

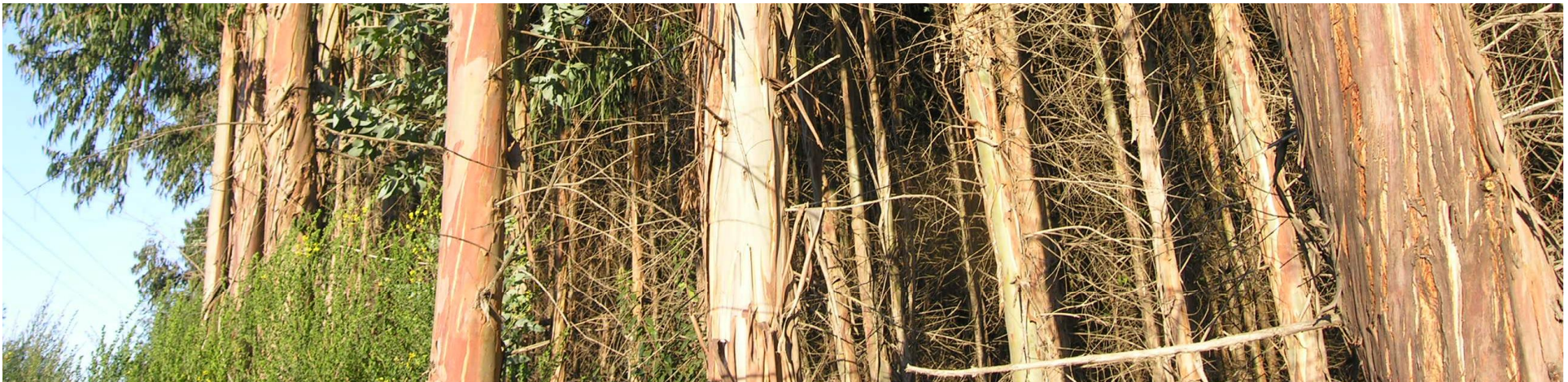
# PaperTech 2008 - INDIA



Brazil...

... a successful case study in plantation forestry & in the pulp and paper business

[www.eucalyptus.com.br](http://www.eucalyptus.com.br)



Celso Foelkel

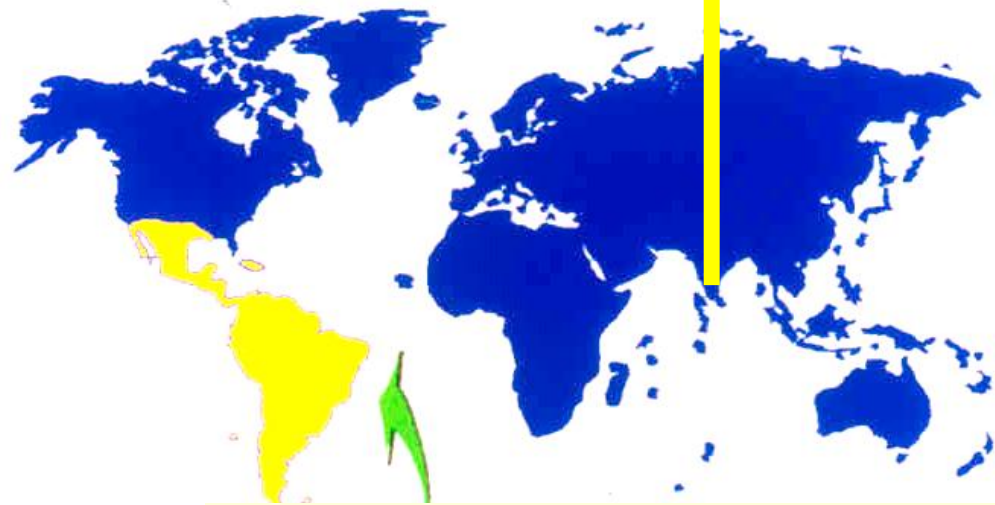


 Celsius Degree / Grau Celsius



Brazil  
...a great country with a  
great people

and you, here...



We are here in Latin America



**...and with a top sustainable forestry technology**



**... we are now sharing with you**

# Brazilian Forest Plantation Area

World : 140 million hectares  
Source: FAO FRA 2005

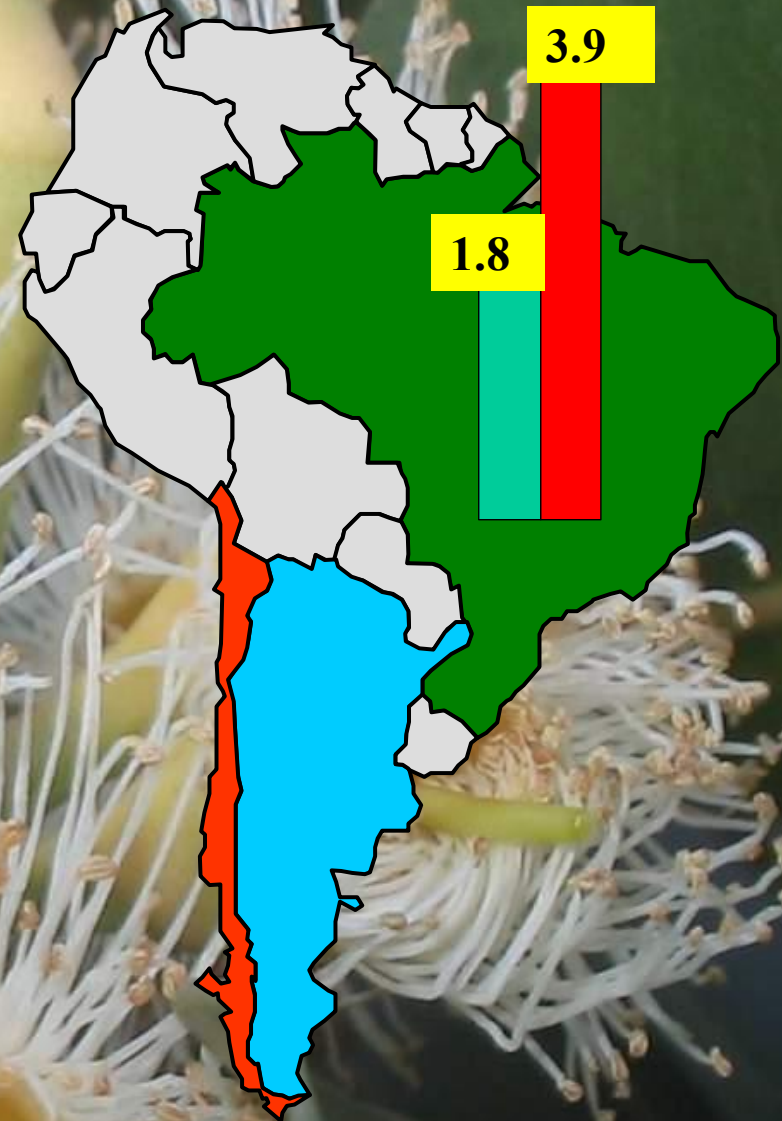
Brazil: 4 % of world  
forest plantations

Brazil: In million hectares

Total: 5.7 ha

**Softwoods (green)**: **1.8** ha

**Hardwoods (red)**: **3.9** ha





# Brazilian Eucalyptus Forest Plantation Area

World : 19.6 million hectares  
Source: GIT-Forestry

Brazil: 19 % of world eucalyptus  
forest plantations



Brazil: In million hectares

Total: 3.75



# The immigration of *Eucalyptus* to Brazil

VISIT: [http://www.eucalyptus.com.br/newseng\\_jul06.html](http://www.eucalyptus.com.br/newseng_jul06.html)



From 1825 to 1868  
*E.globulus*  
*E.gigantea*



# First commercial plantations in 1904

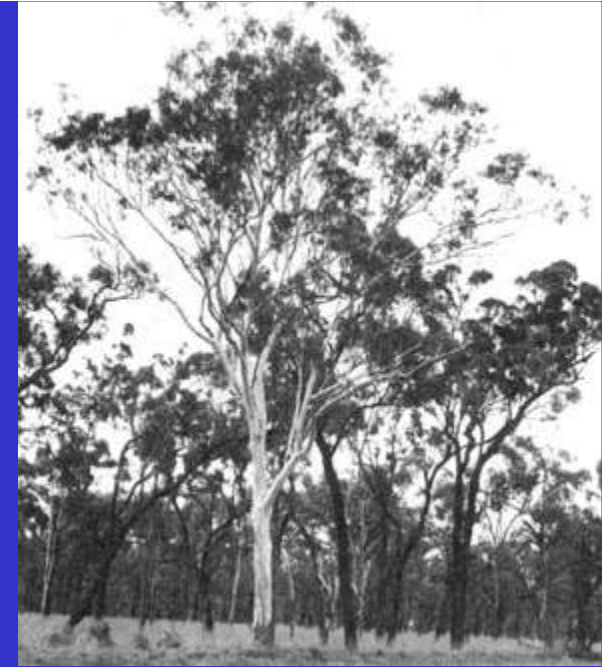


**The “father of the Eucalyptus in Brazil”:**

**Mr. Edmundo Navarro de Andrade**

**Over 150 species first introduced**





Brazil - 1960's

(15 - 20 m<sup>3</sup>/ha.year)





Brazil - 1960's

(15 - 20 m<sup>3</sup>/ha.year)





From the 1960's till...



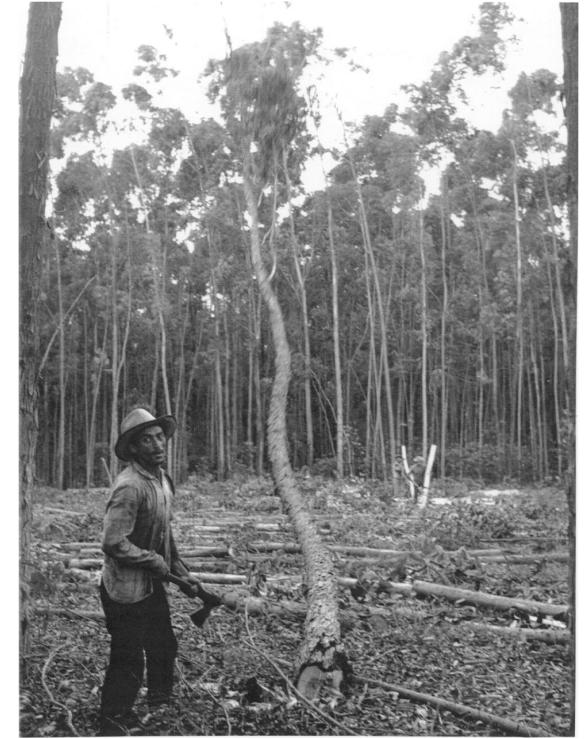
Today







From the 1960's  
till...



Thanks to Mr. Manoel de Freitas who helped me with some of the old technologies photos



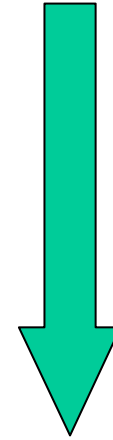
Today



**40 - 50 m<sup>3</sup>/ha.year**



# Past times



# Today



**This is technology...**





## Present Days





# Today's plantation forest performances

*Eucalyptus*: 40 - 55 m<sup>3</sup>/ha.year

*Pinus*: 25 - 35 m<sup>3</sup>/ha.year

*Acacia mearnsii*: 20 - 25 m<sup>3</sup>/ha.year







In 40 years, the forestry technological growth in Brazil was amazing

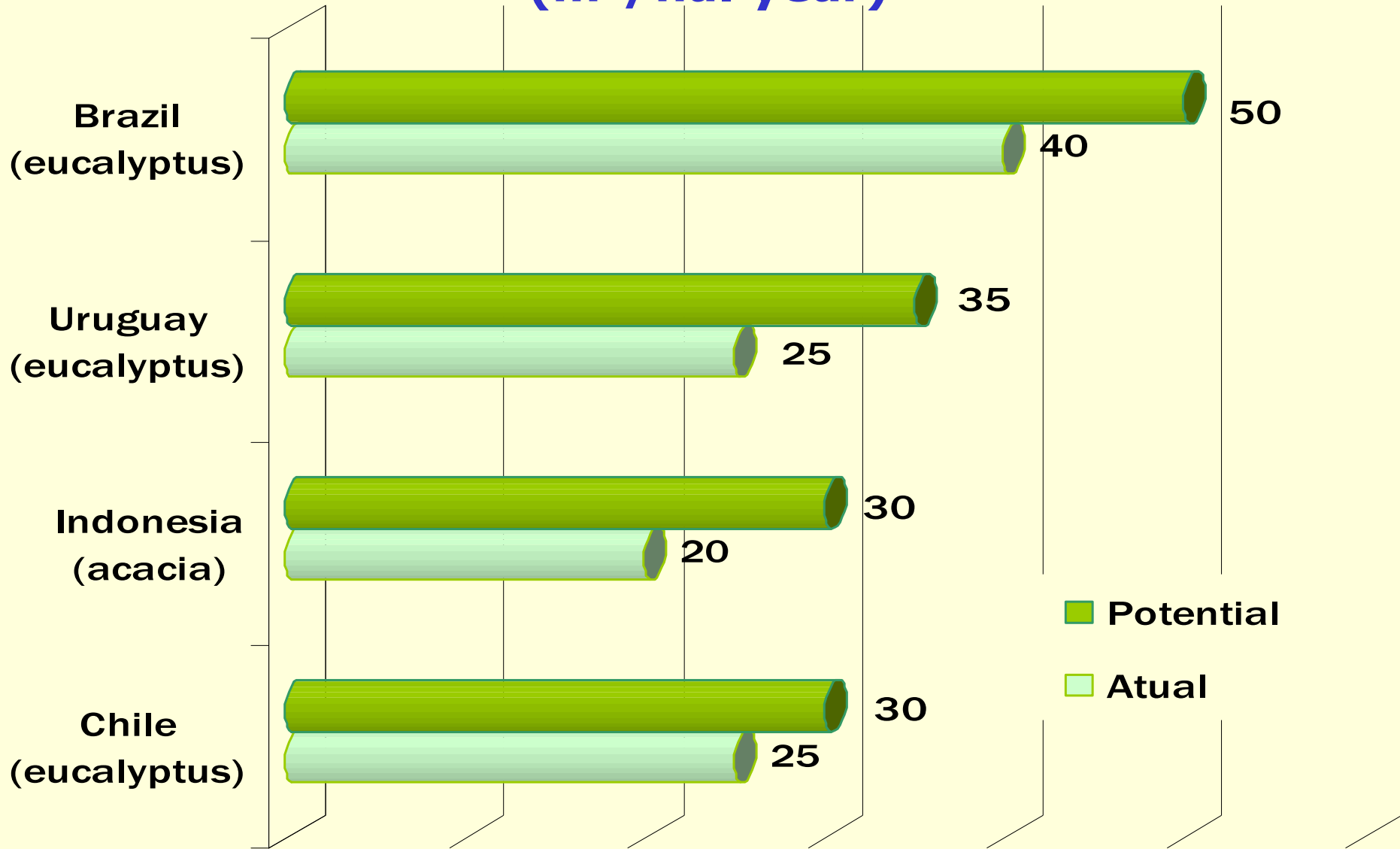


Because of this, the Brazilian forest based industry, including the pulp and paper, is very competitive



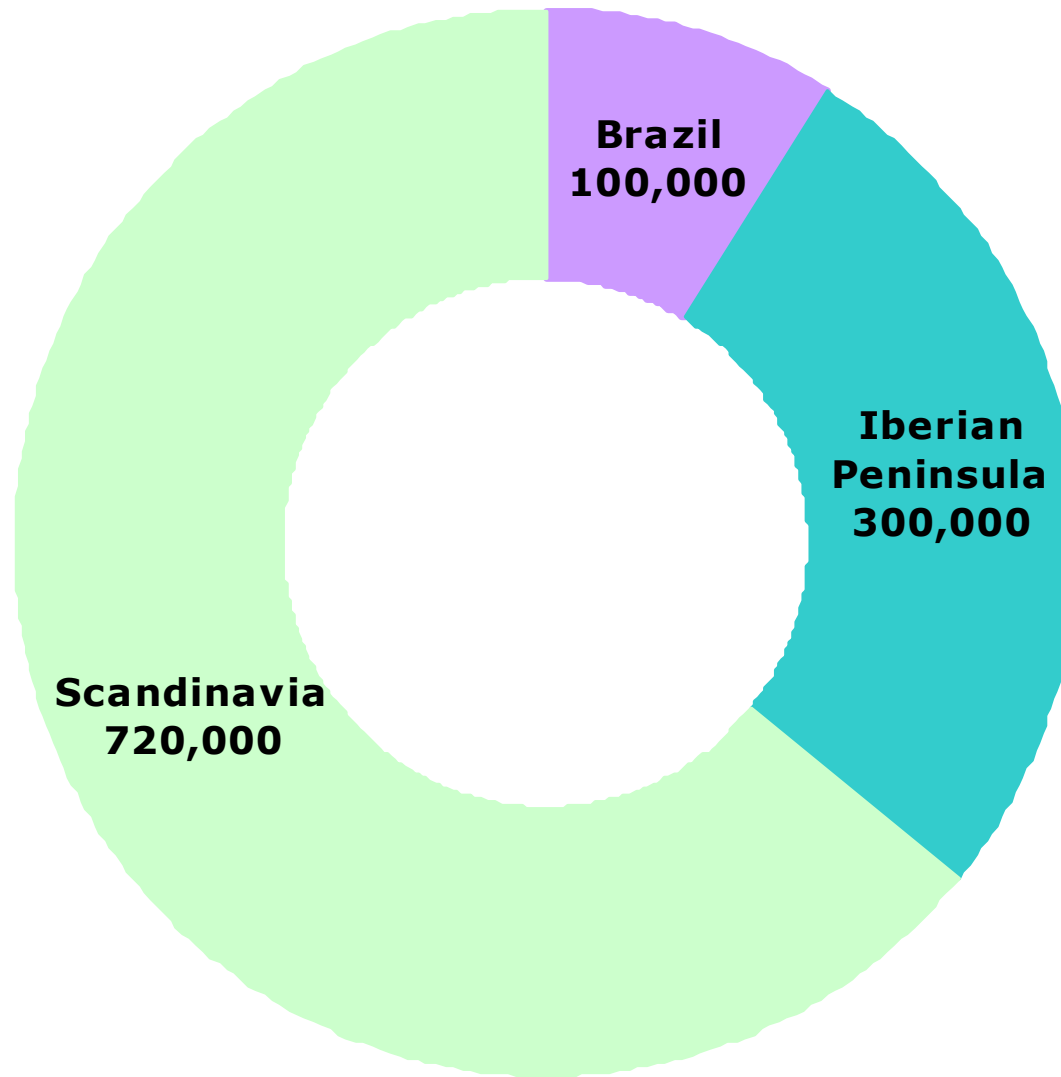


# Fast growing forest productivity in selected countries (m<sup>3</sup>/ha. year)



Source: BRACELPA

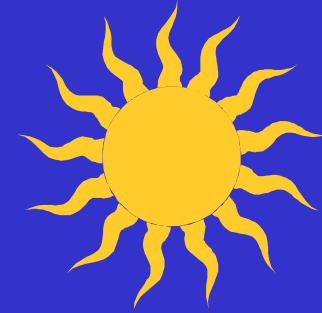
# Forest Area (ha) Required for a 1,000,000 tons/year admt Pulp Mill



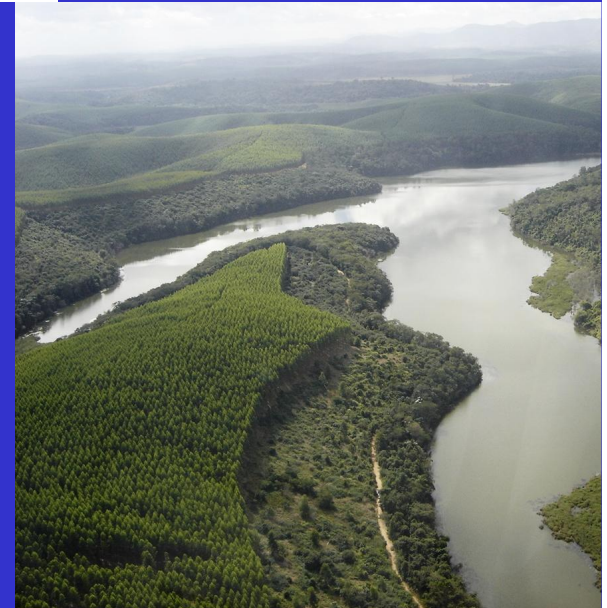
Source: Pöyry



# Forest and Wood Certification



- ☛ F S C
- ☛ CERFLOR
- ☛ ISO 14001



## Forest and Wood Certification



- ISO 9001 e ISO 14001
- Good Forest Management (FSC & CERFLOR)

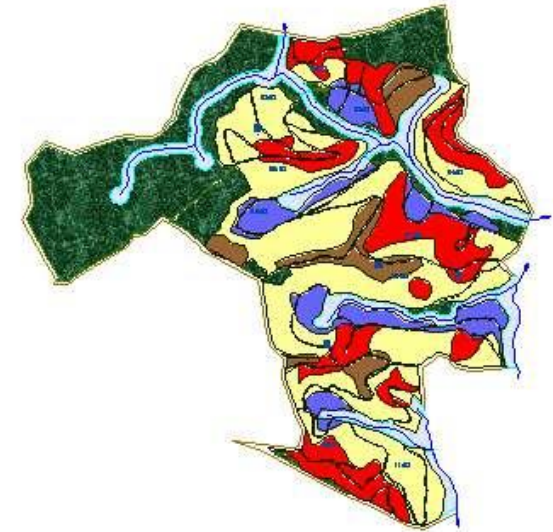
In Brazil, late 2006, the area of certified plantations (forest management) was close to 3 million hectares, this means, over 50% of this kind of forests in the country







# Mosaic Design in Forest Planning



**Monitoring environmental impacts & managing watersheds**





- Social Silviculture is coming, sharing the results with communities (rural owners and agroforestry)
- Improved price paid to the wood to promote forest plantations by rural farmers
- Next forest growth is to happen more in partnership with Society















**Fantastic plantation forests**











# Modern Fiberlines





# P&P Industry Overview 2007

- ✓ **220 companies spread in 450 municipalities**
- ✓ **1.7 million hectares of planted area for industrial use**
- ✓ **2.8 million hectares of preserved forests**
- ✓ **Total certified forest area: 2.2 million hectares**
- ✓ **Exports: US\$ 4.7 billion (forecast 2007)**
- ✓ **Trade Balance: US\$ 3.4 billion (forecast: 8.5% of Brazilian Trade Balance)**
- ✓ **Paid taxes : US\$ 1.3 billion**
- ✓ **Investments: US\$ 12 billion in the last 10 years**
- ✓ **Jobs: 110 thousand direct jobs (industry 65 thousand, forests 45 thousand) and 500 thousand indirect jobs**

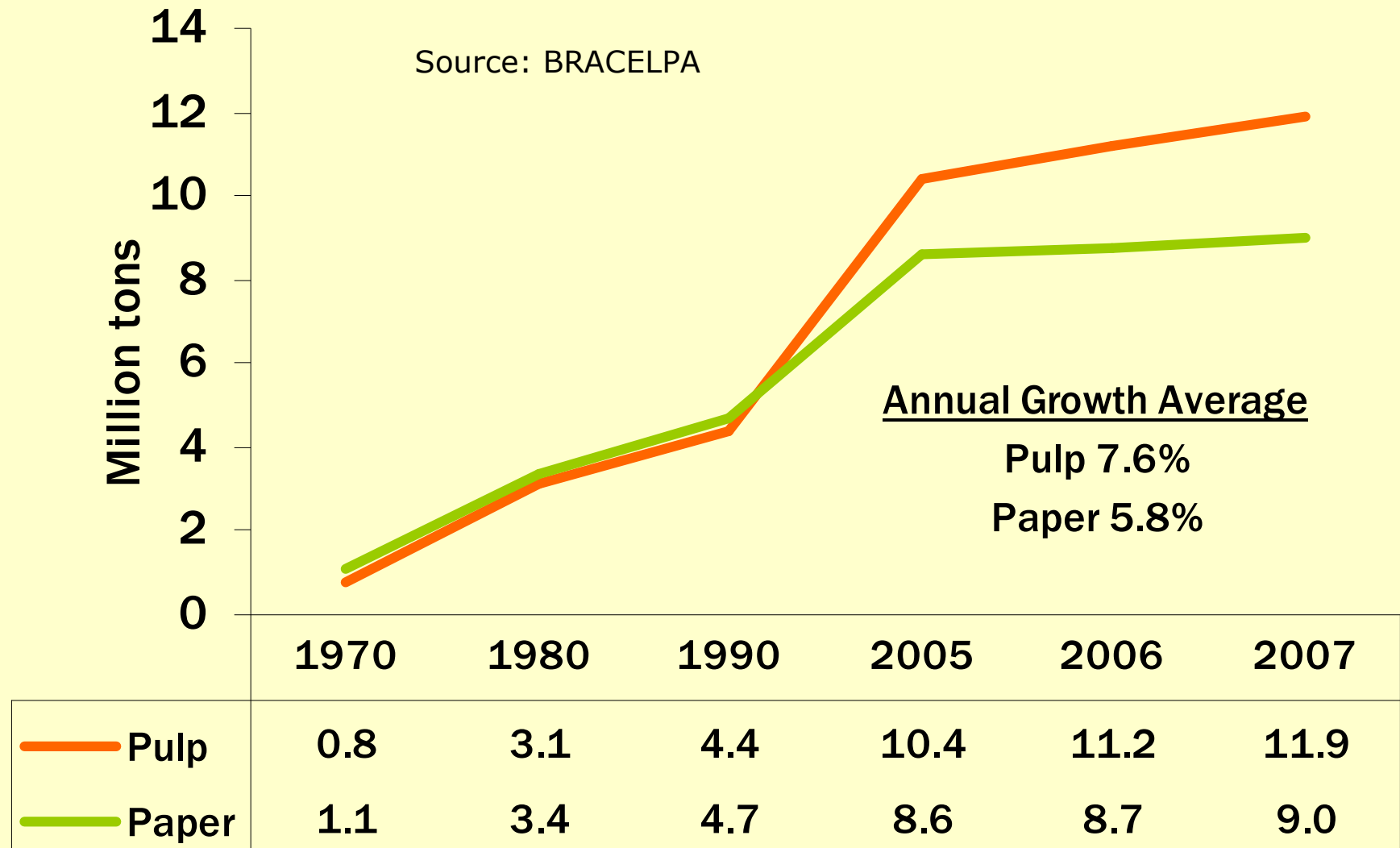


# Contribution to the Environment by the Planted Forests Segment

- ✓ **Planted forests do not compete with traditional agriculture**
- ✓ **Restoration of degraded land**
- ✓ **Soil conservation**
- ✓ **Using land not fit for agriculture purposes**
- ✓ **Mixing plantations and natural forests**
- ✓ **Biodiversity protection**
- ✓ **Watershed protection**
- ✓ **CO<sub>2</sub> sequestration**
- ✓ **Reducing pressure on natural forests**



# Brazilian Pulp and Paper Production



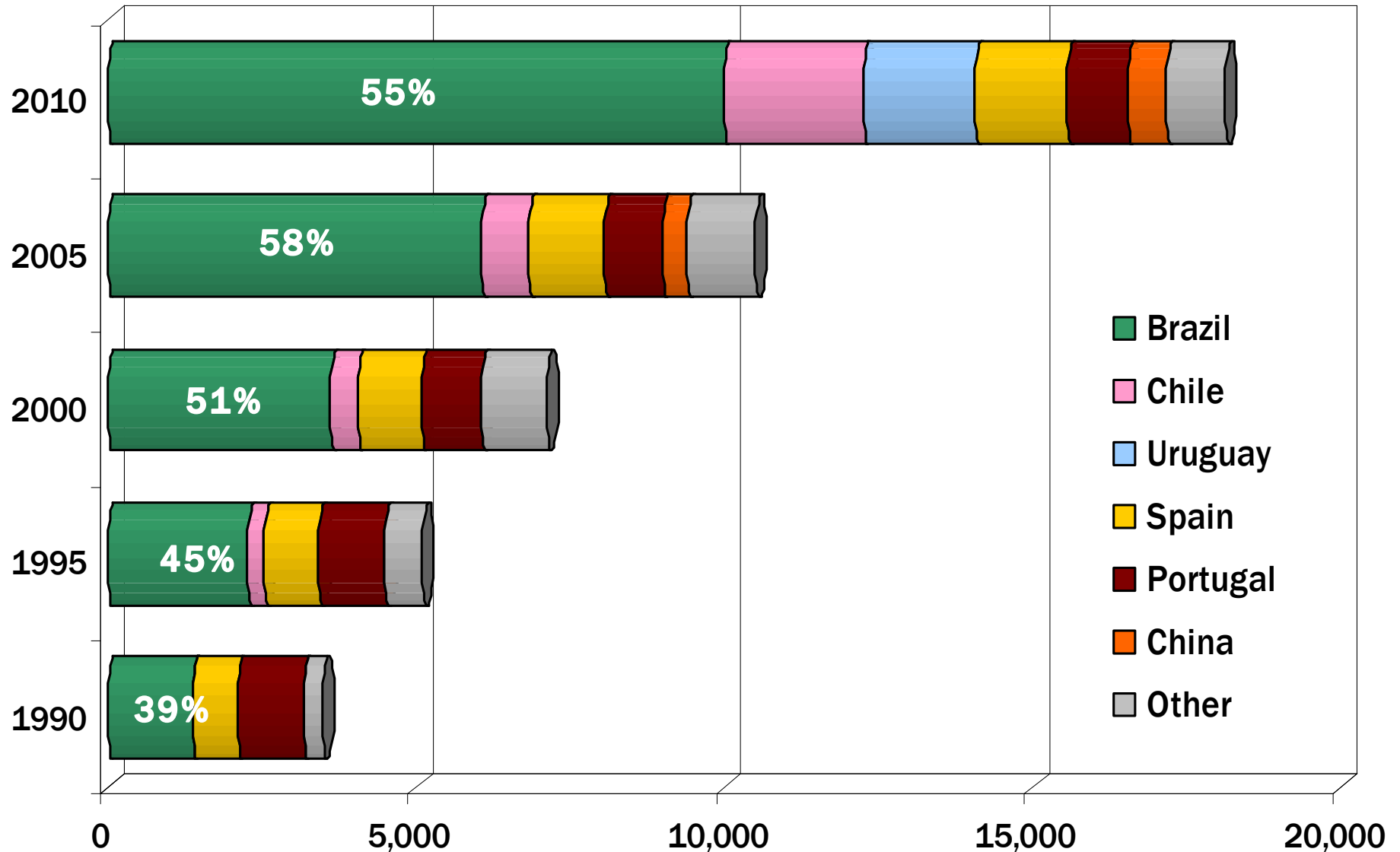


# 2007 World Pulp and Paper Producers

PULP		PAPER	
Country	1,000 tons	Country	1,000 tons
1. USA	53,215	1. USA	84,073
2. Canada	23,677	2. China	65,000
3. China	18,160	3. Japan	31,106
4. Finland	13,066	4. Germany	22,655
5. Sweden	12,240	5. Canada	18,170
<b>6. Brazil</b>	<b>11,916</b>	6. Finland	14,151
7. Japan	10,884	7. Sweden	12,066
8. Russia	7,370	8. South Korea	10,703
9. Indonesia	5,672	9. Italy	10,009
10. Chile	3,550	10. France	10,006
11. India	3,250	<b>11. Brazil</b>	<b>8,966</b>
		12. Indonesia	8,862
<b>WORLD TOTAL</b>	<b>192,177</b>	Source: BRACELPA	<b>381,551</b>



# World HWD Market Pulp



Source: PPPC – Pulp and Paper Products Council

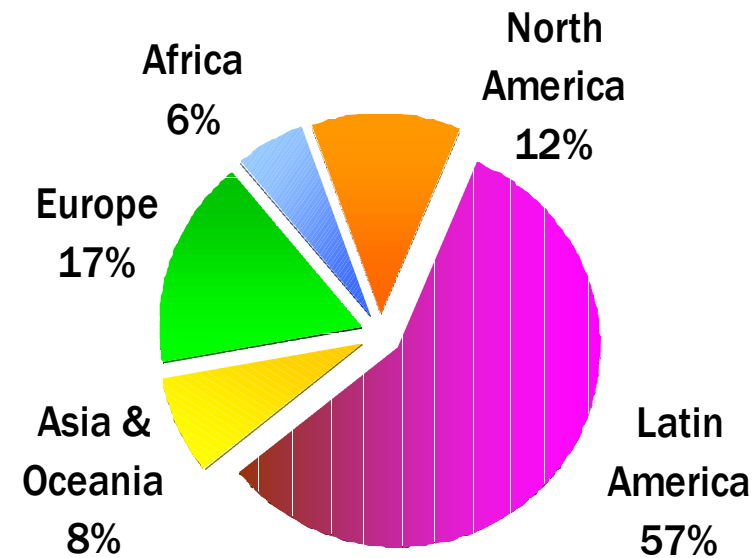
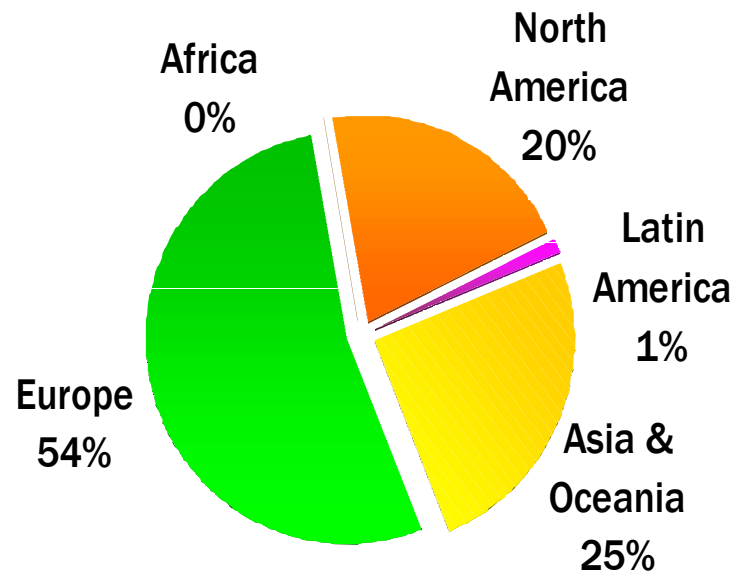


# Brazilian Exports by Destination 2007

## PULP

Source: BRACELPA

## PAPER



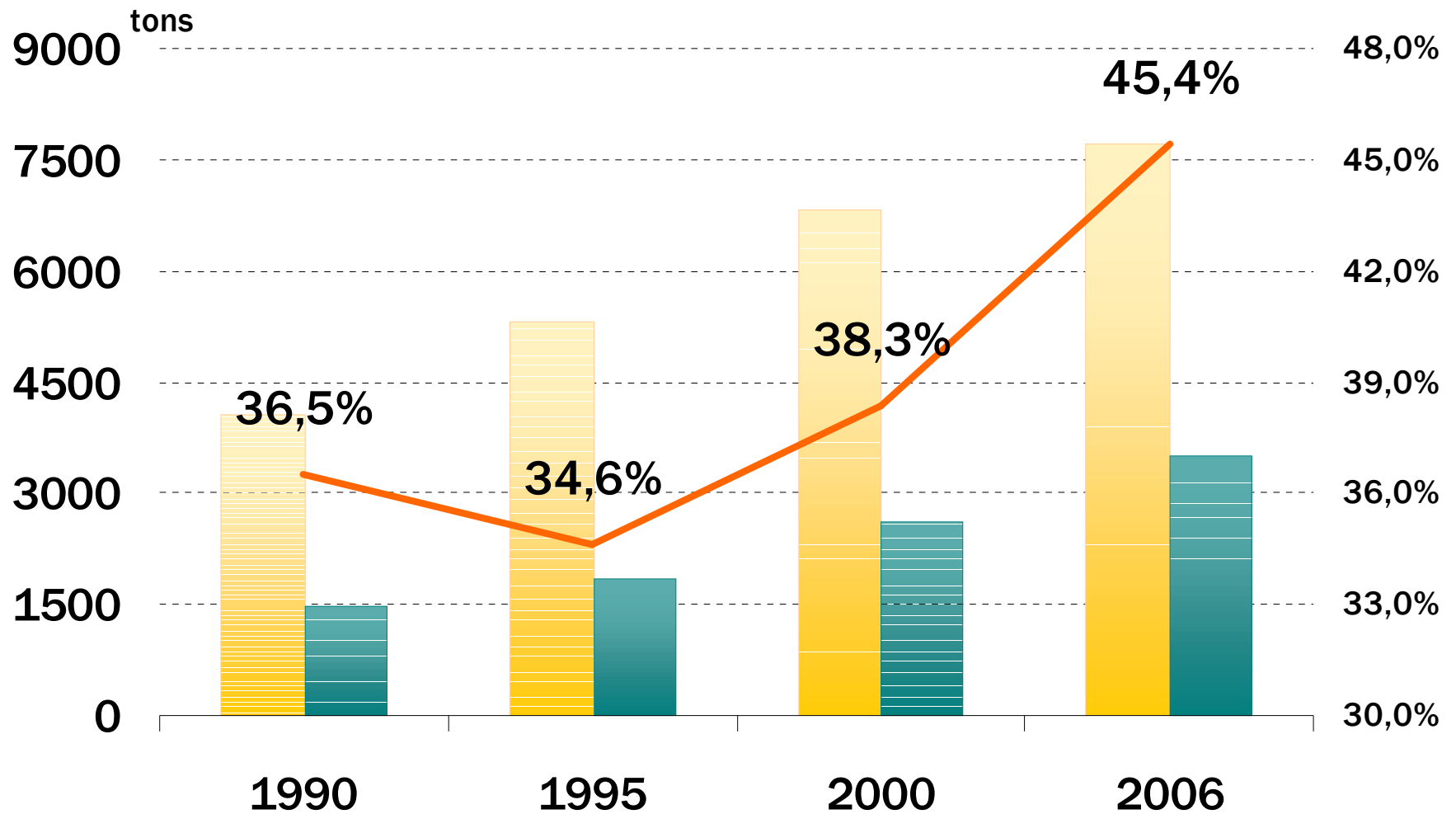
**Total: US\$ 3,0 billion**

**Total: US\$ 1,7 billion**



<b>PRODUCTION</b>	<b>1,000 TONS</b>		<b>Change %</b>
	<b>2007</b>	<b>2008 (Forecast)</b>	
Pulp	11,916	12,800	7.4%
Paper	8,966	9,250	3.2%
Source: BRACELPA			
<b>EXPORTS</b>	<b>US\$ MILLION FOB</b>		<b>Change %</b>
	<b>2007</b>	<b>2008 (Forecast)</b>	
Pulp	3,024	3,500	15.7%
Paper	1,702	1,800	5.7%
<b>TOTAL</b>	<b>4,726</b>	<b>5,300</b>	<b>12.1%</b>

# Recovery Rate of Recycled Paper



Source: BRACELPA

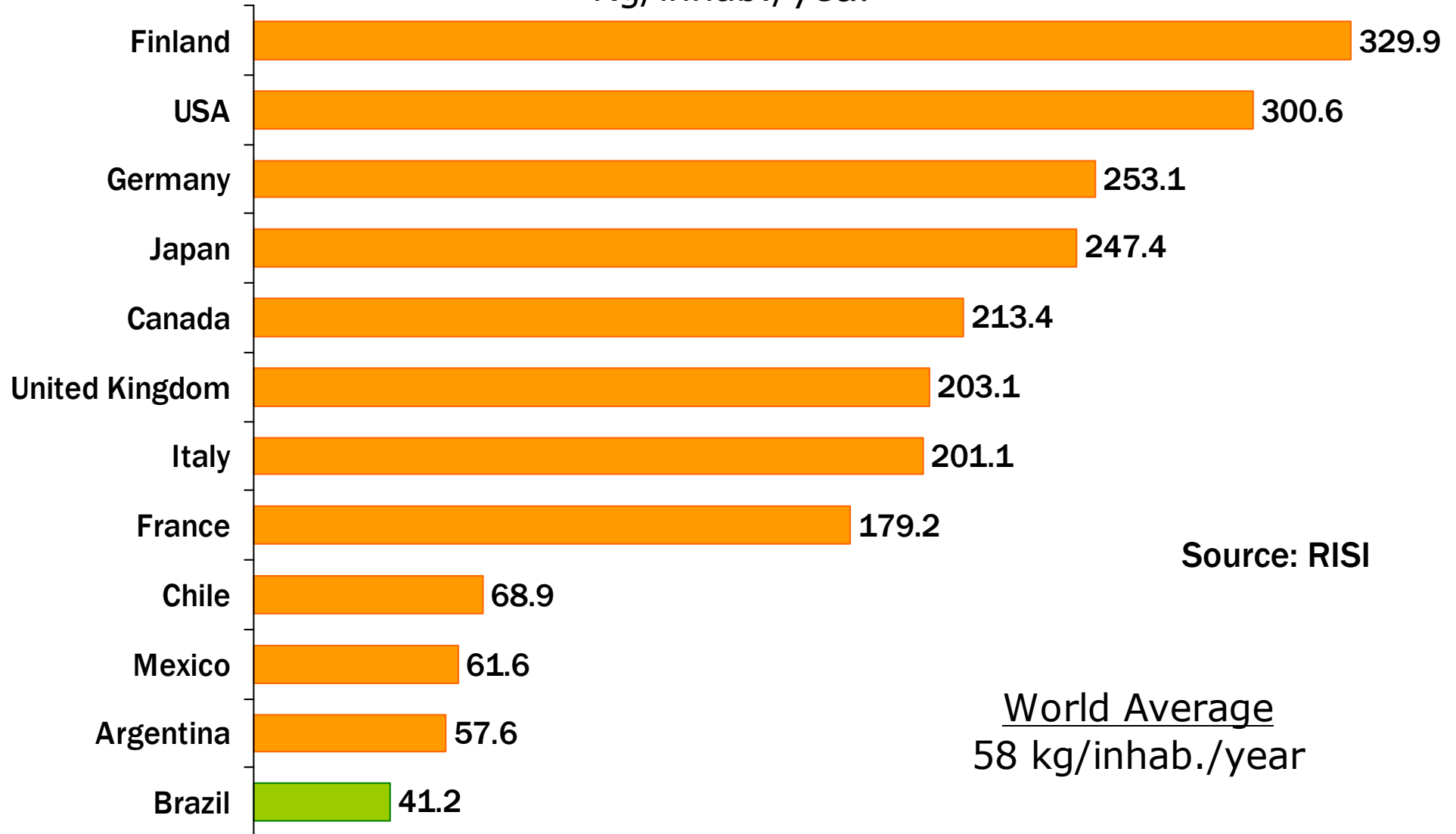
 Paper Apparent Consumption  Recovered Paper Consumption  Recovery Rate %



# Per Capita Paper Consumption

SELECTED COUNTRIES

Kg/inhab./year



Source: RISI

# The Future demands for even more Sustainable Forestry





“As far we love and we need trees and we have the appropriate knowledge, this task will be fulfilled”





One of the issues to be always searched

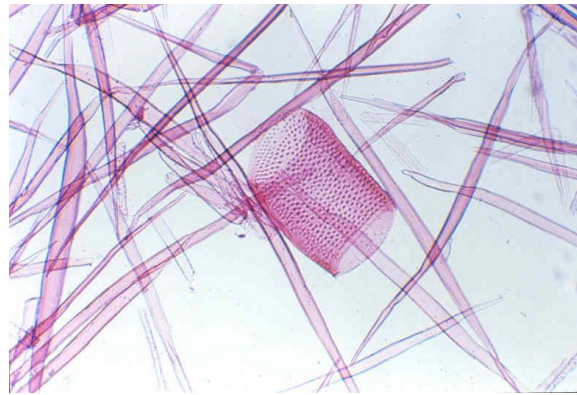


☞ “It is always possible to do anything better than we are doing now.”





# Forest Technologies for High Growth Rates, Excellent Wood Quality and Forest Sustainability







## 1. High quality seedlings





## 2. Minimum impact soil preparation for planting





### 3. Irrigated plantation to guarantee all year operation





## 4. Efficient combat to ants, weeds, and pests & diseases





## 5. Soil nutrition: fertilization and forest residues management



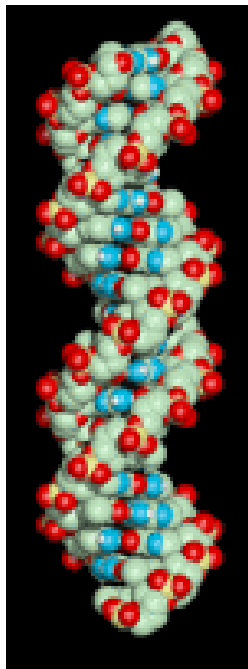


## 6. Soil conservation measures: erosion prevention & water content



## 7. High quality genetic material

**Projeto Genolyptus**  
Mais qualidade e produtividade para o Eucalipto brasileiro



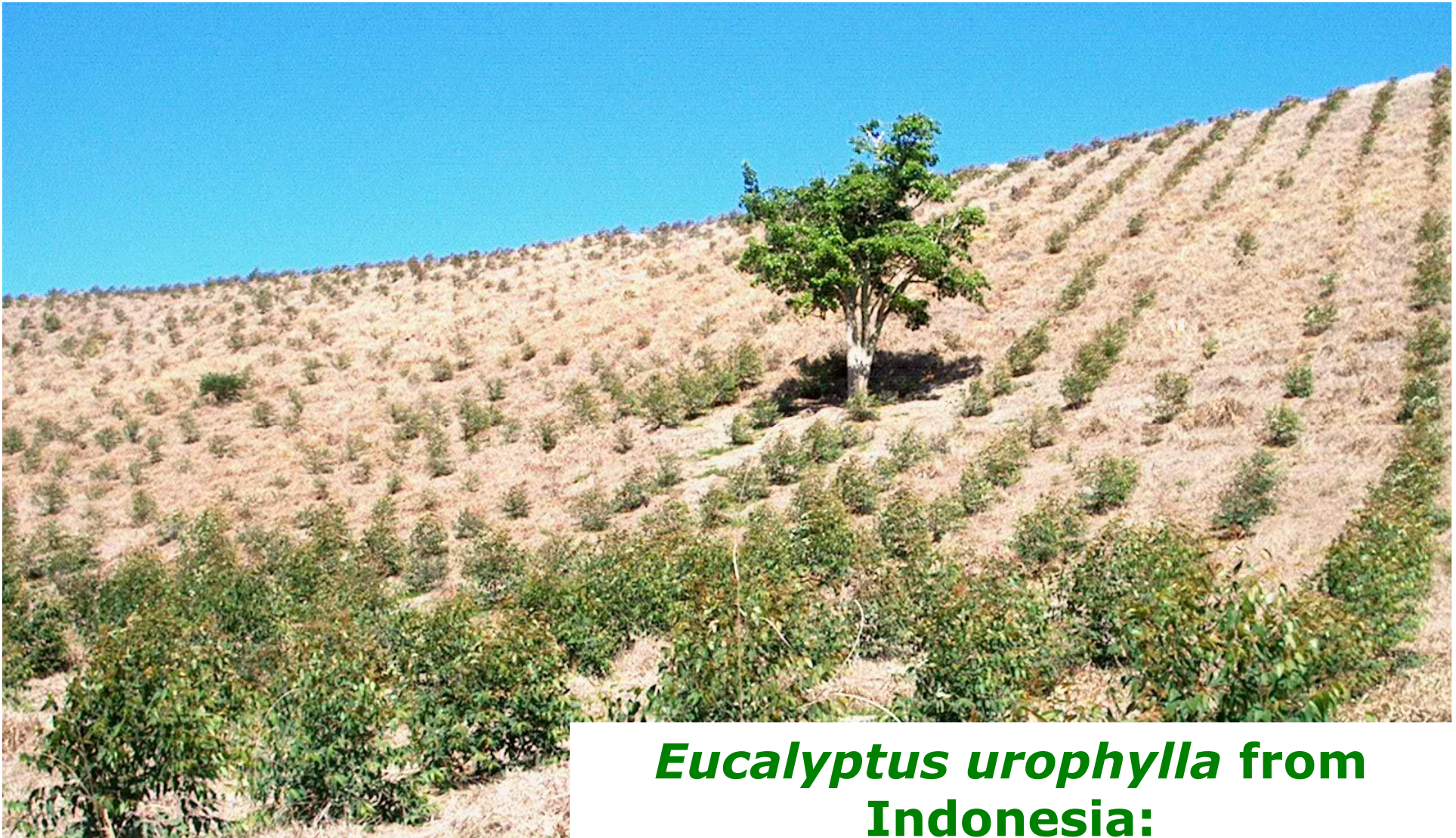


## 8. Hybridization and cloning





**Most of the *Eucalyptus* species in Brazil were sensitive to tropical diseases, as rust and eucalyptus canker**

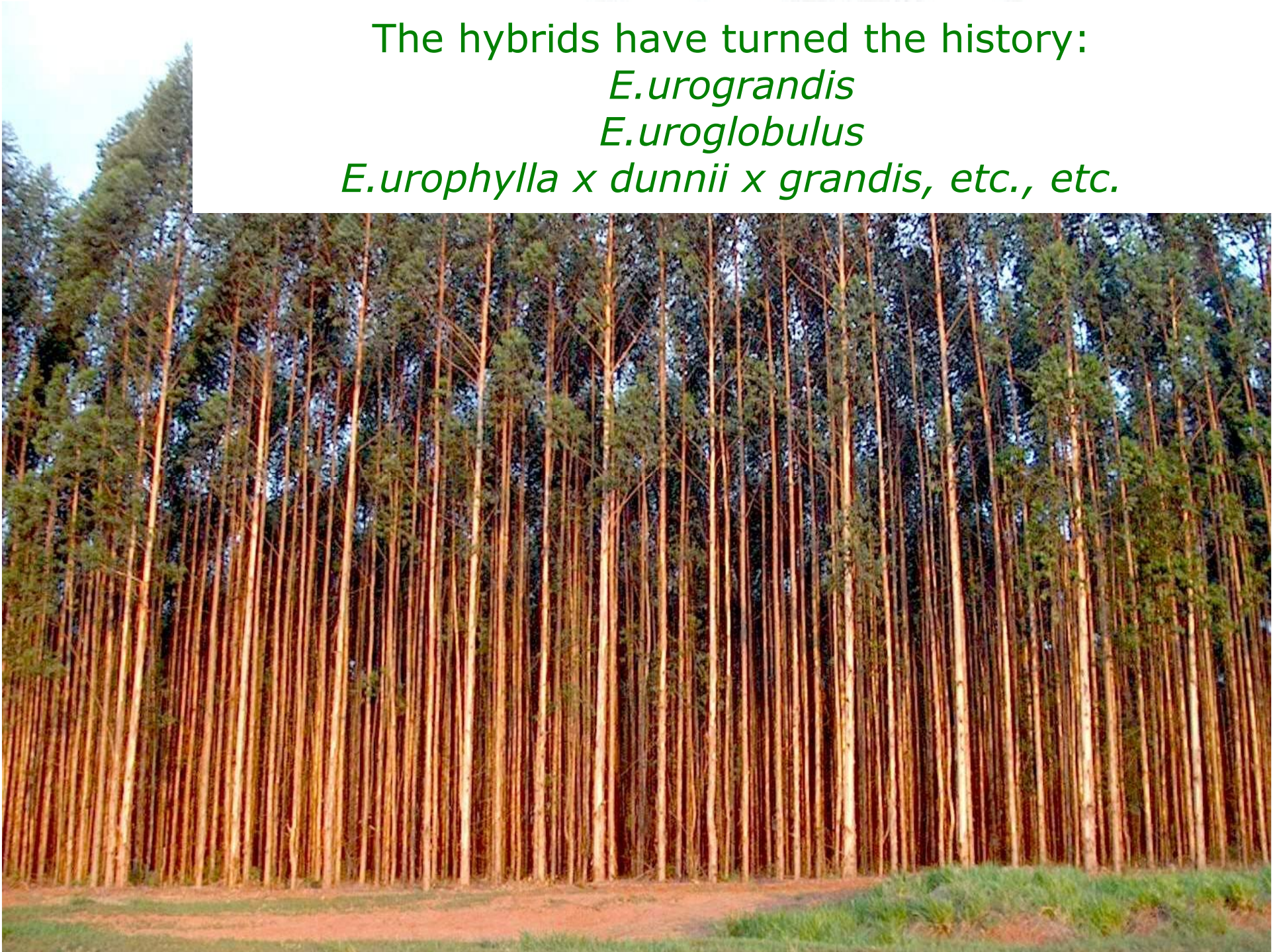


**Hybridization and cloning**

***Eucalyptus urophylla* from Indonesia:  
very healthy, resistant or tolerant to pests and diseases**



The hybrids have turned the history:  
*E.urograndis*  
*E.uroglobulus*  
*E.urophylla x dunnii x grandis, etc., etc.*



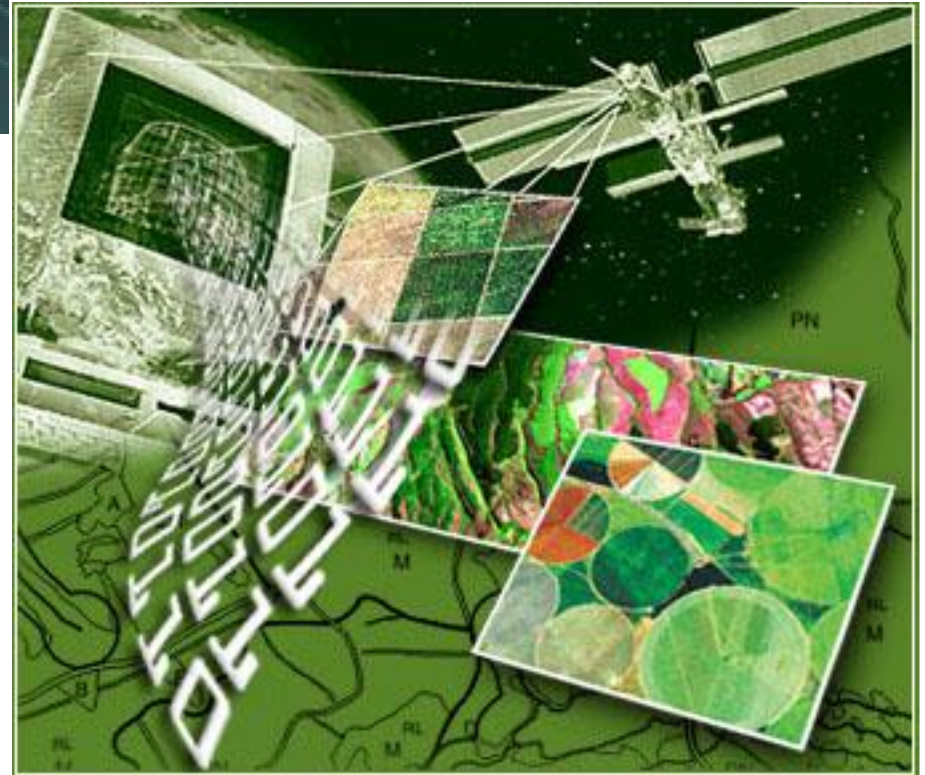
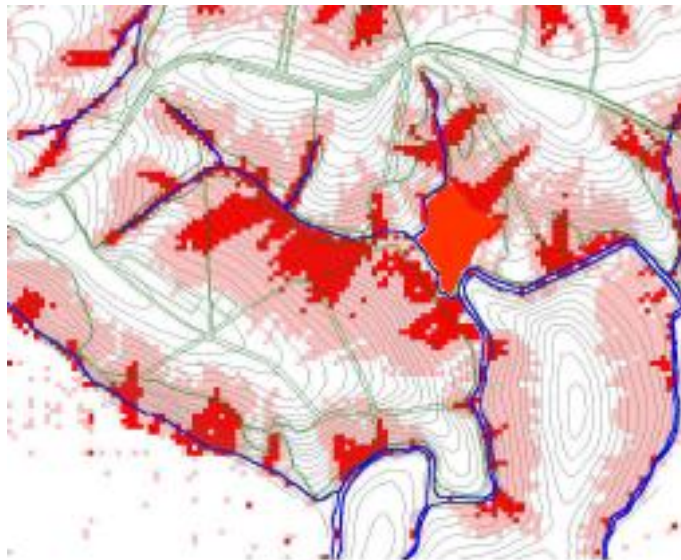
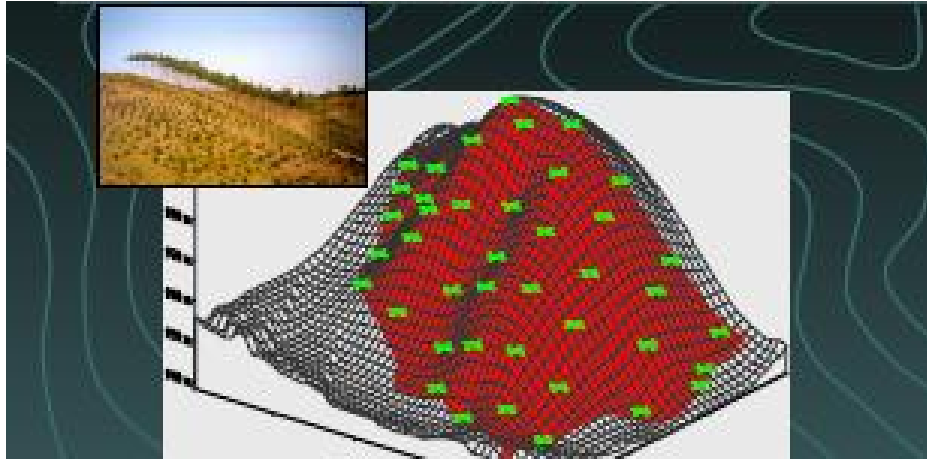


## 9. Mechanized operations and automation



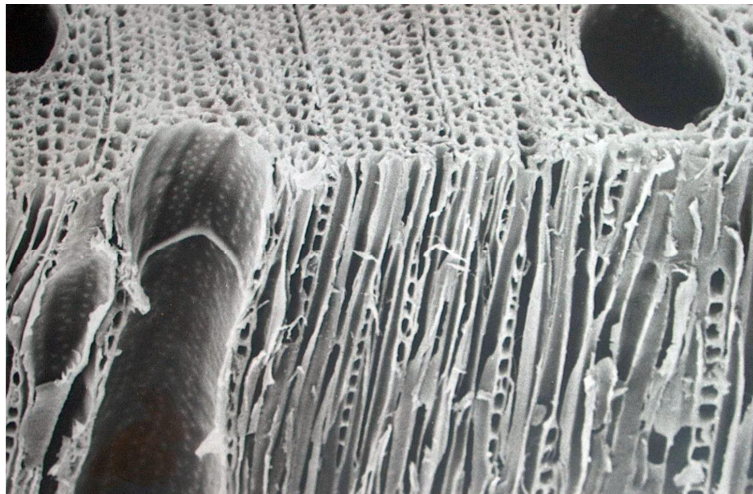


# High tech silviculture





## 10. Tailor-making wood quality



- for pulp manufacturing
- for different paper grades
- for veneer
- for saw timber
- for furniture
- etc





## **11. Silvicultural characteristics for tree selection in forest breeding**

- Individual growth
- Shape of tree, type of branches, canopy
- Resistance to pests and diseases (via inoculation)
- Resistance to herbicides
- Rooting and cloning ability
- Resistance to winds
- Bark content
- Nutrient consumption and efficiency in using them



## **12. Properties for wood selection in tree breeding for pulp and paper production**

- Lignin content and type of lignin
- Extractive content
- Hemicellulose content
- Wood basic density
- Kraft pulp yield and wood specific consumption
- Fiber coarseness and fiber population
- Pulp bleachability
- Pulp strength
- Paper bulk, opacity, porosity, water absorption
- Water retention value, drainability

## 13. Specifications in quality for the the eucalyptus wood and fibers according to end-uses



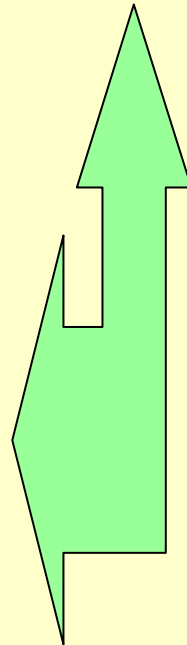
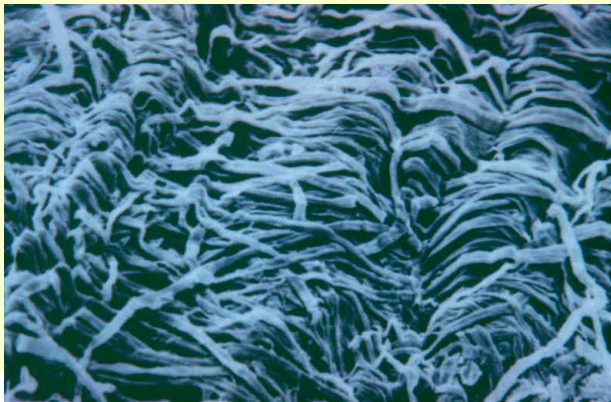
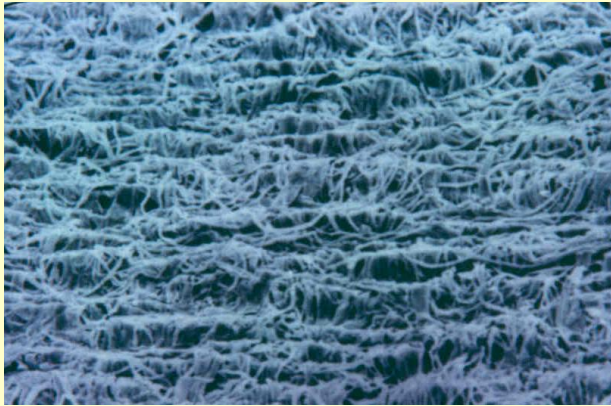
### Tissue & Filter Papers

- higher density wood ( average  $0,55 \text{ g/cm}^3$ )
- higher coarseness fibers ( from 8 to 10 mg/100 m)
- lower fiber population ( average 20 million/g)
- low initial freeness
- high bulk
- high porosity
- high water absorption
- low hemicellulose content ( S-5 lower than 10%)

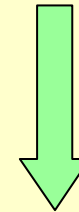


# 13. Specifications in quality for the the eucalyptus wood and fibers according to end-uses

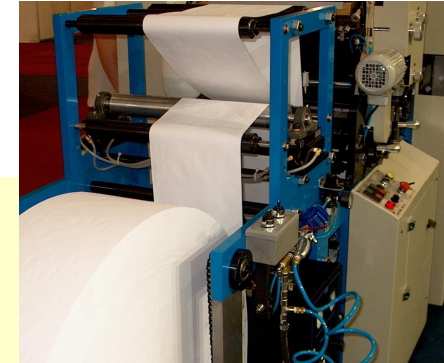
**High quality tissue papers with eucalyptus**



**Poor quality tissue paper**



## 13. Specifications in quality for the the eucalyptus wood and fibers according to end-uses

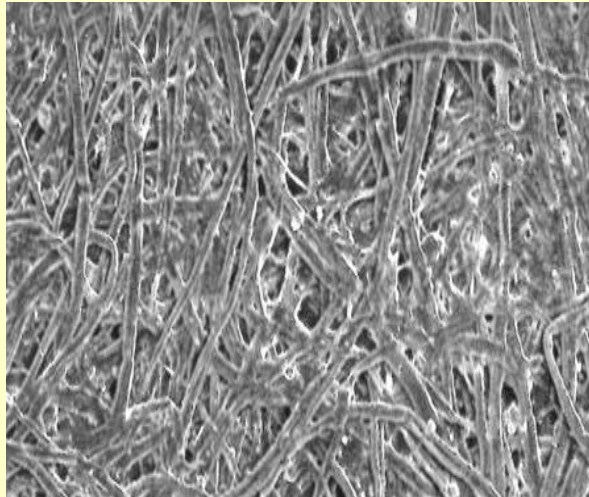


### Printing & Writing Papers

- medium density wood ( $0,48 - 0,52 \text{ g/cm}^3$ )
- lower coarseness fibers ( from 5 to 7 mg/100 m)
- higher fiber population ( average 25 million/g)
- high tear and tensile
- good porosity
- high opacity
- excellent smoothness
- higher hemicellulose content ( S-5 higher than 10%)

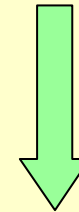
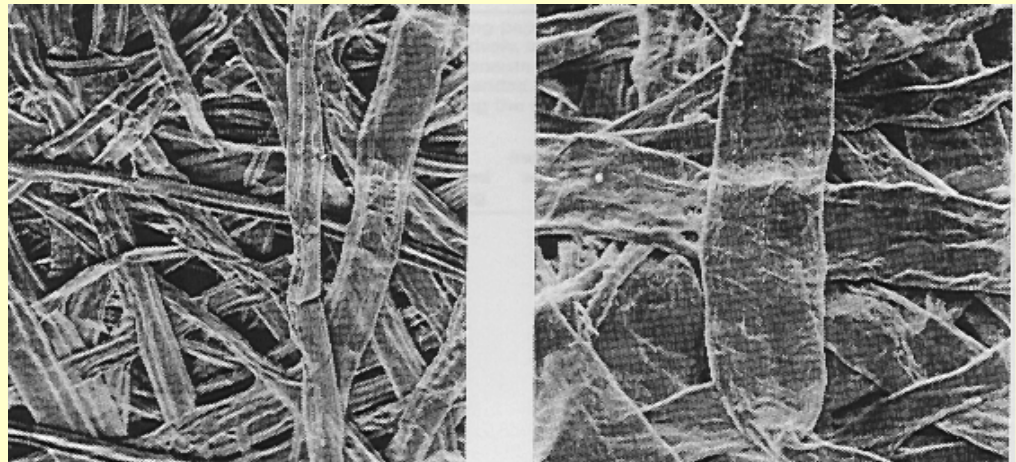
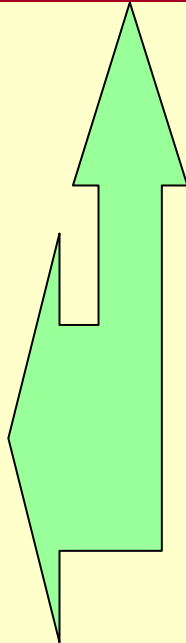
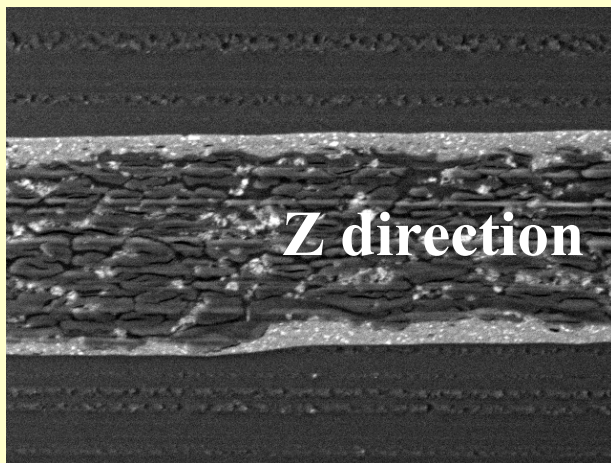


# 13. Specifications in quality for the the eucalyptus wood and fibers according to end-uses



**High quality P&W papers with eucalyptus**

**Long fibered paper**





## Trends



- ➡ The coming forestry age in Brazil will be more concentrated on sustainability and product development and less in improving even further the forest yield and forest costs.
- ➡ Wood costs will not be as low, but the total process quality and eco-efficiency are to compensate this.
- ➡ I'm counting on this...



[www.eucalyptus.com.br](http://www.eucalyptus.com.br)  
[www.celso-foelkel.com.br](http://www.celso-foelkel.com.br)  
[www.abtcp.org.br](http://www.abtcp.org.br)



**This is a wonderful world,  
don't you think so?  
Thanks for your patience...  
...and GOOD LUCK**