

**Strategic Dialogue**

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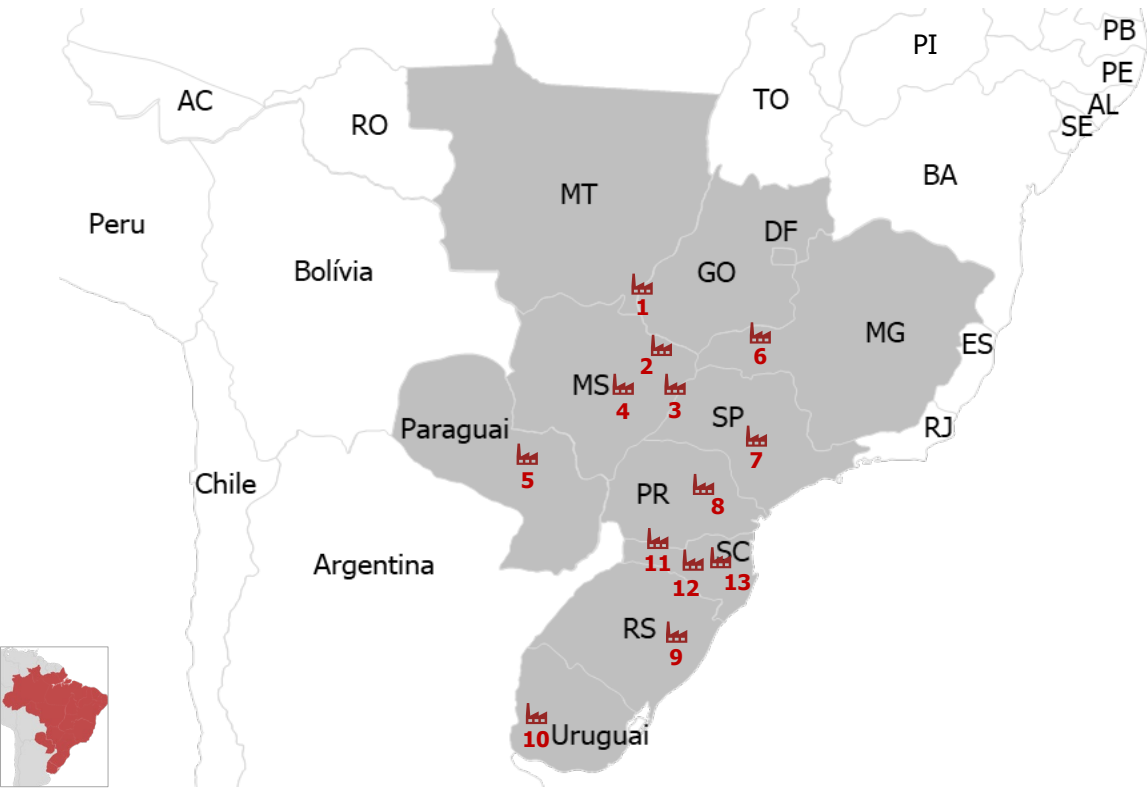
## **Forest biomass supply strategies**



# An increase in demand of approximately 84 Mi m³/year is estimated with 13 large new industrial projects, with consumption above 1 million cubic meters per year, which are driving demand for wood in Brazil, Paraguay and Uruguay

## Location and additional consumption of announced and estimated industrial projects

[projects with startup between 2021 and 2028]



- 1 – Euca Energy
- 2 – Arauco
- 3 – Eldorado
- 4 – Suzano
- 5 – Paracel
- 6 – LD Celulose
- 7 – Bracell
- 8 – Klabin
- 9 – CMPC
- 10 – UPM

- 11 – Guararapes
- 12 – Berneck
- 13 – Klabin

□ Projects announced or estimated  
□ Projects in operation

79,2  
Mi m³/year of  
eucalyptus



Eucalyptus

4,7  
Mi m³/year of  
pine



Pine

⚠  
Increase in demand

83,9  
Mi m³/wooden year

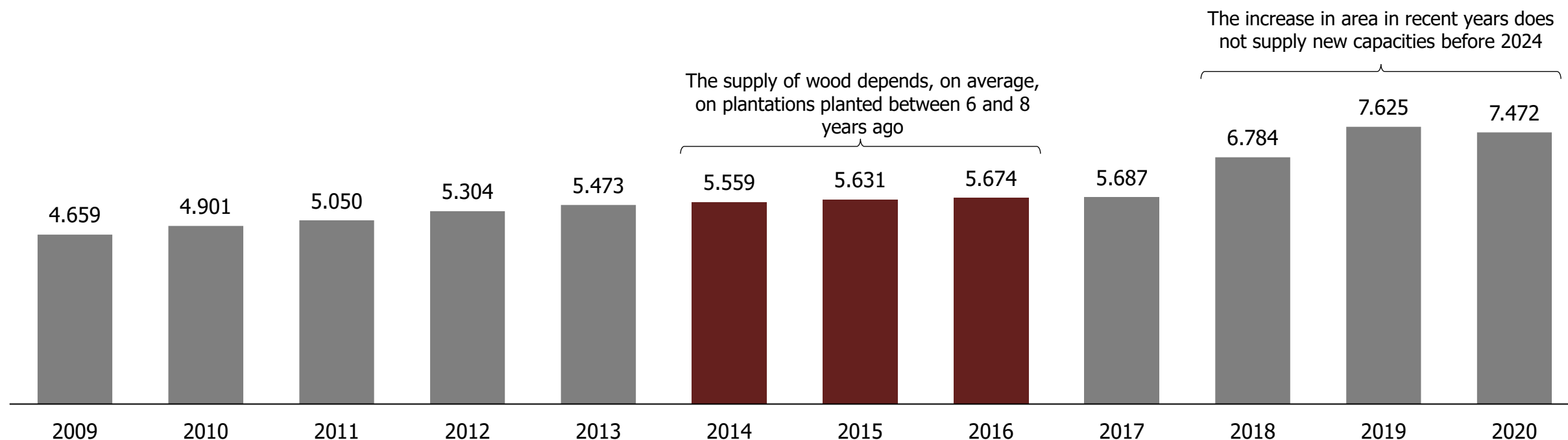


Fonte: Company website | ESG Tech Analysis

# Despite the increase in planted area in recent years, the wood supply does not follow the same pace of demand. New plantations should not impact supply before 2028

## Evolution of the Eucalyptus planted area in Brazil

[Thousand hectares]



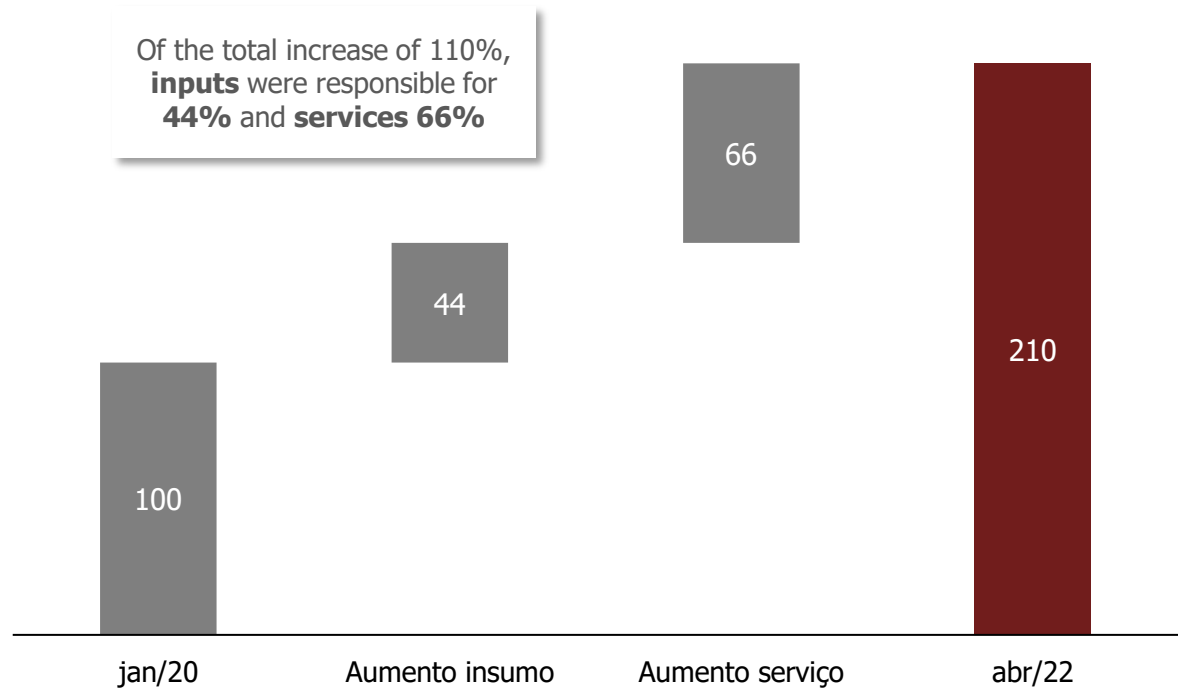
Fonte: IBGE | ESG Tech Analysis



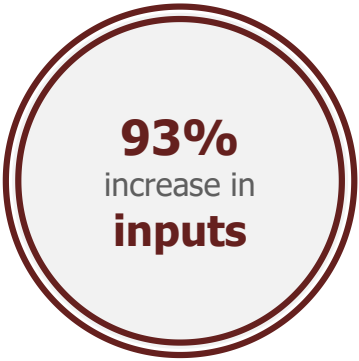
# In addition, the costs of inputs and forestry services increased significantly in recent years, showing an increase of 110%

## Variation of forest establishment costs between January/2020 and April/2022 with breakdown of input and service impact

[Index number with January/2020 costs equal to 100]



## Increase in costs with inputs and services for forest establishment between January/2020 and April/2022

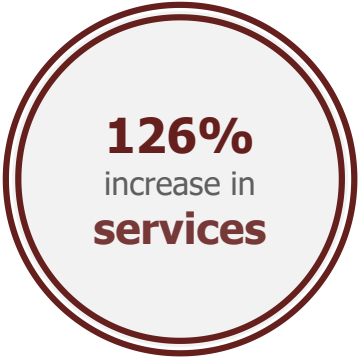


### Highest variation

Fertilization inputs showed increases close to 100% in the period

### What we heard

"The devaluation of the real directly impacts the costs of imported fertilizer components, in addition to the increase in prices in dollars"



### Highest variation

More significant increases in activities that demand the most machine hours (e.g. pre-emergent total area application)

### What we heard

"We have more demand for services and maintenance costs have increased due to the shortage of components and the increase in steel, for example"

Note: increase in fuel prices are reflected in the services category, as only outsourced activities were considered.

Source: ESG Tech database for average values, considering same values of technical prescription and operating income between compared periods.

# Forestry strategy must consider impacts on the entire production chain, skills necessary for success and a balance between market risk and investment

## 100% third-party supply: supplier control

### General process of delivering biomass to industry



### Quality control:

- Purchase technical specification

### Supply cost:

- Product purchase with added margin from suppliers at all stages of the process

## 100% own supply: control of energy inputs

### General process of delivering biomass to industry



### Quality control:

- Technical delivery specification
- Selection of suitable genetic material
- Spacing and BOM
- Harvest and drying age of the material

### Supply cost:

- Operating cost at all stages of the process
- Internalization of Depreciation (CapEx Need)

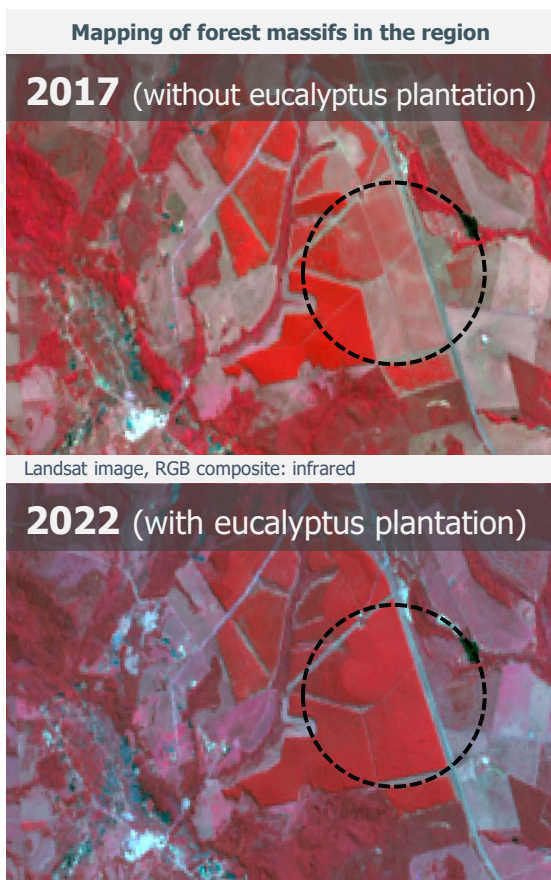
Investment



Market risk



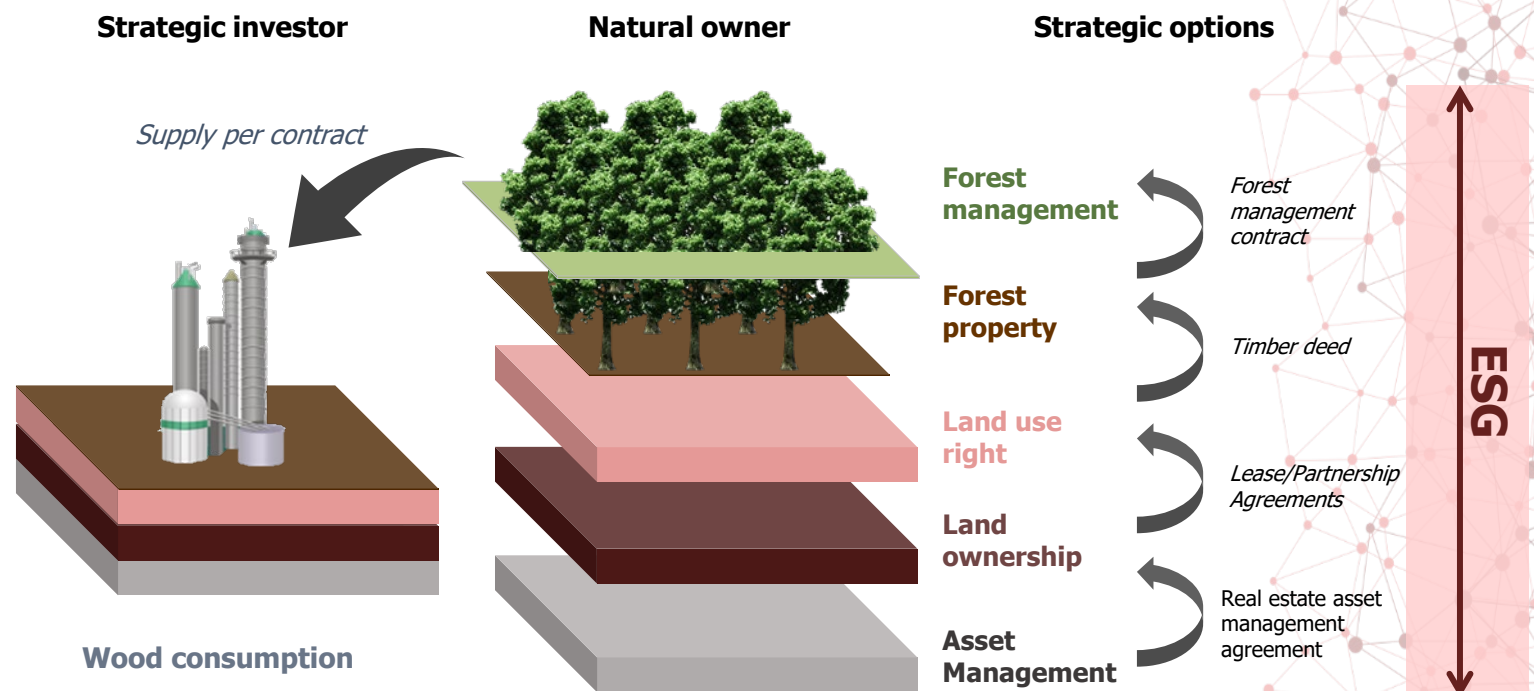
# The forestry strategy must also consider market scenarios, social, and environmental values, and the optimization of resource allocation



Planting area  
Age of forests  
Market data  
Logistical mapping  
Government data



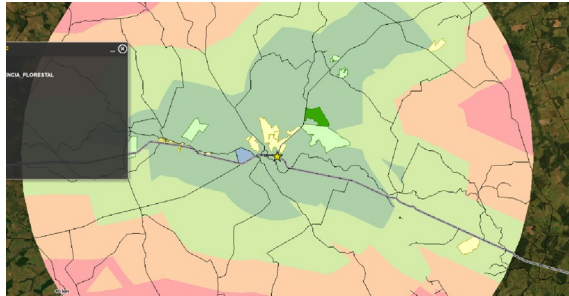
## ESG Tech Vision: Supply + Competitiveness + Asset Optimization





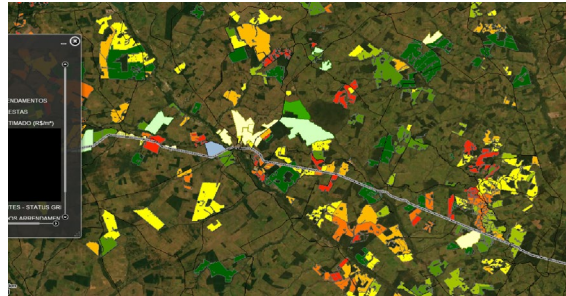
# ESG Tech's technical approach helps identifying plantations and properties to survey timber and land prospecting opportunities

## Definition of supply clusters



Once the scope of the study has been defined, supply and prioritization clusters are defined based on logistical costs

## Identification of plantations and age estimates



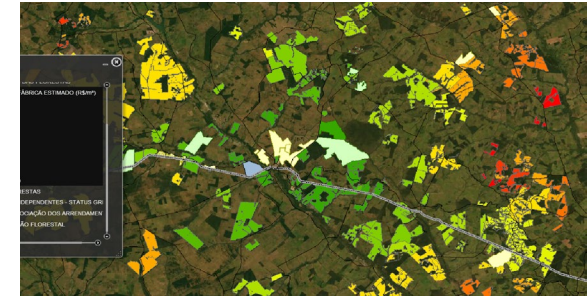
The plantations are spatially identified, and their ages are estimated via temporal analysis of satellite images and prioritization based on areas with appropriate age for the desired supply flow year by year

## Delivered wood cost estimates



The delivered costs of wood are estimated based on harvesting and transport costs to the industry. At this stage, a refinement of field operating cost assumptions is desirable

## Property selection and negotiation

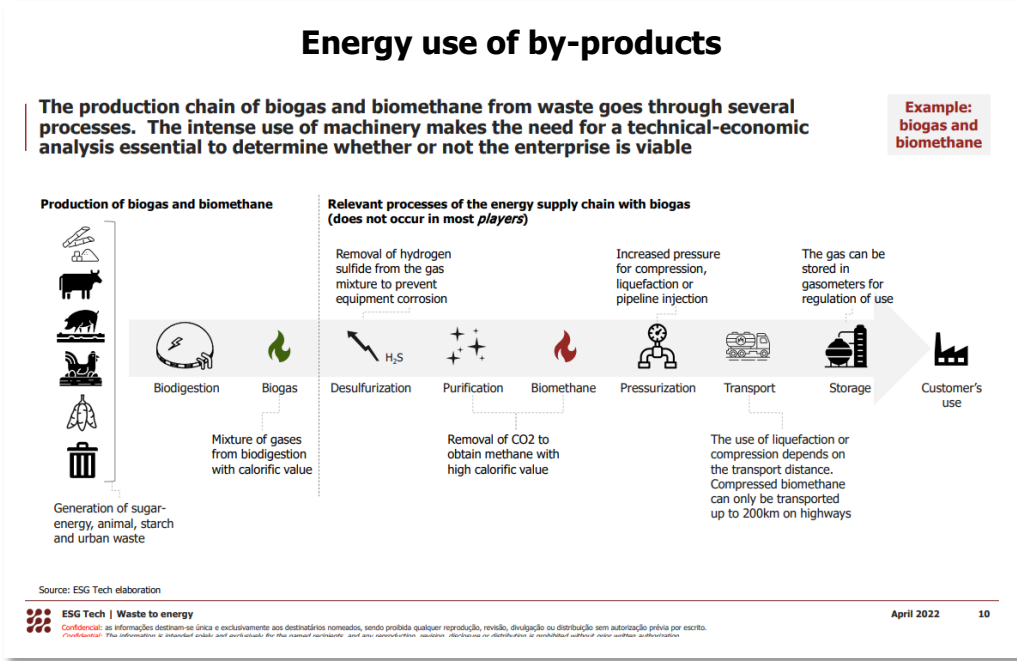
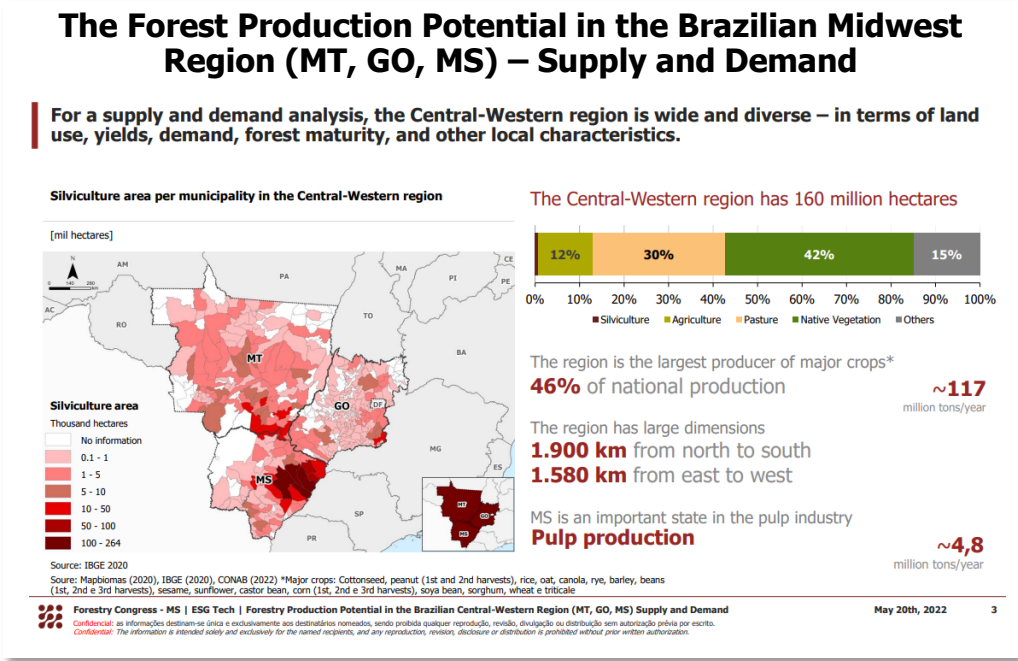


Properties with greater strategic and economic interest are selected so that the client can advance in prospecting and potential negotiation.



# ESG Tech frequently publishes STRATEGIC DIALOGUES, with current information relevant to decision-making within the Brazilian agribusiness chain

## Recent dialogues



To access previous versions with the topic you are interested in, visit the website <https://esgtech.com.br/en/news/>



# How we can help

## Strategic dialogue approaches

- ✓ Forest market booming with new industrial projects announced
- ✓ Demand growth faster than supply and high forest formation costs impact the wood market and companies' supply strategy
- ✓ Supply strategy must consider the entire production chain, competencies needed for success, and a balance between market risk and investment

## Forestry companies and rural producers

- What is the current availability of wood in the region of interest?
- What is the pipeline of industrial projects and its impact on wood consumption in your region?
- What is the expected supply strategy and investment timing?
- What is the current wood balance and trend for the coming years?
- What is the current benchmarking of operational and administrative costs?
- Which wood and land price drivers should be tracked?

## How does ESG Tech contribute to this dialogue?



ESG Tech is a strategy and business development consultancy focused on the forestry and agribusiness sectors. ESG Tech does not commercialize technologies nor is it linked to any supplier, in order to ensure the independence of our analyzes and the freedom to seek in the market the solutions that will bring the greatest return to our customers.

Our team of consultants has specialists in different areas of activity, cultures and links in the agribusiness chains that can assist our clients in all stages of decision making and execution.

**Market studies:** market analysis, competitiveness, chain study, entry and supply model.

**Feasibility analysis:** investment and return projections; determination of optimal scale and location.

**M&A:** from the selection and evaluation of targets or potential strategic partners to the structuring and negotiation of transactions, as well as support in the management of post-acquisition integration.

**Systemic Sustainability:** development of ESG strategies to integrate the systemic sustainability of processes, products and markets, combined with the measurement of their impacts on the Sustainable Development of local governments.

**Strategy studies:** aggregating the studies mentioned above and extracting strategic insights (supply, investment, purchase or sale of assets, others).



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