



STUDY

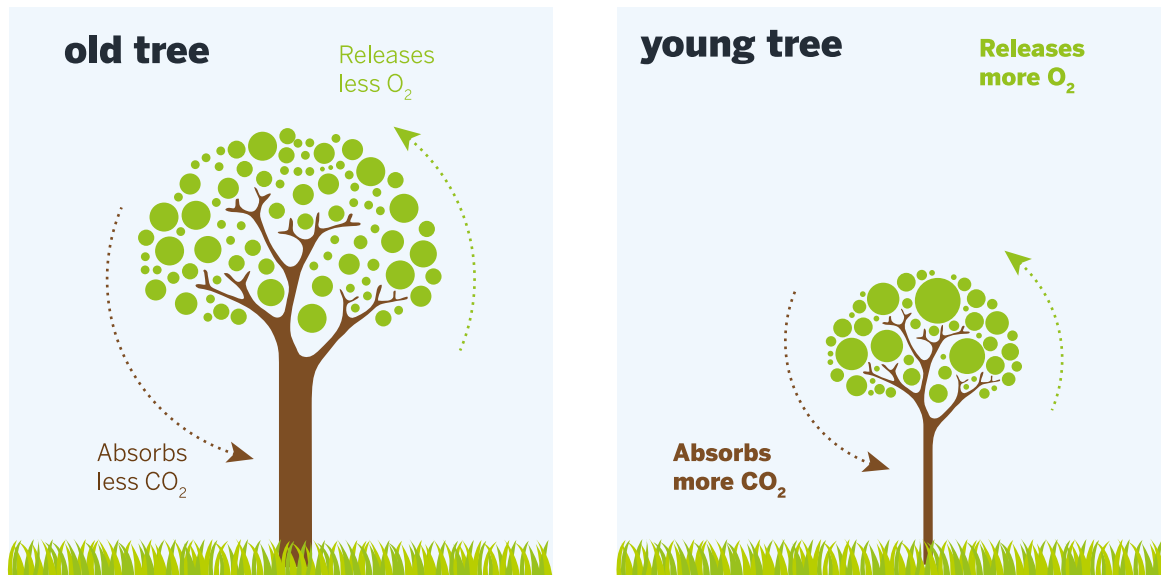
SUSTAINABLE FOREST MANAGEMENT PLAN (PMFS)

*** DATA FROM REAL LOGGING CARRIED
OUT BY ONE OF OUR BRAZILIAN
SUPPLIERS**

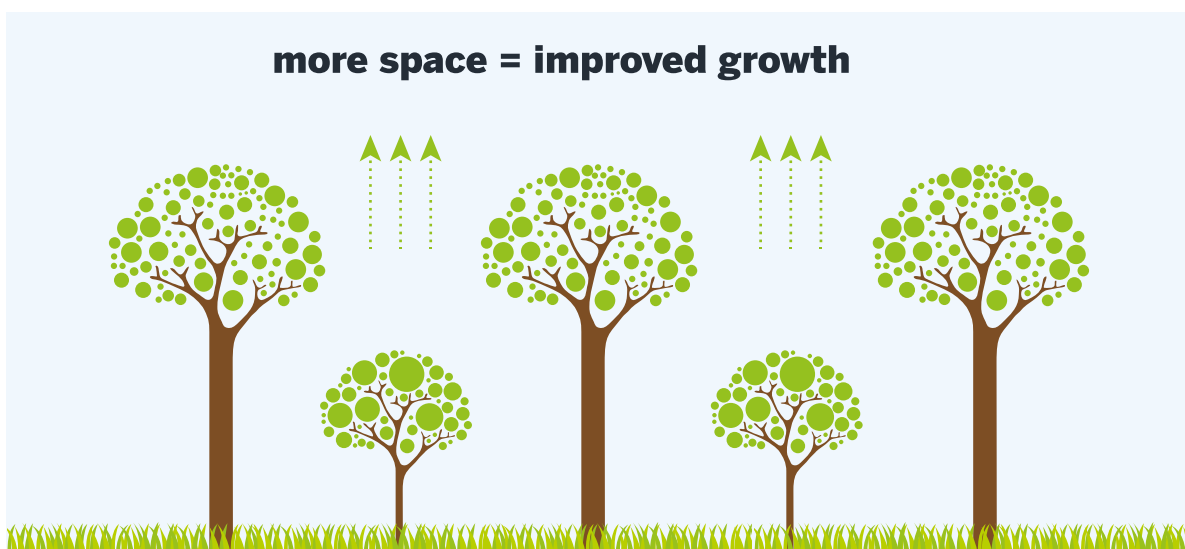


REGENERATING FORESTS REDUCES CO LEVELS AND BOOSTS THE RELEASE OF O₂

** Through this study, we aim to communicate the data resulting from sustainable logging of a tropical forest and to demonstrate, by means of data, that the exploitation of forest resources helps to regenerate forests and to boost oxygen production, whilst also reducing CO₂.*



- In order to grow, trees absorb CO₂ from the atmosphere and store it in their trunks via photosynthesis.
- **Trees which are growing take in the greatest amount of carbon.** This is **why the youngest forest stands are most effective for removing CO₂ from the atmosphere.**
- In the case of older trees, their thick trunks store a greater amount of carbon, even though over time they **have stopped growing and no longer contribute to reducing CO₂ in the atmosphere.**
- At the same time, **older trees** - due to the shade of their large canopies - **prevent younger trees from growing**, by blocking the sunlight needed for photosynthesis
- As a consequence of the previous point, **logging and using older trees** helps to clear forests and allows younger trees to grow strong and retain more CO, thus **contributing to reducing carbon emissions.**



DATA FROM REAL LOGGING IN BRAZIL

ITEM	QUANTITY
Total PMFS (Sustainable Forest Management Plan) area	209.000 hectares
Permanent conservation area, infrastructure...	29.000 hectares
Logging area	180.000 hectares
Logging cycle	30/35 years
Logging area per year (POA-Annual Operational Plan)	6.000 hectares
Maximum volume authorised for extraction per hectare of commercial species	25.8 m3
Approximate average number of commercial trees extracted per hectare	3/4 trees

ITEM	QUANTITY	%
Total no. of species inventoried in the PMFS	206	100 %
No. of species potentially suitable for timber	90	44 %
No. of commercial species inventoried for extraction	32	16 %

STUDY OF LOGGING PERIOD - 1 YEAR

(POA - Annual Operational Plan)

Logging area	Estimated total number of trees (*)	Total no. of trees per hectare	Total commercial trees	Commercial trees per hectare	Total extracted trees	Trees extracted per hectare
3.348,97 hectares	68797 trees	20,55	24359 trees	7,27	10458 trees	3,12

(*) This estimation is calculated as follows:

In this project there are 16 permanent slots that serve as control slots to monitor the growth of the forest. This growth is calculated by measuring all trees with diameters above 10 cm before starting chopping in the project, and then after 3, 5, 10, 15, 20, 25 and 30 years. This demonstrates the high growth potential of the jungle. (Brazilian law considers a 0.86 m3/ha/year growth.)

Measurements have calculated an average of 360 trees per hectare in these 16 slots, thus we estimate a total number of trees in this POA as follows: **3348.97 hectares x 360 = 1,205,629 trees in this Operational Plan**



TOTAL INVENTORY OF TREES

(POA - Annual Operational Plan)

Species	Total inventory: trees for timber		Inventory: extraction of commercial species		Inv. Vol. /
	No. Trees	Volume (M3)	No. Trees	Volume (M3)	Ext. Vol.
Acariquara	82	167	-	-	0%
Amapá	215	1.076	-	-	0%
Andiroba	1	4	-	-	0%
Angelim-pedra	255	1.870	206	1.712	92%
Angelim-rajado	8	43	-	-	0%
Angelim-saia	132	901	-	-	0%
Angelim-vermelho	19	55	-	-	0%
Bacuri	2	9	-	-	0%
Breu-amescla	185	825	-	-	0%
Breu-branco	216	536	-	-	0%
Carapanaúba	119	517	-	-	0%
Castanha-do-pará	2.123	28.639	-	-	0%
Caucho	325	822	157	480	58%
Cedrorana	319	3.239	204	2.027	63%
Cedro-rosa	12	50	-	-	0%
Cedro-vermelho	413	1.447	258	1.087	75%
Copaíba	311	1.324	-	-	0%
Cuiarana	173	643	-	-	0%
Cumarú	176	757	98	488	64%
Cupiúba	391	1.931	301	1.593	83%
Curupixá	449	3.726	398	3.548	95%
Fava-amargosa	376	1.913	213	1.230	64%
Fava-atanã	823	5.305	-	-	0%
Fava-benguê	14	65	-	-	0%
Fava-bolacha	133	776	-	-	0%
Fava-doce	162	547	-	-	0%
Fava-rosca	136	662	-	-	0%
Freijó	77	317	22	140	44%
Garapeira	1.554	11.367	1.324	10.522	93%
Goiabão	1.830	7.056	1.213	5.963	85%
Gombeira	93	231	13	52	23%
Guajará	5	25	-	-	0%
Ipê-amarelo	1.648	7.606	1.290	6.957	91%
Ipê-roxo	212	1.346	155	1.105	82%
Itaúba	227	725	54	307	42%
Jarana	134	276	-	-	0%
Jatobá	1.740	14.033	1.547	13.625	97%
Jutai-mirim	1.230	4.826	433	2.349	49%
Louro-amarelo	55	130	-	-	0%
Louro-canela	9	24	-	-	0%
Louro-preto	261	715	-	-	0%
Louro-tamaquaré	176	440	-	-	0%
Louro-vermelho	18	47	-	-	0%
Maçaranduba	1.281	6.095	853	5.263	86%
Mandioqueira	75	329	-	-	0%
Maparajuba	2	7	-	-	0%
Marupá	397	1.187	219	815	69%
Mirindiba	109	728	-	-	0%
Mogno	21	162	-	-	0%
Muiracatiara	982	4.218	332	2.310	55%
Muirapixuna	1	3	-	-	0%
Paricá	374	1.717	-	-	0%
Pau-de-peixe	141	574	97	454	79%
Pau-santo	10	28	-	-	0%
Pequiá	133	922	69	456	49%
Pequiarana	79	461	-	-	0%
Quaruba	81	511	56	326	64%
Quarubarana	149	801	111	644	81%
Quinarana	359	714	-	-	0%
Sapucaia	172	1.414	-	-	0%
Seringueira	244	579	-	-	0%
Sucupira-amarela	94	373	19	75	20%
Sucupira-pele-de-sapo	3	12	-	-	0%
Sucupira-preta	14	38	-	-	0%
Sucuúba	12	27	-	-	0%
Sumaúma	393	3.278	-	-	0%
Tamboril	287	1.669	-	-	0%
Tanibuca-amarela	231	1.154	-	-	0%
Tatajuba	228	1.778	170	1.511	85%
Tauari	713	4.370	598	4.090	94%
Tauari-caximbo	105	923	49	510	55%
Timborana	366	1.560	-	-	0%
Uxi	7	21	-	-	0%
Virola	457	1.072	-	-	0%
Grand Total	24.359	143.736	10.459	69.638,59	48,45%

EXTRACTION AND FELLING RULES

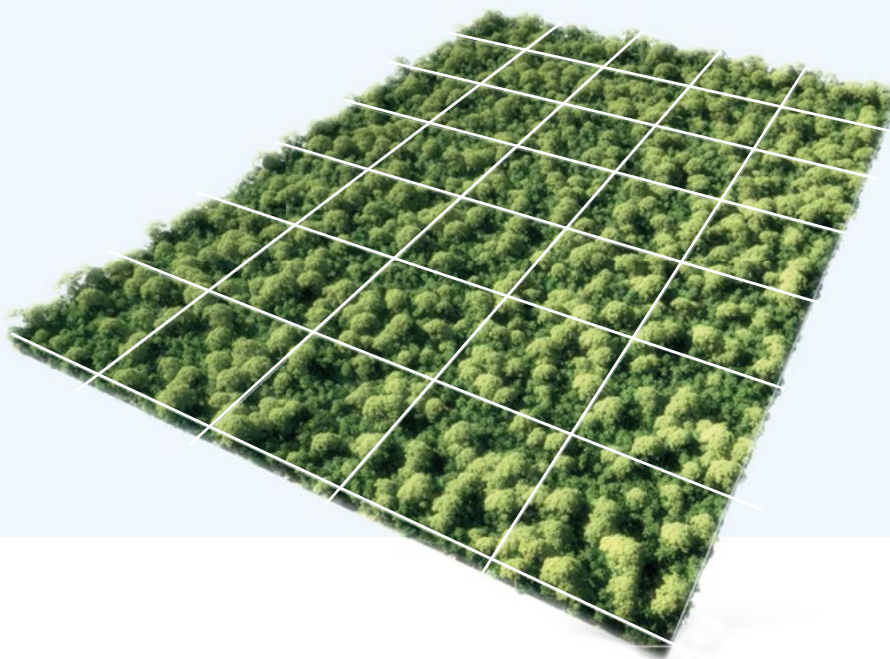
- **Only commercial species** suitable for felling **are inventoried: over 50 cm in diameter**; at least 10% of its specimens are Parent Trees.
- **Trees with a diameter under 50 cm** are deemed “**leftover**” or “**for future felling**” and are cut down after the felling cycle (30/35 years) rather than during the logging year.
- The effective management area represents the spaces where specimens can be extracted without logistical obstacles: the presence of stones, inaccessible areas, Permanent Conservation Areas (Marginal drainage bands, steep areas (gradient over 45%), etc.). In the forest inventory phase (100% census), all these possible obstacles are identified using GPS.
- **The felling cycle lasts 30/35 years for reasons of forest regeneration.** In other words, from the 36th year onwards, the same area can be exploited again, respecting the permitted quantity of 25.8 m³ per hectare, since **the forest regenerates at a rate of 0.86 m³/hectare/year.**



Commercial species
suitable for felling:

over 50 cm in diameter

*** The forest is divided
into 35 areas, one for
each logging year**



CONSEQUENCES OF THIS STUDY

Since we have 209 species and only 32 are felled in the conditions detailed above, the tropical forest is not endangered. In fact, the forest's potential for growth is boosted and it is rejuvenated, therefore helping to mitigate climate change.

Since there are 360 trees in one hectare and only 3 to 4 are chopped, the damage to the forest is negligible; on the contrary, the more old trees we chop down, the more regeneration we achieve, thus consumption of all types of wood should be promoted.

What about when a tree dies?

This is the key issue. Sooner or later, trees die. Over their life-time, they absorb carbon and release oxygen as they grow and when they die... **they rot. But what is rotting?**

A process in which bacteria extracts energy from organic matter, decomposing it into simpler substances which absorb oxygen from the atmosphere and release carbon dioxide.

When plants die and rot, they release the carbon stored inside them and the bacteria which rot them absorb the oxygen previously released by the plant. When the life of a forest tree ends, everything basically returns to how it started.

In summary: breathing and rotting are what, inevitably, mean that mature tropical forests do not produce considerable net oxygen emissions or net CO₂ absorption.

Wood as a CO₂ store

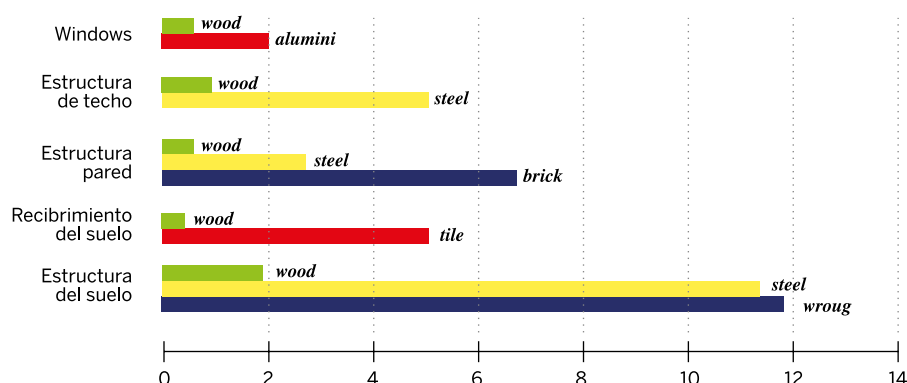
In order to store CO for longer, we must protect trees to make them last; in other words, we should fell them before they die. Wood used for construction or to make furniture effectively stores carbon for centuries.

Example: If we need a table, it is better to use wood than any other material. A solid wood table which is designed to last stores carbon for a long period of time. The better the quality of the wood used to make the table, the longer this CO² will take to return to the atmosphere.

Wood as a substitute for other products

The manufacturing of construction materials such as plastics, aluminium or cement generally requires large amounts of fossil fuels. Substituting them for wood offers significant benefits, therefore, where reducing carbon emissions is concerned.

“Each cubic metre of wood used to substitute other construction materials reduces CO₂ emissions into the atmosphere by an average of 1.1 tonnes of CO₂ (IPCC. UN Intergovernmental Panel on Climate Change. 2000. IPCC Assessment Report)”



** Greenhouse gases emissions produced through manufacturing different construction components for a family home. Graph (Source: CRC for Greenhouse Accounting)*

Wood as fuel, BIOENERGY

Moreover, the **use of wood as fuel**, instead of oil, coal and natural gas, could actually mitigate **climate change**. Although wood and biomass combustion releases carbon dioxide into the atmosphere, if these fuels originate from sustainably-managed forests, these carbon emissions can be offset in European forests by planting new trees or, in the case of tropical forests, by felling older trees to rejuvenate the forest.

Effectively, if correctly managed, forests can provide bioenergy and release almost no greenhouse gases into the atmosphere.



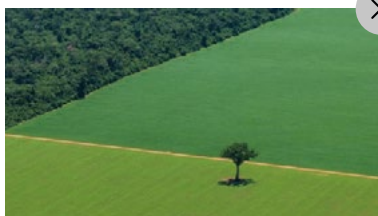
Final conclusion

The use of wood:

1. **Contributes to mitigating climate change**
2. **Helps to increase the surface area of forests in Europe.**
3. **Stops tropical deforestation by preventing forests from becoming pasture-land or soya, palm oil plantations, etc.**
4. **Creates employment and wealth in the poorest regions.**



Area intended for pasture-land



Soya plantation area



*Area intended for timber extraction,
PMFS (Sustainable Forest Management Plan)*



VISIT TO A PMFS

VISIT TO THE INSIDE OF A PMFS (*Sustainable Forest Management Plan*) IN BRAZIL

WORKING CONDITIONS TROPICAL
FOREST MANAGEMENT





QUALITY



COMMITMENT



ENVIRONMENT