renewable energy by the sector has grown 27.5%.

In 2021 it produced 90.9 million gigajoules (GJ), 13.1% higher than the previous year. This represents 74.6% of the 121.8 million GJ used in the sector. Sales back to the public grid totaled 14.2 million GJ, enough to power a city of 1.37 million inhabitants.

FIGURE 48

Energy balance in the Brazilian planted tree sector (million GJ)

Prepared by FGV IBRE | Source: FGV IBRE & Ibá





was the rate of paper scrap recycling in 2021.





growth in production of renewable energy by the sector over the past five years.

Historical energy balance in the sector, 2014–2021 (million GJ)

Prepared by FGV IBRE | Source: FGV IBRE & Ibá



Combining energy efficiency with renewable sources is at the heart of the energy agenda for the planted tree sector. In 2021, the companies that were surveyed for this report used byproducts from their production processes to generate electricity, particularly black liquor (74%) and forest biomass (14%), corresponding to 88% of all energy generated.

FIGURE 50

Sources used by the sector to generate electricity

Prepared by FGV IBRE | Source: FGV IBRE & Ibá



FOREST CERTIFICATION

Consumers who are making increasingly conscious purchasing decisions have sought out certification as a guarantee of traceability and origins in order to be sure their purchases are sustainable. Within this context, seals such as forest certifications are increasingly important as market instruments attesting to the fact that the wood used to manufacture a given product was obtained via forest management that respects the environment and is socially just and economically viable.

Forest certification is a voluntary process in which companies undergo third-party audits every year to verify their compliance with internationally recognized standards. Companies value certification for the access it provides to markets.

In Brazil, the main forest certification systems are FSC (Forest Stewardship Council) and Cerflor (the Brazilian Program of Forest Certification); the latter is internationally recognized by PEFC (the Programme for the Endorsement of Forest Certification).

Both forests and their products can be certified. Certification of forest management attests to the adoption of responsible management practices. In 2021, the total certified area in Brazil reached 7.37 million hectares, 8.4% higher than in 2020, and represented a resumption compared to pre-pandemic levels. Meanwhile, certified planted area expanded to 4.04 million hectares, growth of 8.3% over 2020.





hectares of total certified area in Brazil in 2021, an 8.4% increase over the previous year.

4.04 MILLION

hectares of certified planted area in Brazil in 2021, 8.3% more than the previous year.

Photo credit: Dexco | João Bispo

DOD CHAPTER 6. SUSTAINABILITY

Change in FSC and Cerflor/CEFLOR certified area (2017-2021)



Prepared by FGV IBRE | Source: Cerflor & FSC

TABLE 04

Change in certified area by certification system, 2019-2021

Prepared by FGV IBRE | Source: Cerflor & FSC

Year	Total area (million ha)	FSC alone	Cerflor alone	FSC + Cerflor	Total
2021	Total area	3.16	1.47	2.75	7.37
2021	Planted area	1.98	0.83	1.56	4.37
2020	Total area	2.4	0.75	3.65	6.80
2020	Planted area	1.26	0.46	2.01	3.73
2010	Total area	2.57	1.14	3.66	7.37
2019	Planted area	1.37	0.66	2.01	4.04



Chain of custody certification tracks a product from its origin in certified forests to manufacturing and sales. In 2021, chain of custody certifications reached 1084, an increase of 2.2% compared with 2020 (1061); 85% of these certified companies were located in the South and Southeast regions.

For the third year running, Brazil remained in 10th place in the worldwide ranking of countries with the most FSC chain of custody certifications, with 1120. Poland and Germany advanced in the ranking, while the United States dropped two notches to 6th place. For PEFC certification, the Brazilian planted tree sector ranks 35th worldwide.

OTHER CERTIFICATIONS

In addition to forest management and chain of custody certifications, the companies in the planted tree sector that responded to this survey also hold other certifications, such as the ISO family, certification for food packaging and add-ons (ISEGA, kosher, halal), and certification for panels like CARB (California Air Resources Board).

ISO certifications for Quality Management, Environmental Management, Energy Management, and Workplace Health and Safety are the most widely adopted by the sector, with one third of the companies that responded to the survey implementing one or more.

SOCIAL AND ENVIRONMENTAL INVESTMENTS

Although 2021 was a year full of uncertainties, companies continued with plans to improve living conditions for the people who reside in surrounding areas. They also generated and disseminated knowledge by training for the internal public and communities focusing on environmental responsibility.

In 2021, social and environmental investments by companies in the planted tree sector benefited 5.9 million people. Of the total of R\$ 331 million invested, R\$ 112.2 million were directed toward forest outgrower programs, which made a positive impact on nearly 2 million small producers, diversifying their land use and income. Additionally, activities related to economic development, the environment, health, social and cultural issues, and other aspects drove labor force training, improved local financial and economic development, and also boosted quality of life, household incomes, and job availability.



place in global rankings for countries with the most FSC chain of custody certifications.



5.9 MILLION

people benefited by social and environmental investments by companies in the planted tree sector in 2021. CHAPTER 6. SUSTAINABILITY

TABLE 05 Social and environmental investment, 2021

Prepared by FGV IBRE | Source: FGV IBRE & Ibá

Project name	Total number of people benefited	Investment (million Reais)
Environment	303,168	46.3
Social and cultural	1,290,511	9.8
Economic development	855,576	50.2
Outgrower programs	1,958,527	112.2
Health	517,888	37.9
Education and training	893,217	20.0
Other (sports, recycling, etc.)	100,087	54.6
Grand total	5,918,974	331.0

IMPROVEMENTS IN MUNICIPALITIES RELATED TO IBÁ'S PRODUCTION CHAIN

In analyzing per capita income for the main municipalities⁶ where industrial facilities and forest complexes are located, the planted tree sector emerges as an important agent for economic development.

Mean per capita income in the municipalities influenced by the planted tree production chain was higher than in the states analyzed and in Brazil, with the exception of Mato Grosso, as shown below.

Mean growth in per capita income in the municipalities influenced by the sector also was higher than mean growth in all municipalities in the state.

FIGURE 52

Mean per capita income 2012–2019 (R\$)

Prepared by FGV IBRE | Source: IBGE

TOTAL IBÁ MUNICIPALITIES



6 Aracruz (ES), Araucária (PR), Belo Oriente (MG), Cáceres (MT), Caieiras (SP), Capão Bonito (SP), Eunápolis (BA), Goiana (PE), Imperatriz (MA), Jaguariaíva (PR), João Pinheiro (MG), Louveira (SP), Luís Antônio (SP), Mucuri (BA), Ribas do Rio Pardo (MS), Telêmaco Borba (PR), Três Barras (SC), and Três Lagoas (MS).

TABLE 06

Mean annual growth in per capita income, 2019-2021

Prepared by FGV IBRE | Source: FGV IBRE & Ibá

State/Brazil	Growth in municipality influenced by the sector	
Brazil	9.8	
Maranhão	7.3	
Pernambuco	34.9	
Bahia	6.3	
Minas Gerais	8.0	
Espírito Santo	-1.5	
São Paulo	7.3	
Paraná	13.5	
Santa Catarina	9.3	
Mato Grosso do Sul	8.6	
Mato Grosso	7.1	

SOCIAL AND ENVIRONMENTAL INDICATORS

The results of years of investment, dialog, and collaborative projects with communities can be seen in social and environmental development. The Basic Education Development Index (IDEB) records improvements over the years, with the mean values for the main municipalities remaining slightly above the national average.

Between 2015 and 2017 the percentage of people registered in the CadÚnico system⁷ in Brazil who did not have access to running water, sewage treatment, or trash collection dropped in nearly all the main municipalities where this sector works. In all these municipalities, the share of people registered with CadÚnico and considered vulnerable is lower than the national rate.

Growth in the state/Brazil		
	5.1	
	6.2	
	5.4	
	6.3	
	4.7	
	0.7	
	4.6	
	6.1	
	5.9	
	6.5	
	6.9	



Photo credit: Suzano

⁷ Cadastro Único (CadÚnico) is a set of data about Brazilian families experiencing poverty and extreme poverty. This information is used by the Brazilian federal government, the states, and the municipalities to implement public policies that can improve quality of life for these families.

Socioeconomic indicators related to health⁸ and education⁹ in the main municipalities where the sector works

Prepared by FGV | Source: MEC/INEP, Mortality Information System (SIM), & Live Birth Information System (SINASC)





Basic Education

*According to the IDEB, information for 2021 was not included for the municipalities of Cáceres (MT), Eunápolis (BA), Luís Antônio (SP), and Ribas do Rio Pardo (MS) because the number of SAEB participants was insufficient to report results.

FIGURE 54

Share of people enrolled in CadÚnico without running water, sewage treatment, or trash collection, 2015–2017

Prepared by FGV | Source: Atlas of Human Development in Brazil, using data from IBGE

2015 2016 2017



8 Infant mortality rate: per 1000 live births.

9 IDEB = approval rate*average standardized SAEB score.

DIVERSITY AND INCLUSION

The sector also is working to advance the agenda of diversity and inclusion: 68% of companies have diversity and inclusion goals and invest in internal initiatives to meet these goals and promote diversity of gender, race, ethnicity, sexual orientation, disability, and generations in their organizational cultures.

The majority of internal initiatives involve communications campaigns, events and trainings with staff teams, as well as the creation of affinity groups or establishment of an area or personnel responsible for this subject within the company. Most companies invest in more than one internal strategy to advance and address this subject.

TABLE 07

Internal diversity and inclusion initiatives

Source: Ibá

Initiatives	% of companies ¹⁰
Communications campaigns	95%
Internal events and trainings	81%
Affinity groups or diversity committees	52%
Position and/or area dedicated to diversity	52%
External events and trainings	38%
Specific hiring of diversity groups	33%
D&I policy	29%
Initiatives with clients and/or suppliers	24%

At the same time, companies also have dedicated themselves to participating in external initiatives to learn new approaches and help construct a more diverse and inclusive society; 61% of companies participated in such external initiatives. Most of these initiatives are congresses and courses, as well as participation in UN Women, the Corporate Forum on LGBTQIAPN+ Rights, the AMCHAM Human Resources Forum, and the Mulher Florestal Network.



of companies have diversity and inclusion goals.

63%

of companies participate in external initiatives in order to learn new approaches and help construct a more diverse and inclusive society.

¹⁰ Companies were permitted to note all the initiatives they carry out, and for this reason the totals add up to more than 100%.





of companies monitor corporate sustainability performance.

83% of companies have public positions on ESG topics.

DIALOG AND PARTNERSHIPS AS AN OUTREACH STRATEGY

This industry traditionally acts through dialog and partnerships, with aspirations to evolve and influence the value chain during its work.

Dialog, active listening, and engagement with stakeholders are powerful strategies to map opportunities to improve practices within this sector, since they value the viewpoints and experiences of people who interact with areas managed by these companies every day. Dialogs with stakeholders, which often involve actors with opinions that directly contrast with the productive sector, enrich the way companies face problems and pave the way to new opportunities. Of the companies that participated in Ibá's ESG survey, 56% participate in multi-stakeholder dialog platforms.

Another differential in this sector is its pioneering work in partnerships with research institutes, universities, government agencies, and other drivers of change. These partnerships are created to develop better management techniques and boost productivity, but also to restore ecosystems, monitor biodiversity and water, among other goals; 72% of the companies surveyed are involved in partnerships focusing on research, teaching, and extension.

STRATEGY AND MATERIALITY

Of the companies interviewed, 70% monitor their corporate sustainability performance; this can be done via sustainability strategies with long-term goals and metrics, for example. The most notable topics among the companies were Health and Safety (63%), Climate Change and GHG (47%), Water (43%), Sustainable Forest Management (43%), and Ethics, Integrity, and Transparency (37%).

GOVERNANCE

The demand for transparency in actions, commitments, and goals has become increasingly evident and necessary in the corporate world, especially for companies that receive external funding.

The survey found that 81% of the companies have public positions or policies on ESG topics. Of these companies with public ESG positions, 96% state that they focus on ethics and integrity, followed by health, safety, and the environment (92%), and compliance (88%).

TABLE 08

Topics addressed in governancerelated activities in sector companies

Source: Ibá

Governance topics addressed with policies and/or public positions	Percent adopted by companies
Ethics and integrity	96%
Health, safety, and the environment	92%
Compliance	88%
Anti-corruption	84%
Information security	84%
Sustainability	76%
Corporate governance	72%
Risk management	68%
Internal controls	68%
Human rights	60%
Purchasing	60%
Diversity & inclusion	52%
Sales	52%



SUSTAINABLE FINANCING

Thematic bonds or securities are financial instruments focusing on projects, assets, or organizations with verifiable and measurable environmental and/or social benefits, and include external audits to confirm these benefits. There are also debt instruments linked to pre-established sustainability goals. Five of the companies that responded to Ibá's ESG survey issue thematic bonds, securities, debentures, and/or sustainable funding.

The three main areas in which resources are applied were sustainable forest management, followed by initiatives for eco-efficiency and the circular economy, and low carbon and renewable products.

In order to assure investors and the market of their commitment to sustainability, some companies are listed in indexes that affirm their economic efficiency, environmental balance, social justice and governance, for example. These indexes are used as a benchmark for various investment funds in several countries. The main indexes where companies in the sector are listed are:

- S&P/B3 Brazil ESG Index
- MSCI (Morgan Stanley Capital International)
- B3 Corporate Sustainability Index (ISE B3)
- Dow Jones Sustainability World Index



Historical series



Photo credit: Unsplash | Jake Nackos

CHAPTER 7 Historical series

Photo credit: Klabin | Anna Carolina Negri

AREA OF PLANTED TREES

In 2021, eucalyptus plantations occupied 7.53 million hectares, representing 75.8% of the total area planted with trees in Brazil. These areas are concentrated mostly in the states of Minas Gerais, São Paulo, and Mato Grosso do Sul. Pine plantations accounted for 19.4% of the total area, mostly in the south of the country. Other species are also planted, like rubber in Mato Grosso do Sul, acacia in Rio Grande do Sul and Roraima, and teak in Mato Grosso.

TABLE 09

Area planted with trees, total by state 2012–2021

Source: Poyry & Ibá until 2017; after 2018, FGV IBRE, Ibá, & Canopy

State	2012	2013	2014	2015	2016	2017	2018*	2019**	2020***	2021
North	319,461	329,011	421,308	431,220	438,197	443,585	485,118	494,013	422,835	425,993
Rondônia	-	-	-	-	-	-	26,318	27,319	8,822	8,822
Acre	-	-	-	-	-	-	-	-	967	967
Amazonas	-	-	-	-	-	-	-	-	382	382
Roraima	-	-	-	-	-	-	21,557	30,000	23,079	23,079
Pará	159,657	159,657	197,478	203,750	208,129	211,008	212,957	212,436	193,602	193,602
Amapá	49,951	57,614	61,961	64,962	66,962	67,826	67,826	67,826	92,217	92,217
Tocantins	109,853	111,740	161,870	162,508	163,106	164,751	156,461	156,432	103,766	106,923
Northeast	817,748	868,571	913,853	891,590	897,497	900,628	881,634	902,086	971,716	1,009,653
Maranhão	173,324	209,249	211,334	210,496	221,859	228,801	225,052	237,859	279,238	297,213
Piauí	27,730	28,053	31,212	29,333	26,068	25,675	25,675	25,281	34,098	32,159
Ceará	-	-	-	-	-	-	650	867	342	342
Rio Grande do Norte	-	-	-	-	-	-	-	-	44	44
Paraíba	-	-	-	-	-	-	5,614	6,109	82	82
Pernambuco	-	-	-	-	-	-	4,060	4,873	961	961
Alagoas	-	-	-	-	-	-	21,000	21,512	13,863	13,863
Sergipe	-	-	-	-	-	-	6,179	6,024	3,381	3,381
Bahia	616,694	631,269	671,307	651,761	649,570	646,152	593,404	599,562	639,707	661,608
Southeast	2,884,073	2,813,733	2,881,989	2,873,835	2,840,262	2,823,187	3,430,522	4,197,159	3,827,893	3,879,349
Minas Gerais	1,491,681	1,451,236	1,445,219	1,437,997	1,430,125	1,421,702	2,020,786	2,306,205	2,305,918	2,305,582
Espírito Santo	205,895	224,360	246,441	244,935	251,278	251,600	231,073	231,421	270,631	279,821
Rio de Janeiro	-	-	-	-	-	-	30,574	29,764	29,903	30,325
São Paulo	1,186,497	1,138,137	1,190,329	1,190,903	1,158,859	1,149,884	1,148,089	1,629,768	1,221,441	1,263,620
South	1,913,064	1,991,276	2,172,166	2,234,420	2,233,635	2,232,068	2,511,617	2,479,757	3,085,886	3,143,898
Paraná	817,566	862,769	914,113	972,273	972,173	976,064	1,066,479	1,008,990	1,165,490	1,177,596
Santa Catarina	645,965	647,887	660,751	665,521	668,218	666,555	664,238	642,310	1,004,844	1,031,694
Rio Grande do Sul	449,533	480,620	597,302	596,626	593,244	589,449	780,900	828,457	915,552	934,608
Center-West	913,762	1,025,074	1,272,557	1,294,484	1,345,351	1,365,720	1,546,090	1,558,246	1,443,219	1,474,968
Mato Grosso do Sul	597,135	707,458	833,834	855,323	906,077	930,016	1,104,717	1,125,435	1,052,720	1,073,523
Mato Grosso	184,628	187,090	300,339	298,391	297,668	294,098	258,805	260,032	199,235	207,832
Goiás	131,999	130,526	138,384	140,770	141,606	141,606	178,425	169,094	189,179	191,528
Distrito Federal	-	-	-	-	-	-	4,143	3,685	2,085	2,085
Other	18,838	15,657	74,297	75,498	75,379	75,023				
Brazil	6,866,946	7,043,322	7,736,170	7,801,047	7,830,322	7,840,211	8,854,982	9,631,262	9,751,548	9,933,861

* Data revised in 2020. | ** Data revised in 2021. | *** Data revised in 2022.



of Brazil's total planted forest

area contains pine, mostly in

the south of the country.



TABLE 10

Area planted with eucalyptus trees, 2012–2021 (hectares)

Source: Poyry & Ibá until 2017; after 2018, FGV IBRE, Ibá, & Canopy

State	2012	2013	2014	2015	2016	2017	2018*	2019**	2020***	2021
Minas Gerais	1,438,971	1,404,429	1,400,232	1,395,032	1,390,032	1,381,652	1,970,063	2,231,754	2,233,762	2,236,660
São Paulo	1,041,695	1,010,444	976,186	976,613	946,124	937,138	1,035,874	1,417,708	945,114	981,315
Mato Grosso do Sul	587,310	699,128	803,699	826,031	877,795	901,734	1,093,805	1,111,737	1,022,521	1,042,112
Bahia	605,464	623,971	630,808	614,390	612,199	608,781	585,258	589,336	637,765	648,143
Rio Grande do Sul	284,701	316,446	309,125	308,515	308,178	309,602	426,371	456,001	581,338	592,365
Espírito Santo	203,349	221,559	228,781	227,222	233,760	234,082	225,520	225,311	260,170	264,094
Paraná	197,835	200,473	224,089	285,125	294,050	295,520	255,955	271,042	448,818	449,722
Maranhão	173,324	209,249	211,334	210,496	221,859	228,801	200,612	199,911	268,912	286,931
Mato Grosso	184,628	187,090	187,090	185,219	185,219	181,515	187,947	188,838	120,489	127,319
Pará	159,657	159,657	125,110	130,431	133,996	135,843	151,888	154,402	167,354	167,354
Goiás	115,567	121,375	124,297	127,201	127,201	127,201	127,201	159,943	161,940	163,129
Tocantins	109,000	111,131	115,564	116,365	116,798	118,443	149,886	149,291	98,988	101,669
Santa Catarina	106,588	107,345	112,944	116,250	116,240	114,513	219,199	255,682	307,229	316,137
Amapá	49,506	57,169	60,025	63,026	65,026	67,826	67,826	67,826	68,462	68,462
Other	46,568	43,710	49,369	48,691	45,307	44,558	87,983	89,291	84,395	82,736
Total	5,304,163	5,473,176	5,558,653	5,630,607	5,673,784	5,687,209	6,785,387	7,568,074	7,407,257	7,528,148

* Data revised in 2020. | ** Data revised in 2021. | *** Data revised in 2022.

Photo credit: Eucatex



growth in consumption of wood from forests planted for industrial purposes compared to the previous year.



Area planted with pine trees, 2012–2021 (hectares)

Source: Poyry & Ibá until 2017; after 2018, FGV IBRE, Ibá, & Canopy

State	2012	2013	2014	2015	2016	2017	2018*	2019**	2020***	2021
Paraná	619,731	662,296	673,769	670,906	661,684	661,684	789,194	733,200	704,177	713,769
Santa Catarina	539,377	540,542	541,162	542,662	545,453	545,453	445,009	386,628	696,130	713,134
Rio Grande do Sul	164,832	164,174	184,585	184,603	182,508	182,508	264,725	281,548	291,589	289,354
São Paulo	144,802	127,693	123,996	124,222	122,667	122,667	79,041	184,135	148,609	151,414
Minas Gerais	52,710	46,807	39,674	37,636	34,764	34,764	50,295	74,451	40,311	38,445
Goiás	16,432	9,151	9,087	8,569	8,500	8,500	8,500	6,771	6,547	6,661
Mato Grosso do Sul	9,825	8,330	7,135	6,292	5,282	5,282	2,574	4,652	8,194	6,637
Other	15,074	11,153	9,589	6,349	6,319	6,319	3,024	2,585	10,523	10,641
Total	5,304,163	5,473,176	5,558,653	5,630,607	5,673,784	5,687,209	6,785,387	7,568,074	7,407,257	7,528,148

* Data revised in 2020. | ** Data revised in 2021. | *** Data revised in 2022.

TABLE 12

Area planted with other species, 2014–2021 (hectares)

Source: Poyry & Ibá until 2017; after 2018, FGV IBRE, Ibá, & Canopy

State	2014	2015	2016	2017	2018*	2019**	2020***	2021
Rio Grande do Sul	103,592	103,508	102,558	97,339	89,804	90,907	42,625	52,889
Mato Grosso	113,249	113,172	112,449	112,583	70,858	71,194	77,964	79,733
Pará	72,368	73,319	74,133	75,165	61,069	58,034	26,220	26,220
São Paulo	90,147	90,068	90,068	90,079	33,174	27,926	127,718	130,891
Paraná	16,255	16,242	16,439	18,860	21,330	4,749	12,494	14,105
Bahia	34,000	34,000	34,000	34,000	8,146	10,226	1,907	13,431
Tocantins	45,876	45,878	45,878	45,878	6,575	7,141	4,777	5,254
Espírito Santo	15,000	15,000	15,000	15,000	5,553	6,110	8,758	13,904
Goiás	5,000	5,000	5,905	5,905	42,724	2,380	20,693	21,738
Mato Grosso do Sul	23,000	23,000	23,000	23,000	8,339	9,045	22,005	24,774
Minas Gerais	5,313	5,329	5,329	5,286	429	-	31,844	30,478
Other	64,721	64,686	64,602	62,730	79,233	101,507	61,205	62,241
Total	588,520	589,201	589,361	585,825	427,232	389,218	438,210	475,658

* Data revised in 2020. | ** Data revised in 2021. | *** Data revised in 2022.





WOOD FOR INDUSTRIAL USE

In 2021, consumption of wood from trees planted for industrial use grew 4.8% over 2020 to reach 227.3 million m³. Again, this growth was exclusively from consumption of eucalyptus, which advanced 7.8%. Consumption of pine and other species dropped by 3.5% and 2.9%, respectively.

60%

growth in pulp production over the past 10 years, with an 80% increase in exports.

HISTORY OF PRODUCTION AND CONSUMPTION

Over a 10-year period, pulp production rose by more than 60%, and exports by over 80%.¹¹ In Brazil, the pulp sector is very successful in the market; its strong competitiveness is mainly the result of favorable soil and climate conditions in the country, as well as investments in research during this period. This is the segment with the strongest growth among the entire planted tree production chain over this ten-year period. But in 2021 wood panels and laminate flooring were notable, registering the highest sales volumes in the historical series starting in 2009 and since 2013, respectively. During the pandemic (2020 and 2021), these segments grew 9.5% and 15.2% on average, much higher than pulp (6.9%) and paper (0.7%).

FIGURE 55

Wood consumption for industrial use in million m³, 2013–2021

Source: Poyry & Ibá until 2018; after 2019, FGV IBRE & Ibá



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11 See explanatory note.

PULP & PAPER

FIGURE 56

Production and consumption of pulp in Brazil, 2012–2021 (million tons)

Prepared by FGV IBRE | Source: Ibá

DOMESTICPRODUCTION **APPARENT CONSUMPTION**



PAPER



22.5

15.7

7.0

0.2

2021

IMPORTS

RECONSTITUTED WOOD PANELS AND LAMINATE FLOORING

FIGURE 57

Sales and consumption of panels (million m³) and laminate flooring (million m²) in Brazil, 2012–2021

Prepared by FGV IBRE | Source: Ibá

 DOMESTIC PRODUCTION
 APPARENT CONSUMPTION
 EXPORTS
 IMPORTS



LAMINATE FLOORING





NOMINAL PRICE INDEX AND INDUSTRIAL PRODUCT INDEX

In 2021, average export prices rose for all products from the planted tree sector except for woodchips, which remained stable. This result is consistent with the recovery of economies around the world, driving international trade. Notable growth of over 20% was seen in the price indexes for the plywood, lumber, wood panel, and laminate flooring segments. This growth was mostly driven by the higher average export prices, which is explained by price growth throughout 2021 as global supply chains were unbalanced and the exchange rate devalued. Photo credit: Unsplash | Arpad Czapp





growth in price indexes for the plywood, lumber, wood panel, and laminate flooring segments.

CHAPTER 7. HISTORICAL SERIES

Nominal price and industrial product indexes

Prepared by FGV IBRE | Source: SECEX





PAPER (2007=100)



WOOD PANELS (2007=100)



LUMBER (2007=100)



Photo credit: AdobeStock

PLYWOOD (2007=100) 160 **79%** 140 120 100 80 60 40 2015 2016 2017 2018 2019 2020 2020 2007 2008 2009 2010 2011 2012 2013 2014





In 2021, average export prices rose for all products from the planted tree sector except for woodchips, which remained stable.





LAMINATE FLOORING (2007=100)





DOD CHAPTER 7. **HISTORICAL SERIES**

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The methodological notes and glossary for the 2022 Ibá Annual Report can be found in the attached document or at: www.iba.org



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