ABRAF STATISTICAL YEARBOOK | 2007

BASE YEAR | 2006

ABRAF
Associação Brasileira
de Produtores de
Florestas Plantadas

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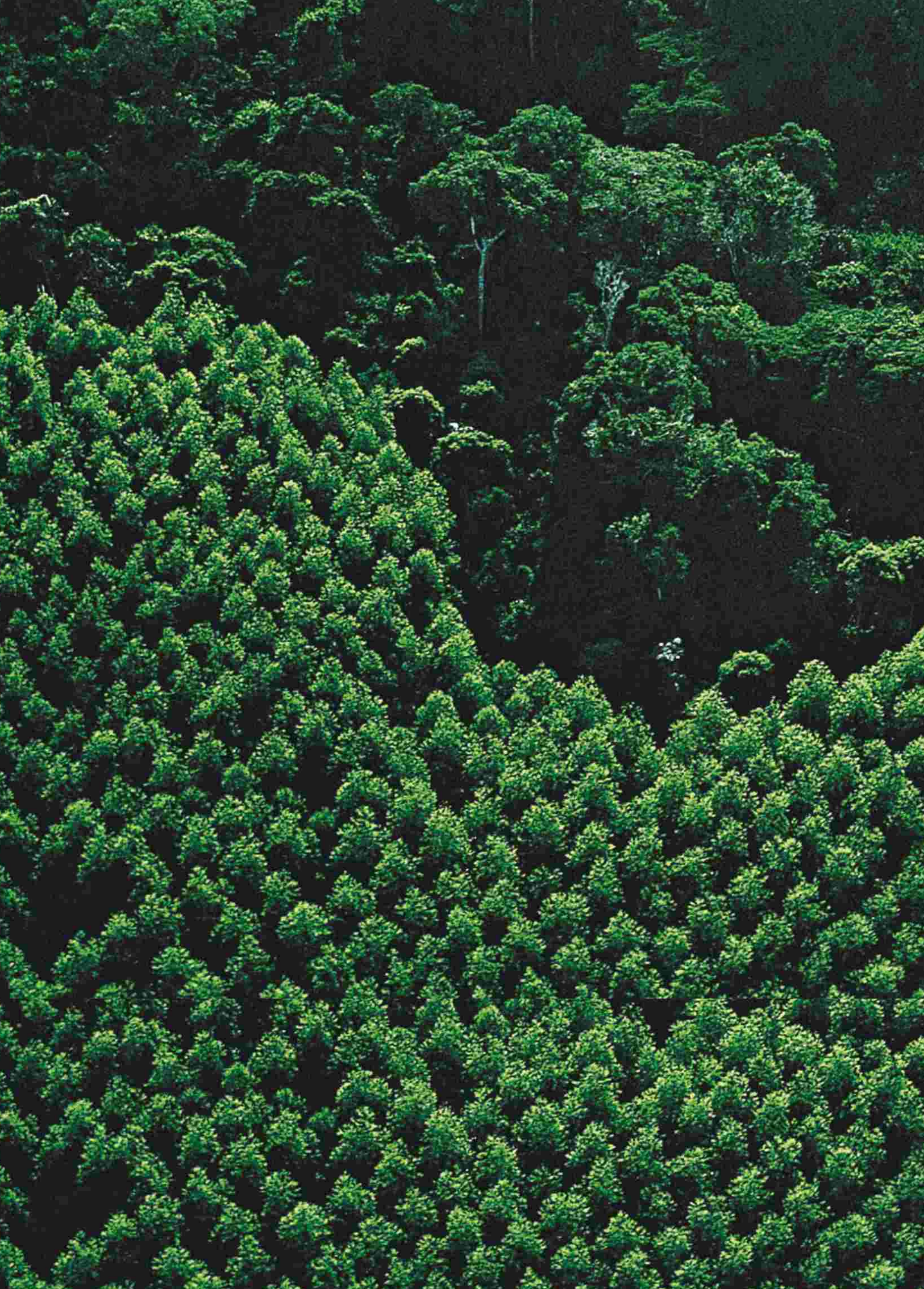

Presentation

By making available the 2007 ABRAF Yearbook (Base Year 2006) to the Brazilian forest sector and other industrial segments of the country as well as to the various sectors of the civil society and government agencies, ABRAF highlights in this 2nd Yearbook the moment of clear expansion of the companies associated to planted forests with eucalypt and pine.

The investments announced by the pulp and paper, reconstituted wood-panels, pig-iron based on charcoal, and solidwood products industries from planted forests for the next year are significant that follow the perspectives of economic growth of the country.

With ongoing investments in new pulpmills in Rio Grande do Sul and Mato Grosso do Sul (the latter also including a new papermill), these states raise as new development clusters of planted forests integrated to wood product manufacturing.

In the segment of reconstituted wood panel segment, the announcements of new MDF plants in the state of São Paulo and Minas Gerais, and new MDP plants in the Southern states, also point out to the growth of forest plantation development in those regions, in line with the growing productivity of the forests associated to those industries.

In the states of Pará and Maranhão, some large existing industrial plants based on planted forest aim at to supply the demand for legally-produced charcoal for the pig-iron cluster of Carajás.

In this scenario of large investments and businesses, the expansion of planted forests in 2006, compared to 2005, reached about 130,000 hectares in new planted areas, in addition to a total area of forest reforms that exceeds 500,000 hectares. This is reinforced by the increasing forest productivity that allows obtaining higher wood volume from a given planted area.

In a moment whose effects of climatic changes take the world to rethink the consumption of energy, under its various forms, from industrial businesses to the daily routine daily of institutions, from families to people, planted forests re-affirm its leading position in the carbon credit market as a feasible alternative for reducing greenhouse gases emission. Furthermore such credits constitute a new tradable product in the financial market, attracting interest of new investors.

With this 2nd issue of its Yearbook, ABRAF makes available data from planted forest in the country for the year 2006, providing its contribution to the forest sector at the beginning of a new and promising cycle of the sector growth.

Brasília, April 17 2007
Carlos Aguiar
ABRAF Chairman

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List of Units

§	Paragraph
%	Percentage
BRL	Brazilian Real (R$)
ha	hectare
m3	Cubic meter
MDC	Cubic meter of charcoal
USD	United States Dollar ($)

List of Abbreviations

ABAF	Forest Plantation Producers Association of Bahia (*Associação de Produtores de Florestas Plantadas do Estado da Bahia*)
ABIMCI	Brazilian Association of Mechanically Processed Timber Industry (*Associação Brasileira da Indústria de Madeira Processada Mecanicamente*)
ABIMÓVEL	Brazilian Association of the Furniture Industry (*Associação Brasileira das Indústrias do Mobiliário*)
ABIPA	Brazilian Association of Wood Panel Industry (*Associação Brasileira da Indústria de Painéis de Madeira*)
ABRAF	Brazilian Association of Forest Plantation Producers (*AssociaçãoBrasileira de Produtores de Florestas Plantadas*)
ACR	Forest Companies Association of Santa Catarina (*Associação Catarinense de Empresas Florestais*)
AGEFLOR	Forest Companies Association of Rio Grande do Sul (*Associação Gaúcha de Empresas Florestais*)
AMS	Silviculture Association of Minas Gerais (*Associação Mineira de Silvicultura*)
APP	Permanent Preservation Area (*Área de Preservação Permanente*)
APRE	Forest Companies Association of Paraná (*Associação Paranaense de Empresas Florestais*)
AREFLORESTA	Forest Plantation Producers Association of Mato Grosso (*Associação dos Reflorestadores do Estado de Mato Grosso*)
ASICA	Pig-Iron Producers Association of Carajás (*Associação dos Produtores de Ferro Gusa do Carajás*)
ASIFLOR	Metallurgical Plants Association for Forestal Fomentation (*Associação das Siderurgias para o Fomento Florestal*)
BASA	*Banco da Amazônia*
BB	*Banco do Brasil*
BNB	*Banco do Nordeste do Brasil*
BNDES	National Economic and Social Development Bank (*Banco Nacional de Desenvolvimento Econômico e Social*)
BRACELPA	Brazilian Pulp and Paper Association (*Associação Brasileira de Celulose e Papel*)
CEPA	Institute of Harvest and Market Study Center (*Centro de Estudos de Safras e Mercados - Santa Catarina*)
CEPEA	Center for Advanced Studies on Applied Economics (*Centro de Estudos Avançados em Economia Aplicada - USP*)
CEPEF	Center for Forestry Studies and Research - Federal University of Santa Maria (*Centro de Pesquisas Florestais - UFSM*)
CERFLOR	Brazilian Program of Forest Certification (*Certificado Nacional de Qualidade Ambiental de Florestas*)
CNA	Brazilian Agricultural and Animal Farming Confederation (*Confederação da Agricultura e Pecuária do Brasil*)
CNI	National Confederation for Industry (*Confederação Nacional da Indústria*)
COFINS	Tax for Social Security Financing (*Contribuição para o Financiamento da Seguridade Social*)
CPMF	Temporary Federal Tax on Financial Movement (*Contribuição Provisória sobre Movimentação Financeira*)
CSO	Clonal Seed Orchard
EAP	Economically Active Population
EMATER-MG	Technical Assistance and Rural Extension Company of Minas Gerais

List of Acronyms

EMBRAPA	Brazilian Agricultural Research Corporation (*Empresa Brasileira de Pesquisa e Agropecuária*)
EPAGRI	State Agricultural Research and Extension Organization (*Empresa de Pesquisa Agropecuária e Extensão Rural - Santa Catarina*)
ESALQ	Luiz de Queiroz College of Agriculture (*Escola Superior de Agricultura - USP*)
FAO	Food and Agriculture Organization of the United Nations
FCO	Constitutional Fund for Financing of the West Central (*Fundo Constitucional de Financiamento do Centro-Oeste*)
FJP	João Pinheiro Foundation (*Fundação João Pinheiro*)
FNE	Constitutional Fund for Financing of the Northeast (*Fundo Constitucional de Financiamento do Nordeste*)
FNO	Constitutional Fund for Financing of the North (*Fundo Constitucional de Financiamento do Norte*)
FSC	Forest Stewardship Council
FUPEF	Forest Research Foundation of Paraná (*Fundação de Pesquisa Florestal do Paraná of the Federal University of Paraná UFPR*)
GPV	Gross Product Value
HDI	Human Development Index
IAP	Environmental Institute of Paraná (*Instituto Ambiental do Paraná*)
IBAMA	Brazilian Institute for the Environment and the Natural Renewable Resources (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis*)
IBGE	Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística*)
IBPT	Brazilian Institute of Tax and Corporate (*Instituto Brasileiro de Planejamento Tributário*)
ICMS	Tax on Sales and Services (*Imposto sobre Circulação de Mercadorias e Serviços*)
IEF	State Forestry Institute of Minas Gerais (*Instituto Estadual de Florestas - Minas Gerais*)
INCAPER	Research, Technical Assistance and Rural Extension Institute of Espírito Santo (*Instituto Capixaba de Pesquisa, Assistência Técnica e Extensão Rural*)
IOF	Federal Tax on Financial Transactions (*Imposto sobre Operações Financeiras*)
IPEF	Forestry Science and Research Institute (*Instituto de Pesquisas e Estudos Florestais - ESALQ*)
IRPJ	Corporate Income Tax (*Imposto de Renda de Pessoa Jurídica*)
ISS	Municipal Service Tax (*Imposto Sobre Serviços de Qualquer Natureza*)
ITR	Federal Rural Property Tax (*Imposto sobre a Propriedade Territorial Rural*)
ITTO	International Tropical Timber Organization
LAE	Quick Aerial Surveys (*Levantamento Aéreo Expedito*)
MAI	Mean Annual Increment
MAPA	Ministry of Agriculture, Livestock and Supply (*Ministério da Agricultura, Pecuária e Abastecimento*)
MDA	Ministry of Agrarian Development (*Ministério do Desenvolvimento Agrário*)
MDF	Medium Density Fiberboard
MDIC	Ministry of Development, Industry and Trade (*Ministério do Desenvolvimento, Indústria e Comércio Exterior*)
MDP	Medium Density Particleboard
MIN	Ministry of National Integration (*Ministério da Integração Nacional*)
MMA	Ministry of the Environment (*Ministério do Meio Ambiente*)
MTE	Ministry of Labor and Employment (*Ministério do Trabalho e do Emprego*)
NCM	Common Mercosur Standards (*Normas Comum do Mercosul*)
NGO	Non-Governmental Organizations

NWFP	Non-Wood Forest Product
OSB	Oriented Strand Board
PASEP	Public Servant Fund (*Programa de Formação do Patrimônio do Servidor Público*)
PIS	Contribution for the Social Integration Program (*Programa de Integração Social*)
PNUD (UNDP)	United Nations Development Program (*Programa das Nações Unidas para o Desenvolvimento – PNUD*)
PRONAF	National Agricultural Family Strengthening Program (*Programa Nacional de Fortalecimento da Agricultura Familiar*)
PROPFLORA	Commercial Plantation and Forest Recovery Program (*Programa de Plantio Comercial e Recuperação de Florestas*)
RL	Legal Reserve (*Reserva Legal*)
RPPN	Private Reserve of Natural Protection (*Reserva Particular de Patrimônio Natural*)
SEAB-PR	Secretary of Agriculture and Supply of Paraná (*Secretaria da Agricultura e do Abastecimento do Paraná*)
SEBRAE	Brazilian Micro and Small Business Support Service (*Serviço Brasileiro de Apoio às Micro e Pequenas Empresas*)
SECEX	Secretary of Foreign Trade (*Secretaria do Comércio Exterior*)
SERFLOR	System of Mandatory Forest Plantation of State of Paraná (*Sistema Estadual de Reposição Obrigatória -Paraná*)
SESI	Industry Social Service (*Serviço Social da Indústria*)
SFM	Sustainable Forest Management
SIDRA	IBGE Automatic Retrieval System (*Sistema IBGE de Recuperação Automática*)
SIF	Society for Forestry Investigation - Federal University of Viçosa (*Sociedade de Investigações Florestais - UFV*)
SINDIFER	State of Minas Gerais Class Association of Iron Industry (*Sindicato da Indústria do Ferro no Estado de Minas Gerais*)
UFLA	Federal University of Lavras (*Universidade Federal de Lavras*)
UFPR	Federal University of Paraná (*Universidade Federal do Paraná*)
UFSM	Federal University of Santa Maria (*Universidade Federal de Santa Maria*)
UFV	Federal University of Viçosa (*Universidade Federal de Viçosa*)
USP	University of São Paulo (*Universidade de São Paulo*)

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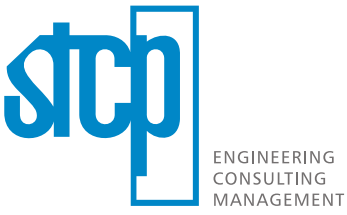
ACR – Forest Companies Association of Santa Catarina *(Associação Catarinense de Empresas Florestais)*
www.acr.org.br
AGEFLOR – Forest Companies Association of Rio Grande do Sul *(Associação Gaúcha de Empresas Florestais)*
www.ageflor.com.br
AMS – Silviculture Association of Minas Gerais *(Associação Mineira de Silvicultura)*
www.silviminas.com.br
APRE – Forest Companies Association of Paraná *(Associação Paranaense de Empresas de Base Florestal)*
FLORESTAR SÃO PAULO
www.floresta.org.br
REFLORE MS – Planted Forest Consumers and Producers Association of Mato Grosso do Sul *(Associação Sul Matogrossense de Produtores e Consumidores de Florestas Plantadas)*
www.reflore.com.br



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ABRAF STATISTICAL YEARBOOK | 2007 - BASE YEAR 2006

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Florestas Plantadas

Chapter 1

Forest Plantations in Brazil

Planted Forests with Other Species
Forest Plantations with Eucalypt and Pine
Planted Forests vs. Natural Forests

1| Forest Plantations in Brazil

1.1 | Forest Plantations with Eucalypt and Pine

The total area with planted forests in Brazil, for eucalypt and pines, reached 5,373,417 ha in 2006, representing a growth of slightly over 131,000 compared to 2005, as demonstrated in tables 1.01, 1.02 and 1.03. Such growth refers to the balance between the area with forest planting and harvesting in 2006, for the species under consideration.

Expansion of new planted areas with eucalypt and pine and the increasing forest productivity from the existing forests, obtained by investments in R&D in reference national research centres, reflect the attractiveness of plantation with both species. Such plantation sustains the large expansion of investments announced in 2006 for the planted wood-based companies of the pulp and paper, reconstituted wood-panels and pig-iron based on charcoal.

Table 1.01 | Planted Forests with Pine and Eucalypt in Brazil - 2005 and 2006

State	Pine (ha)		Eucalypt (ha)		TOTAL (ha)	
	2005	2006	2005	2006	2005	2006
MG	153,000	152,000	1,063,744	1,083,744	1,216,744	1,235,744
SP	148,020	146,474	798,522	816,880	946,542	963,354
PR	677,772	686,453	114,996	121,908	792,768	808,361
SC	527,079	530,992	61,166	70,341	588,245	601,333
BA	54,746	54,820	527,386	540,172	582,132	594,992
RS	185,080	181,378	179,690	184,245	364,770	365,623
ES	4,898	4,408	204,035	207,800	208,933	212,208
MS	38,909	28,500	113,432	119,319	152,341	147,819
PA	149	149	106,033	115,806	106,182	115,955
MA	0	0	60,745	93,285	60,745	93,285
AP	27,841	20,490	60,087	58,473	87,929	78,963
GO	13,330	14,409	47,542	49,637	60,872	64,045
MT	43	7	42,417	46,146	42,460	46,153
Others	3,703	4,189	27,409	41,392	31,112	45,582
TOTAL	**1,834,570**	**1,824,269**	**3,407,204**	**3,549,148**	**5,241,775**	**5,373,417**

Source | ABRAF and STCP 2006

Table 1.02 | Forests Plantation with Pine and Eucalyptus in Brazil by State in 2006 (ha)[1]

State	TOTAL Forest Plantations – Brazil				ABRAF Member Companies [2]				Non-members of ABRAF			
	Pine	Eucalypt	TOTAL	%	Pine	Eucalypt	TOTAL	%	Pine	Eucalypt	TOTAL	%
MG	152,000	1,083,744	1,235,744	23.0	101,243	906,338	1,007,581	29.5	50,757	177,406	228,163	11.7
SP	146,474	816,880	963,354	17.9	14,873	452,951	467,824	13.7	131,601	363,929	495,530	25.4
PR	686,453	121,908	808,361	15.0	462,839	78,141	540,980	15.8	223,614	43,767	267,381	13.7
SC	530,992	70,341	601,333	11.2	288,482	23,654	312,136	9.1	242,510	46,687	289,197	14.8
BA	54,820	540,172	594,992	11.1	2,323	461,580	463,903	13.6	52,498	78,592	131,090	6.7
RS	181,378	184,245	365,623	6.8	7,069	219,052	226,121	6.6	174,309	-34,807	139,502	7.1
ES	4,408	207,800	212,208	3.9	0	171,405	171,405	5.0	4,408	36,395	40,803	2.1
MS	28,500	119,319	147,819	2.8	7,028	95,583	102,611	3.0	21,472	23,736	45,208	2.3
PA	149	115,806	115,955	2.2	149	50,404	50,553	1.5	1	65,401	65,402	3.3
MA	0	93,285	93,285	1.7	0	1,187	1,187	0.0	0	92,098	92,098	4.7
AP	20,490	58,473	78,963	1.5	15,295	55,853	71,148	2.1	5,195	2,620	7,816	0.4
GO	14,409	49,637	64,045	1.2	0	603	603	0.0	14,409	49,034	63,442	3.2
MT	7	46,146	46,153	0.9	0	1,500	1,500	0.0	7	44,646	44,653	2.3
Others	4,189	41,392	45,582	0.8	0	1,961	1,961	0.1	4,189	39,431	43,620	2.2
TOTAL	**1,824,270**	**3,549,147**	**5,373,417**	**100**	**899,301**	**2,520,212**	**3,409,513**	**100**	**924,969**	**1,028,935**	**1,953,904**	**100**

Source | ABRAF member companies; STCP, 2006

[1]Forest plantation areas came from data compiled from different sources as described in the Methodological Notes (Chapter 5)

[2]ABRAF Member Companies and ABRAF Collective Forest Associations' companies (see section ABRAF – Structure and Members)

Table 1.03 | Forest Plantation by ABRAF Member Companies and ABRAF Collective Forest Association's Companies in 2006 (ha)[1]

State	ABRAF Member Companies[2]				ABRAF Collective Forest Associations[3]				ABRAF TOTAL			
	Pine	Eucalypt	TOTAL	%	Pine	Eucalypt	TOTAL	%	Pine	Eucalypt	TOTAL	%
MG	25,486	667,140	692,625	28.6	75,758	239,198	314,956	31.5	101,243	906,338	1,007,581	29.5
SP	14,556	449,423	463,979	19.2	317	3,528	3,845	0.4	14,873	452,951	467,824	13.7
PR	141,793	70,298	212,091	8.8	321,046	7,843	328,889	32.9	462,839	78,141	540,980	15.8
SC	125,328	8,054	133,382	5.5	163,154	15,600	178,754	17.9	288,482	23,654	312,136	9.1
BA	2,323	441,373	443,695	18.3	0	20,207	20,207	2.0	2,323	461,580	463,903	13.6
RS	99	137,855	137,954	5.7	6,970	81,197	88,167	8.8	7,069	219,052	226,121	6.6
ES	0	170,486	170,486	7.0	0	919	919	0.1	0	171,405	171,405	5.0
MS	7,028	95,583	102,611	4.2	0	0	0	0.0	7,028	95,583	102,611	3.0
AP	15,295	44,379	59,674	2.5	0	11.474	11.474	1.1	15,295	55,853	71,148	2.1
GO	0	0	0	0.0	0	603	603	0.1	0	603	603	0.0
MA	0	1,187	1,187	0.0	0	0	0	0.0	0	1,187	1,187	0.0
MT	0	0	0	0.0	0	1.500	1.500	0.2	0	1,500	1,500	0.0
PI	0	0	0	0.0	0	100	100	0.0	0	100	100	0.0
PA	0	0	0	0.0	149	50.404	50.553	5.1	149	50,404	50,553	1.5
Outros	0	1,861	1,861	0.1	0	0	0	0.0	0	1,861	1,861	0.1
TOTAL	**331,907**	**2,087,638**	**2,419,545**	**100.0**	**567.394**	**432.574**	**999.968**	**100.0**	**899,301**	**2,520,212**	**3,419,513**	**100.0**

Source | ABRAF Member Companies; STCP, 2006

[1]Forest plantation areas came from data compiled from different sources as described in the Methodological Notes (Chapter 5)

[2]Only the 24 ABRAF Member Companies

[3]ABRAF Collective Forest Association's Companies

The conversion of land (being used for various cultivation) into forest plantations has become an attractive economic alternative in some regions of the country.

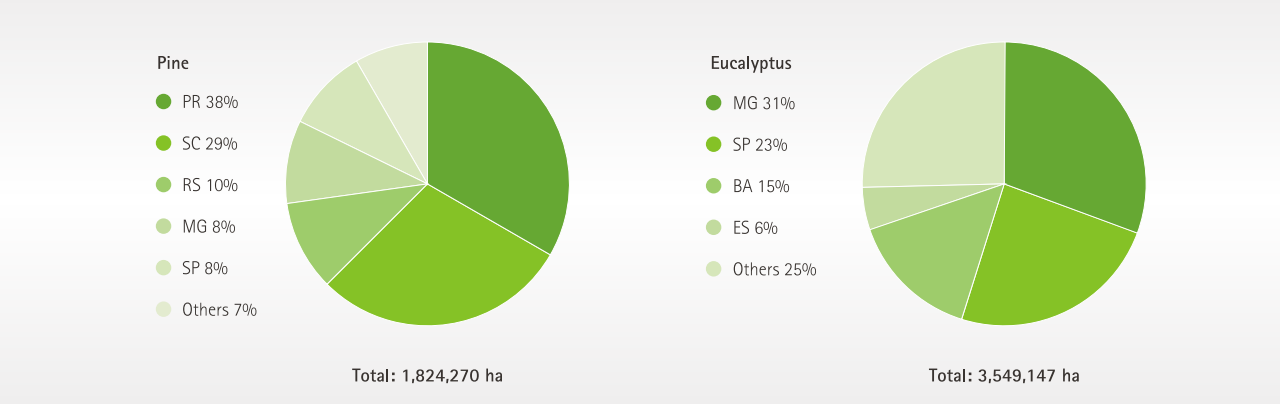
For instance, the state of Rio Grande do Sul that has historically concentrated its economic activity in annual crops, has started a large eucalypt plantation program aiming at future wood supply for manufacturing wood pulp, and possible strengthening of the forest products industry in the state.

A similar situation has been observed in the states of Bahia, Mato Grosso do Sul, Maranhão, Pará and Piauí. In the state of Minas Gerais traditional pastureland, mainly degraded areas, and some traditional coffee growing areas have been replaced by eucalypt plantations.

In 2006, Brazil had a total forest plantation area of about 5.4 million hectares with pine and eucalypt, concentrated mainly in the States of Minas Gerais, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul, and Bahia (see tables 1.02 and 1.03).

The state of Minas Gerais has the largest planted forest area, estimated at nearly 1.24 million hectares (out of which 12.3% with pine and 87.7% with eucalypt). It is followed by São Paulo, Paraná, Santa Catarina and Bahia, respectively with 963,000 ha, 808,000 ha, 601,000 ha, and 595,000 ha, according to data from graph 1.01.

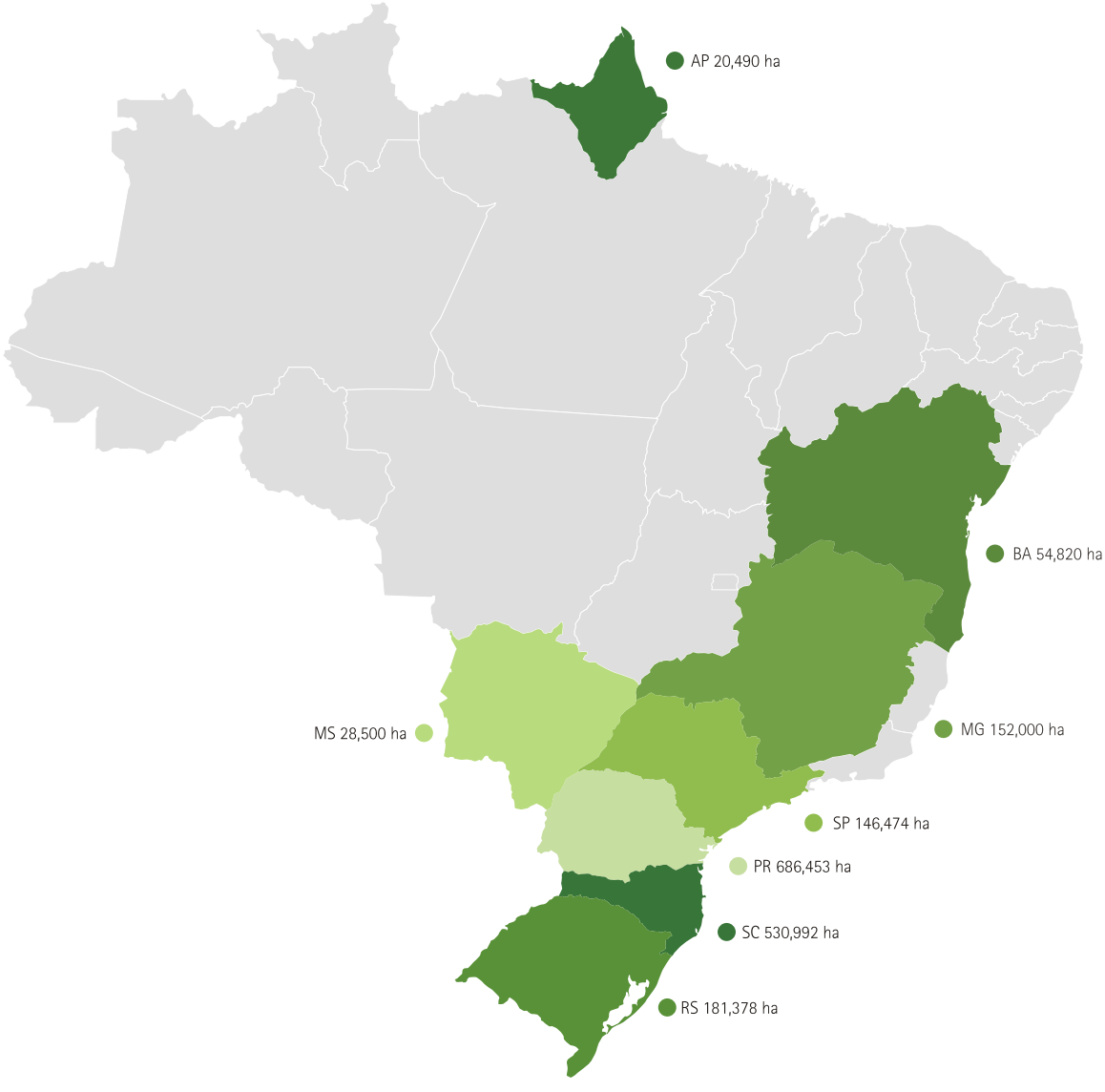
Graph 1.01 | Distribution of Pine and Eucalyptus Plantations in Brazil by State in 2006



Source | ABRAF; STCP, 2006

The geographic distribution of forest plantations in Brazil in 2006 can be observed in figures 1.01, 1.02 and 1.03 respectively for pine, eucalypt and total plantation.

Figure 1.01 | Area and Distribution of Planted Forests with Pine in Brazil (2006)

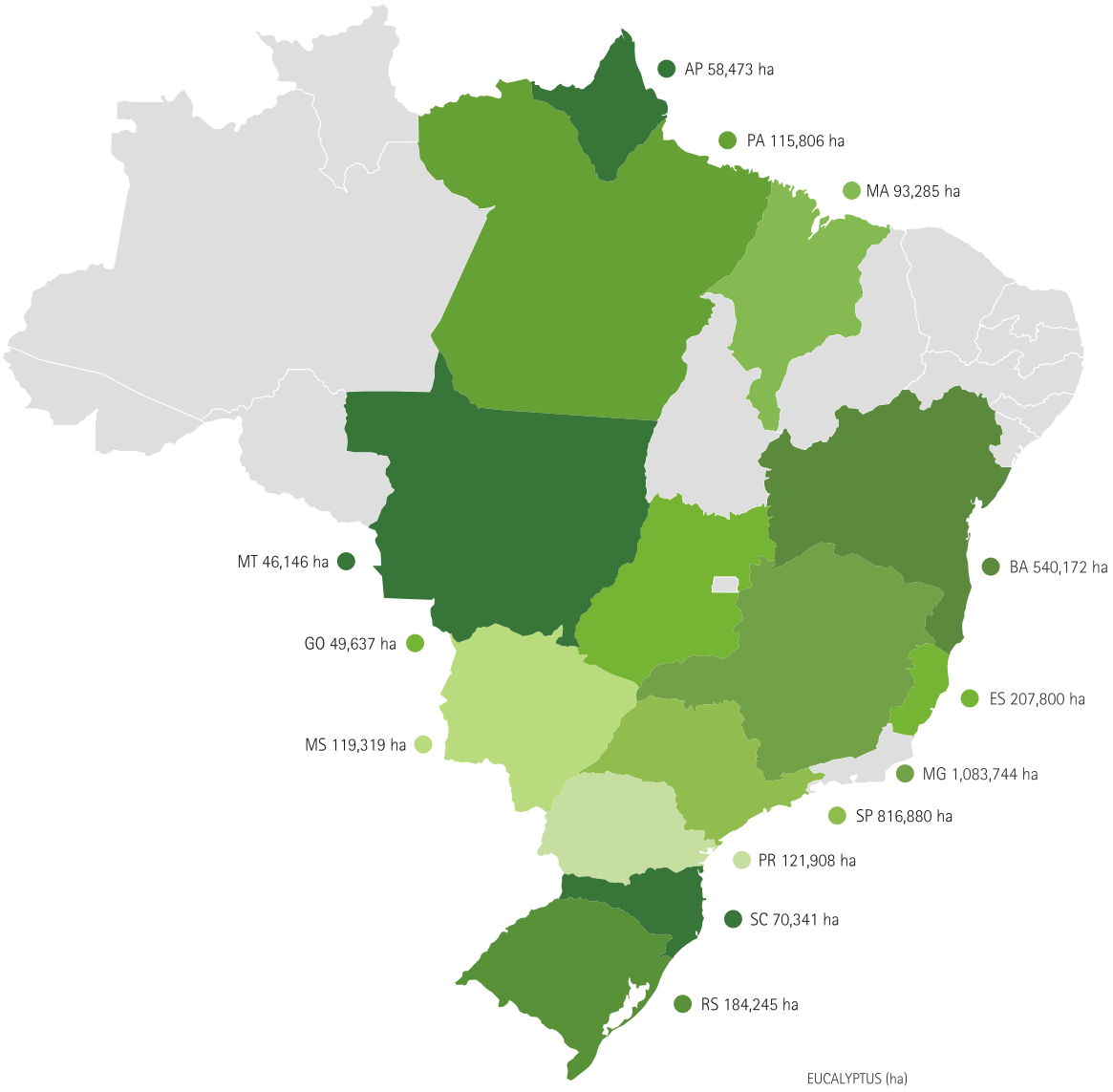


PINE (ha)

STATE	2005	2006
Paraná	677,772	686,453
Santa Catarina	527,079	530,992
Rio Grande do Sul	185,080	181,378
Minas Gerais	153,000	152,000
São Paulo	148,020	146,474
Bahia	54,746	54,820
Mato Grosso do Sul	38,909	28,500
Amapá	27,841	20,490
Others	22,123	23,162
TOTAL	**1,834,569**	**1,824,270**

Source | Various; Adapted by STCP (see Methodological Notes, section 5.1)

Figure 1.02 | Area and Distribution of Planted Forests with Eucalyptus in Brazil (2006)

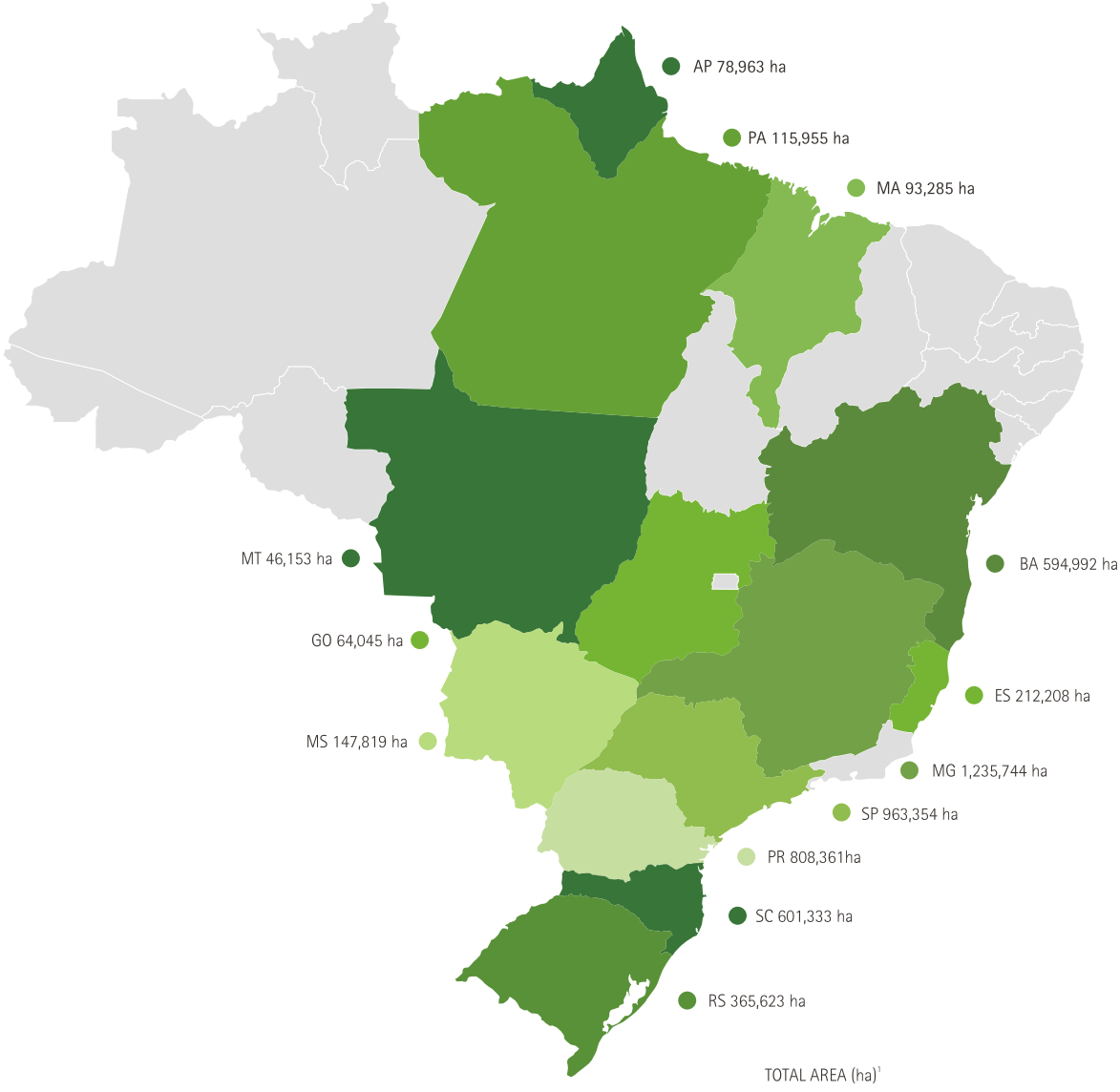


EUCALYPTUS (ha)

STATE	2005	2006
Minas Gerais	1,063,744	1,083,744
São Paulo	798,522	816,880
Bahia	527,386	540,172
Espírito Santo	204,035	207,800
Rio Grande do Sul	179,690	184,245
Paraná	114,996	121,908
Mato Grosso do Sul	113,432	119,319
Pará	106,033	115,806
Santa Catarina	61,166	70,341
Maranhão	60,745	93,285
Amapá	60,087	58,473
Goiás	47,542	49,637
Mato Grosso	42,417	46,146
Others	27,409	41,392
TOTAL	**3,407,205**	**3,549,147**

Source | Various; Adapted by STCP (see Methodological Notes, section 5.1)

Figure 1.03 | Area and Distribution of Total Planted Forests in Brazil (2006)



TOTAL AREA (ha)[1]

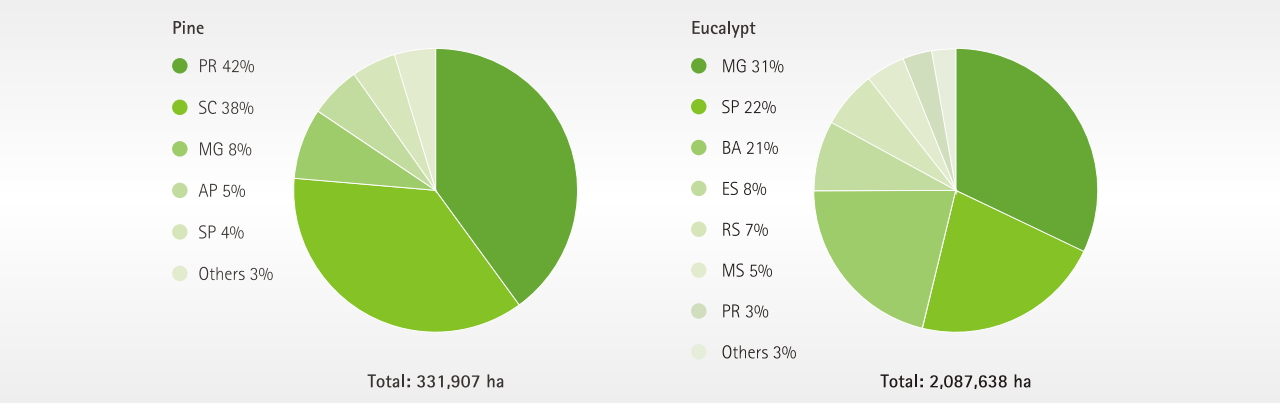
STATE	2005	2006
Minas Gerais	1,216,744	1,235,744
São Paulo	946,542	963,354
Paraná	792,768	808,361
Santa Catarina	588,245	601,333
Bahia	582,132	594,992
Rio Grande do Sul	364,770	365,623
Espírito Santo	208,933	212,208
Mato Grosso do Sul	152,341	147,819
Pará	106,182	115,955
Maranhão	60,745	93,285
Amapá	87,929	78,963
Goiás	60,872	64,045
Mato Grosso	42,460	46,153
Others	31,112	45,582
TOTAL	**5,241,775**	**5,373,417**

Source | Various; Adapted by STCP (see Methodological Notes, section 5.1)
[1] Pine and Eucalyptus

Pine plantations concentrate mainly in Southern Brazil especially in the states of Paraná, Santa Catarina and Rio Grande do Sul, corresponding to 34% of the total pine and eucalypt forests in Brazil. Plantation with Eucalyptus represents 66% of the total forest plantation area (with pine and eucalypt) and is concentrated in the states of Minas Gerais, São Paulo, and Bahia.

Graph 1.02 shows the distribution of planted area with pine and eucalypt among ABRAF member companies in the major forest producing Brazilian states in 2006.

Graph 1.02 | Distribution of Pine and Eucalyptus Plantation Area Among ABRAF Member Companies by State in 2006



Source | ABRAF Member Companies; STCP, 2006

The increasing demand for wooden raw-material among industrial segments has strengthened the importance of investment in forest plantations.

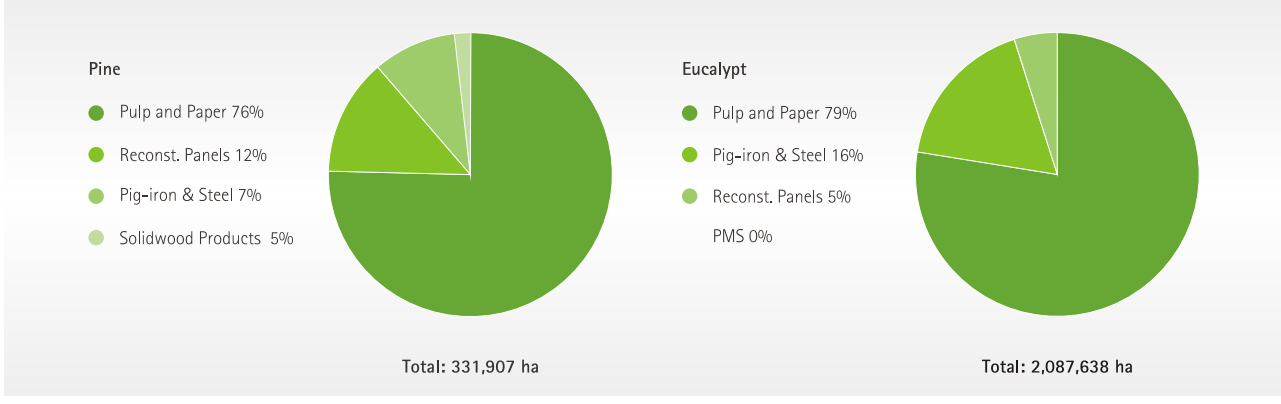
Reflecting such scenario, ABRAF member companies and ABRAF collective forest association's companies have 3,419,513 hectares with pine and eucalypt forests that correspond to 63.6% of the total planted forests with these species in Brazil.

Out of this total, 73.7% of the planted forests are eucalypt, while 26.3% are pine plantation. In other words, comparatively to the total plantation in the country, ABRAF member companies and those linked to ABRAF collective forest associations respond respectively for 45.0% and 18.6%.

As for the classification of forest plantations by type of property among ABRAF member companies, the option for plantation in own areas decreased from 2005 to 2006 in the states of Amapá, Minas Gerais, and São Paulo. While in Amapá the alternatives of investment remained unchanged, in Minas Gerais the alternatives of forest outgrowing and land lease grew significantly.

The states of the Espírito Santo, Bahia, Mato Grosso of Sul, and Rio Grande Do Sul, however, had a significant increase of plantation in own areas. In the first two states, investment in forest outgrower schemes increased, while in Mato Grosso do Sul the prominent option was for land lease/partnership. The state of Rio Grande Do Sul, showed a considerable increase of forest outgrowing and lease (see Graph 1.03).

Graph 1.03 | Forest Plantation Area of ABRAF Member Companies by Industrial Segment in 2006[1]



Source | ABRAF member companies; STCP, 2006
[1]Solidwood products and Other products of eucalypt is negligible compared to the total

Moreover, Minas Gerais is the leading state with the largest area with forest plantations with pine and eucalypt, and also the state with the largest area of ABRAF member companies, followed by Bahia and São Paulo.

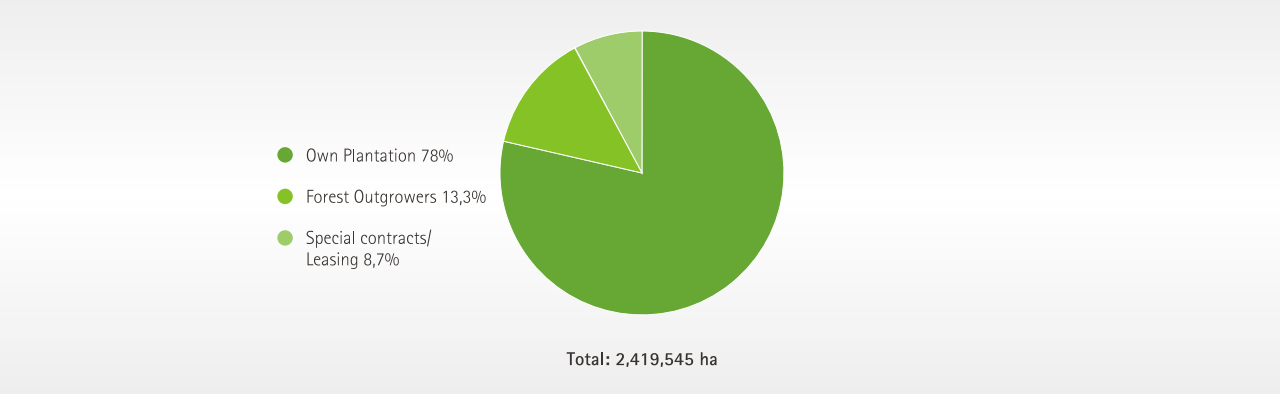
Table 1.04 and graph 1,04 show the comparative distribution of planted areas by type of property, for 2005 and 2006.

Table 1.04 | Distribution of Forest Plantations with Pine and Eucalypt of ABRAF Member Companies by Property Type in 2005 and 2006

State	Forest Plantation Area (ha) 2005				Forest Plantation Area (ha) 2006			
	Own Plantation	Forest Outgrower Plantations	Special Contracts/ Land Leasing	TOTAL	Own Plantation	Forest Outgrower Plantations	Special Contracts/ Land Leasing	TOTAL
AP	66,386	0	0	66,386	59,674	0	0	59,674
BA	337,300	76,748	9,481	423,530	346,602	89,598	7,495	443,695
ES	129,752	35,191	1,287	166,230	129,987	39,196	1,303	170,486
MG	655,820	52,266	32,783	740,868	593,076	61,011	38,538	692,625
MS	73,308	0	10,010	83,318	80,943	0	21,668	102,611
PR	150,227	36,914	12,947	200,088	151,408	44,169	16,514	212,091
RS	67,250	3,732	14,690	85,672	83,586	29,690	24,678	137,954
SC	99,419	21,623	11,371	132,413	100,355	18,766	14,261	133,382
SP	339,944	31,532	91,437	462,913	339,417	39,592	84,970	463,979
Others	4,399	0	2,119	6,517	1,390	116	1,542	3,048
TOTAL	**1,923,805**	**258,006**	**186,124**	**2,367,935**	**1,886,438**	**322,138**	**210,969**	**2,419,545**

Source | ABRAF member companies; STCP, 2006
Note: In addition, forest plantations with other species (mainly Araucaria – Parana pine) at ABRAF member companies reach 10,899 hectares

Graph 1.04 | Distribution of Forest Plantation Area of ABRAF Member Companies by Property Type in 2006



Source | ABRAF member companies; STCP, 2006

1.2 | Planted Forests with Other Species

Besides eucalypt and pine, other major planted species with economic importance are wattle (*Acacia spp.*), teak (*Tectona grandis*), rubber tree (*Hevea brasiliensis*), Parana pine (*Araucaria angustifolia*) and Populus (*Populus spp.*) that are used by the forest-based sector, although in smaller proportion.

It is worth mentioning the extensive plantation with Paricá (*Schizolobium amazonicum* Huber ex Ducke), native species from the Amazon praised for its wood characteristics highly desirable for plywood production. Furthermore, it is relevant to point out the large-scale plantation with teak, a species originally from Southeastern Asia, with high value for solidwood products, mostly oriented to international markets.

Table 1.05 presents the planted area with the main species in Brazil, besides pine and eucalypt.

Table 1.05 | Planted Area with Other Forest Species in Brazil (2005 and 2006)

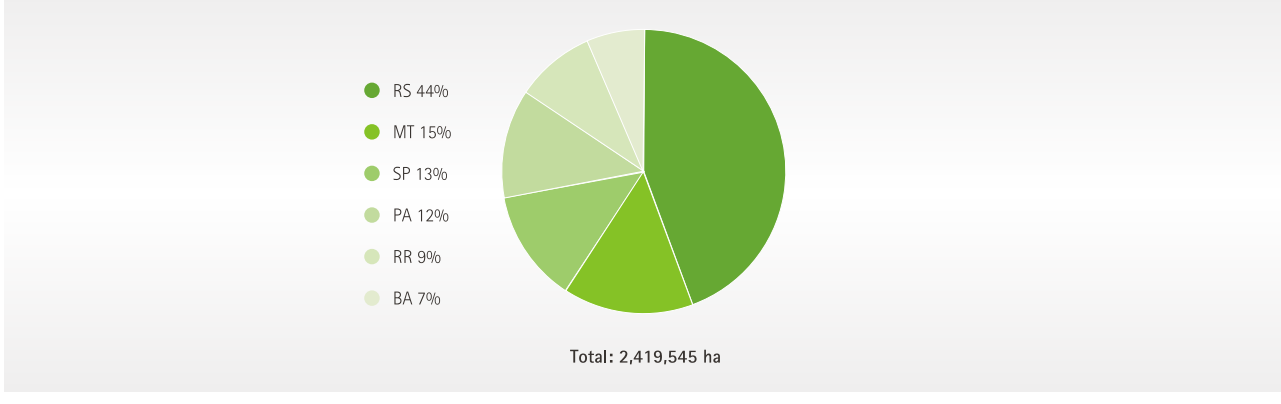
Species	Area (ha) 2005	Area (ha) 2006
Wattle (Acacia)	178,377	184,363
Teak	67,964	81,312
Rubber tree	50,000	42,496
Parana pine	24,235	18,275
Poplar	5,600	2,972
Parica	n.i.	41,100
TOTAL	**326,176**	**370,519**

Source | ABRAF member companies; STCP, 2006

In 2006, amongst he other planted species in Brazil, wattle leads with around 184,000 hectares, followed by rubber tree with slightly over 81,000 hectares. The other species add an estimated area of 104,000 hectares, as observed in table 1.05.

Graph 1.05 presents the distribution of planted forests with other species according to the location in the main Brazilian states in 2006.

Graph 1.05 | Distribution of Planted Forests with Other Species in Brazil in 2006



Source | ABRAF member companies; STCP, 2006

Wattle represents 50% of the planted area with other species in Brazil and is located mostly in the states of Rio Grande do Sul and Roraima. In Rio Grande do Sul, the main planted species is *Acacia mearnsii*, used for tannin production and as a by-product, among others, for the wood chip production for exports. Currently, the state of Rio Grande do Sul has about 82.7% of the planted area with this species in Brazil, or approximately 152,461 ha. In Roraima, the planted wattle species is *A. mangium* totalling 31,902 ha.

Teak, populus and Parana pine sum up 63,700 hectares of plantation. Teak is planted mostly in the state of Mato Grosso, with its wood being oriented to the manufacture of furniture, decks, sawnwood, among other uses. Forest plantations with Parana pine concentrate in Southern Brazil in the states of Paraná and Santa Catarina, while populus is planted exclusively in Paraná, as function of its unique climatic conditions.

| Summary of Planted Forests in Brazil in 2006

Table 1.06 presents the total forest plantation area with pine, eucalypt and other species in Brazil in 2005 and 2006. The total planted area with these species reached 5.57 million hectares in 2005 and 5.74 million hectares in 2006.

Amongst the countries with the largest forest plantation area, Brazil stands as the seventh largest with about 5.74 million de hectares, accounting for 3.0% of the world's total (estimated at 192.1 million hectares), as can be observed at 2006 ABRAF Yearbook – Base Year 2005, available at ABRAF website (www.abraflor.org.br).

Table 1.06 | Area with Planted Forests with the Main Species in Brazil (2005 and 2006)

Species	Planted Area (ha) 2005	Planted Area (ha) 2006
Pine	1,834,569	1,824,270
Eucalypt	3,407,205	3,549,147
Other Species	326,176	370,519
TOTAL	**5,567,950**	**5,743,936**

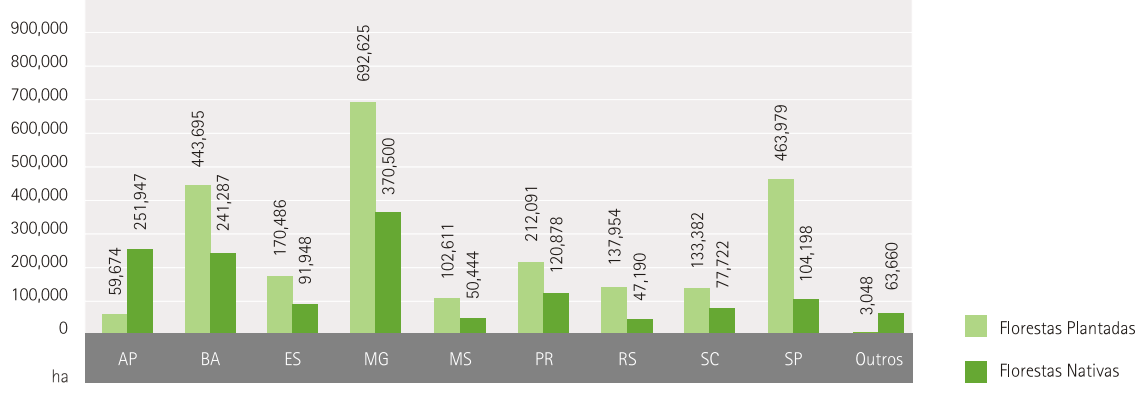
Source | ABRAF member companies; STCP, 2006

1.3 | Planted Forests vs. Natural Forests

ABRAF member companies, besides producing and consuming timber from forest plantations, effectively contribute to the Brazilian economy and help preserving and protecting part of the country's natural forests and biodiversity. In 2006, the member companies maintained preserved nearly 1.4 million hectares of natural forests.

The distribution of natural forests protected by ABRAF member companies by state in 2006, can be seen in graph 1.06 and in table 1.07.

Graph 1.06 | Total Area with Natural Forest Protected by ABRAF Member Companies by State in 2006



Source | ABRAF member companies; STCP, 2006

Table 1.07 | Distribution of Natural Forests Area Protected by ABRAF Member Companies by State in 2005 and 2006

State	2005				2006			
	Own Forest Plantations (ha)	Protected Natural Forests (ha)	Other Uses (ha)	TOTAL Land Area (ha)	Own Forest Plantations (ha)	Protected Natural Forests (ha)	Other Uses (ha)	TOTAL Land Area (ha)
AP	66,386	180,749	71,746	318,881	59,674	180,932	78,268	318,874
BA	337,300	231,486	83,686	652,472	346,602	250,398	98,583	695,583
ES	129,752	85,113	36,690	251,555	129,987	82,837	48,852	261,676
MA	3,851	68,310	105,246	177,407	742	63,660	97,755	162,157
MG	655,820	365,329	105,081	1,126,230	593,076	370,500	226,176	1,189,752
MS	73,308	46,629	32,292	152,229	80,943	47,185	37,288	165,416
PR	150,227	116,026	40,228	306,481	151,408	120,878	55,524	327,810
RS	67,250	16,585	69,684	153,519	83,586	47,190	120,275	251,052
SC	99,419	67,188	41,129	207,736	100,355	77,722	36,983	215,061
SP	339,944	104,818	152,096	596,858	339,417	103,519	141,922	584,858
Others	548	0	2,558	3,106	648	0	2,548	3,196
TOTAL	**1,923,805**	**1,282,231**	**740,439**	**3,946,475**	**1,886,438**	**1,344,822**	**944,173**	**4,175,434**

Source | ABRAF member companies; STCP, 2006

Chapter 2

Silviculture of Planted Forests

2 | Silviculture of Planted Forests

2.1 | Highlights of Silviculture in 2006

The most relevant issues related to the Brazilian planted forest sector in 2006 are the result of events and trends observed over the last couple of years. Among them, the most prominent issues are:

- Expansion of the forest-based industry integrated to forest plantations, both through the development of new forest development clusters and expansion in already-producing regions;
- Participation of the forest companies in the emerging carbon credit market;
- New modalities of investments in planted forests.

2.1.1 | Expansion of the Forest-Based Industry Associated to Planted Forests

New Clusters of Forest Development

The forest-based industry, mainly that associated to segments of pulp and paper, pig-iron based on charcoal, and reconstituted wood panel experiences a moment of expansion. Aspects such as the growth of domestic and international markets, as well as competitive advantages of the Brazilian forest-based sector, compared to international competitors, have created a highly favourable environment for the growth of these segments in Brazil. This context has brought domestic and international companies to promote studies for site identification aiming at expansion or establishment of new forest-industrial enterprises in the country.

One of the main regions for forest plantation expansion in the country is the Centre-South part of the state of Rio Grande do Sul. The region has some tradition in the forest area and some of the most important pulp and paper and reconstituted wood panel companies of the sector are located there.

Following the path of new investments associated to the pulp and paper segment, two new mills were announced in the state of Mato Grosso do Sul, one pulpmill and one papermill.

A new cluster of forest development in the North/ Northeast region encompasses extensive areas located in the states of Pará and Maranhão with new businesses. They are directed to supply charcoal from planted forests to the Carajás pig-iron cluster. Similar development is observed in the West-Central region (state of Mato Grosso do Sul) with the expansion of a pig-iron cluster.

Another new frontier that has demonstrated great forest potential is the state of Piauí, specifically in the West-Central region of the state. Recently, the State Government developed and has implemented the so-called Forest Development Program of the Parnaíba Valley, aiming at bursting forest plantation development.

Expansion in Producing Regions

The wood-based panel sector has shown growth rate in production of approximately 25% over the last six years without signs of reduction. Recently, it has announced investments in new MDF plants in the states of São Paulo, Minas Gerais and Paraná, besides new MDP plants in the state of Santa Catarina.

For the period 2008-2012, it is estimated that the pulp and paper segment will invest a total of USD 7.9 billion in new forest businesses and industrial lines in the country. Such investments will likely occur mainly in expansions of companies of the segment located in the states of Bahia, Minas Gerais, Paraná and Rio Grande do Sul. The industrial expansion will follow the forest plantation expansions that are already in course for a couple of years.

The Brazilian Institute of Pig-Iron (*Instituto Brasileiro de Siderurgia* - IBS in Portuguese) has recently released that the segment will invest USD 15 billion in the increase of 40% of the installed capacity of annual production of steel, from the current 36 million ton to 50 million ton in the next several years. This will certainly impact the demand for charcoal, currently being used in the production of a third part of the domestic steel. In such scenario, it is estimated for 2010, a demand of 53 million MDC (charcoal cubic meter). To fulfil such growing demand of the pig-iron industry and integrated companies, a total of 34 million MCD of charcoal would be necessary (75% of the domestic consumption).

2.1.2 | Carbon Market

The carbon market is a system for which countries and organisations can negotiate their carbon credits (CO_2), known as units of reduction of greenhouse effect gases emissions. They are commercially used to reduce the emission and sequestration of CO2 in the atmosphere.

Increasing pressure to deal with climatic changes has created multimillionaire markets for carbon that is expected to reach billions of US dollars in annual transactions in the next 10 years.

Since the establishment of Convention on Climatic Changes of the United Nations (UN), the signatory countries have set the objective to stabilise the concentrations of the greenhouse effect gases (GEE, in Portuguese).

The Kyoto Protocol, originated from the 1997 Third Conference of Parts of the UN, established three mechanisms that can be considered in the emissions accounting of each country: (i) Emissions Trade; (ii) Joint Implementation Mechanism; and (iii) Clean Development Mechanisms (CDM). The Kyoto Protocol entered into force with the ratification of the treaty by Russia in February 2005, raising from 44.2% to 55% the percentage of emission of greenhouse gases by the signatory countries. Through the Protocol, industrialised countries have to seek reduction of their emissions or to utilise carbon credits quota of projects implemented in developing countries through the CDM. Developing countries with forest vocation, like Brazil, presents full potential to implement CDM projects, benefiting from the carbon credit trade.

Additionally to Kyoto, there are other carbon credit trade markets, among them the Chicago Climate Exchange (CCX) and the European Climate Exchange (ECX), besides other specific markets in Europe.

Among the complementary alternatives of the planted forests segment companies is the commercialisation of carbon credits as a way to get an additional return from the forest, besides strengthening their social-environmental actions and sustainable development strategies. Following this line, some ABRAF member companies already trade their carbon credits at the Chicago Climate Exchange (CCX). CCX is the only North American system and first voluntary world system of registering, reducing and trading emission for six greenhouse-effect gases. The system is self-regulatory with well-defined rules, governed by their member companies and institutions.

2.1.3 | New Modalities of Planted Forest Investments

The forest investments present some distinct features compared to other investments found in the financial market:

- Prices - Forest characteristics are the main factors that contribute to the return of an enterprise. When wood market prices hare low, landowners and companies can abstain to sell it and can decide to sell it at a more favourable period;
- Hedge - The behaviour of the financial return of investments in forest presents a negative correlation with other options of investments such as stocks and bounds (FAO/Standard and 500 Poors index);
- Risk - Usually the returns in forest investments present a low risk, according to a FAO study that compared it with other financial assets (forestland in USA with return of 8.2% with volatileness of 12%; 500 S&P Stock Index with 5.6% return and volatileness of 16.7%);
- Horizon - Investments in forest have long-terms due to its biological condition. In this sense, Brazil provides some comparative advantage in comparison to countries located in the North Hemisphere, as rotation period in the country are considerably lower than those found in the North.

Among some recent trends of new modalities of forest investments in Brazil, mainly those associated to planted forests, besides direct investments by forest companies, both domestic and foreign, the following modalities should be mentioned:

i. **TIMO** (Timberland Investment Management Organisations);
ii. **Investment in planted forests for energy purpose** by companies from other segments (food processing agro-companies and ceramics) that demand wood and forest residues as energy source for their processes;
iii. **Plantation Investments from planted planting associations**;
iv. **Forest outgrowing schemes by companies and independent rural producers**, as described at 2006 ABRAF Yearbook, available at ABRAF website (www.abraflor.org.br).

TIMO

Financial instruments created for investing in forests were initially developed by financial professionals who perceive the attractiveness of the forest business mainly in the United States, about fifteen years ago.

The interest in forest investments in the USA was directed by two main forces. The first was an Act of the security agency (Employment Retirement Income Security) allowing a diversification of investment portfolios. Secondly, many companies of the industrial forest sector (large companies) viewed the segregation of their forest assets as an opportunity to reduce their assets (forests) and to increase the profitability of their businesses.

TIMO's that were initially insurance companies are currently tied to other sectors such as the forest-based industry and act like a bridge between investors and forest investments. TIMOs have worked as fund-raisers, analysed forest markets, acquired forest properties and managed forests to maximise the investor's goals (high return rates over investments).

TIMO's have performed in Brazil since the end of last decade, concentrating mainly in the South region of Brazil, with focus in the acquisition of mature planted forest assets with commercialisation of timber in domestic forest markets, highly demanding for the product.

In Brazil that still lacks forests investment options, TIMO's have become an opportunity for investment within the forest sector. For them, planted forest can serve as a long-term investment with attractive returns and low risk. Such profile is appropriate mainly for those investments related to pension funds.

Investment Planted Forests for Energy Purpose

The consumption of planted wood has gained increasing importance for energy generation (change in the industrial energy matrix), mainly for those segments that utilise firewood as main energy input. This trend is observed as result of the increasing fossil fuels price over the last years and the interest by private groups of this segment to be tied to renewable sources of energy and environmental conservation.

A industrial sector that have increased the consumption of wood from forest plantation in the past several years, mainly eucalypt, is the food-processing segment (such as soybean and corn), whose main wood utilisation is for drying and processing grains.

The utilisation of planted forest by the food processing agro-companies has two main identified reasons:

- Currently there is a more active control by environment state agencies, enforcing the obligation of replacement forest laws. The utilisation of wood or firewood from natural forests imposes a responsibility to consuming companies obligating them to fulfil the forest replacement. Thus, it become feasible for these companies to purchase anticipately wood from planted forests, outgrowing programmes or the establishment of own planted forests;
- The majority of the food-processing agro-companies are export-oriented, requiring them to adopt proper environment policies in the countries where they operate. Thus, they preserve their public image and zeal for the certification of origin of their products;
- Other fossil fuel consuming sectors, such as ceramics and pig-iron, are potential consumers of wood from planted forest, given the problems faced with carbon emission and other factors, as the recent crisis of natural gas supplying in Brazil.

Most of them utilise fossil fuels that have a high cost. Their substitution, and in some cases their re-conversion, has occurred as result of the high cost of this type of fuel and its pollution effect.

Forest Planting Associations

Associations linked to forest plantings, notably those fast-growing species, have expanded their participation in some regions of the country. For instance, it is noteworthy those in the Carajás pig-iron cluster (where an investment fund was created), in the tobacco-producing region in Rio Grande do Sul and in the pig-iron producing clusters in Minas Gerais.

Besides these, other associations oriented to planting of forest plantations have worked with emphasis in the states of São Paulo and in Rio Grande do Sul, with eucalypt species. Furthermore, it is worth mentioning the state of Pará, in the Amazon region, with large-scale plantations of Paricá, a native species.

2.2 | Annual Plantation Area

According to data released by the Ministry of Environment Brazilian forest plantation area reached 627 thousand hectares including reform and the expansion of new areas for pine, eucalypt and other species. Out of this total it is estimated that 25% (157 thousand hectares) were established in small and medium-sized properties supported by the private sector outgrowing schemes and by public forest financial incentive programs like PRONAF Florestal and PROPFLORA among others.

As 2005, plantation reforms and newly planted areas in 2006 were also concentrated in the Southern and Southeastern regions and represent 72% of the total planted in the country. The states that most contributed for the plantations are Minas Gerais (145 thousand ha), Rio Grande do Sul (90 thousand ha), Bahia (81 thousand ha) and Mato Grosso do Sul (33 thousand ha). The states of São Paulo, Espirito Santo and Amapá have also achieved an important share in the plantations establishment as shown in table 2.01.

Plantations areas in 2006 reached 627 thousand hectares which represent an increment of 13.4% in comparison with the 553 thousand hectares planted in 2005.

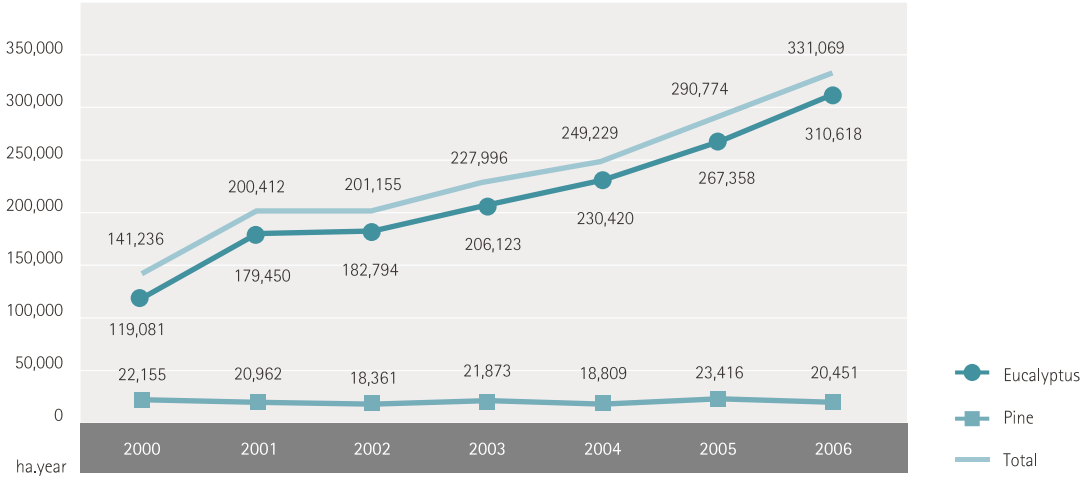
Table 2.01 | Forest Planting Area in Brazil (Forest Expansion and Reform) 2005 and 2006

Region	State	Planted Area 2005 (ha)	Planted Area 2006 (ha)	TOTAL 2005 (ha)	TOTAL 2006 (ha)
South	SC	40,000	45,000	129,000	175,000
	PR	54,000	40,000		
	RS	35,000	90,000		
Southeast	MG	160,000	145,000	268,000	275,000
	SP	79,500	98,000		
	ES	26,000	30,000		
	RJ	2,500	2,000		
West Central	MS	25,000	33,000	38,000	48,000
	MT	8,000	10,000		
	GO	5,000	5,000		
North	AC	-	500	30,500	34,500
	AM	-	1,000		
	AP	17,000	10,000		
	PA	5,500	13,000		
	RO	-	1,500		
	RR	3,500	4,000		
	TO	4,500	4,500		
Northeast	BA	75,000	81,000	87,500	94,500
	MA	8,500	11,000		
	PE	2,000	500		
	PI	2,000	2,000		
BRAZIL	**TOTAL**	**553,000**	**627,000**	**553,000**	**627,000**

Source | MMA – Programa Nacional de Florestas, 2006
Obs | 1 - Data not available thorugh MMA by reform and newly planted areas.
2 - States with estimated planted area smaller than 500 ha were not considered by MMA

The ABRAF member companies planted about 331 thousand ha in 2006, participating with nearly 52.8% of the total planted area in Brazil in that year. Out of the total forest plantation area established by ABRAF member companies, 310 thousand hectares were eucalypt and 20 thousand hectares pine. Figure 2.01 shows the annual growth of planted forests by ABRAF member companies from 2000 to 2006.

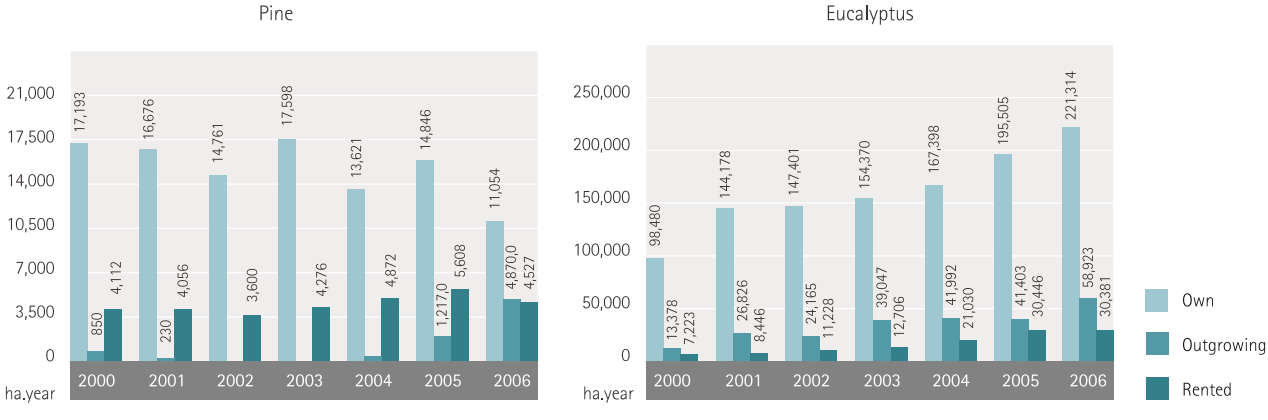
Graph 2.01 | Evolution of Annual Planting of Forest Plantations by ABRAF Member Companies by Species (2000-2006)



Source | ABRAF Member Companies; STCP, 2006
[1] Numbers include forest expansion and reform (planting in a former planted area)

The dynamics of the annual planting is clearly observed in figure 2.02. The annual planting with pine plantations by ABRAF member companies has remained relatively stable over the past few years. On the other hand, eucalypt plantations have shown an accelerated growth from 2000 to 2006, both in own areas and leased areas. The annual growth of leased areas is still incipient, although they have local or regional importance (see graph 2.02).

Graph 2.02 | Evolution of Annual Planting by ABRAF Member Companies by Type of Plantation (2000-2006)



Source | ABRAF member companies; STCP, 2006

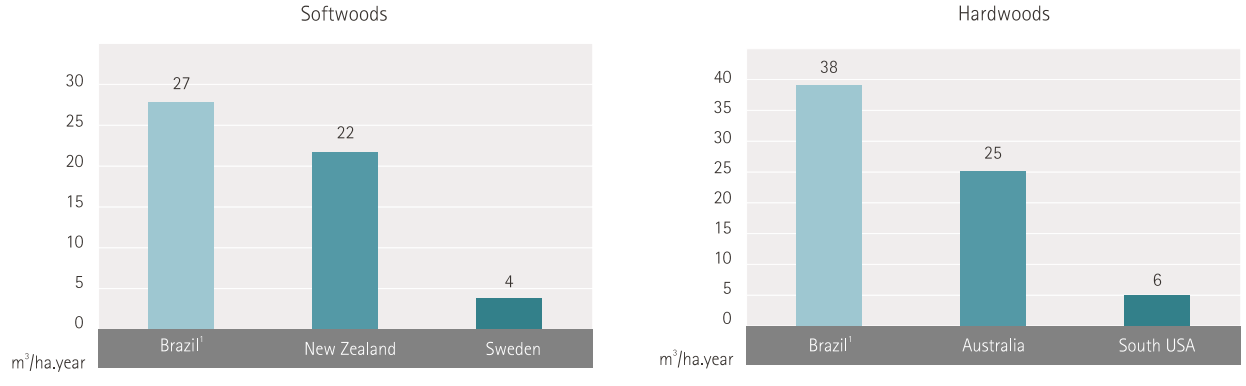
2.3 | New Technologies and Forest Productivity

Brazilian forest companies that are dedicated to planted forests are utilizing new worldwide recognized technologies aiming to increase forest productivity levels and genetic improvement.

As a result of these efforts an important portion of Brazilian plantations are from clone stocks of high productivity (Eucalyptus) or from improved seeds (Pinus). In both cases, the planting stock has been developed for adapting to adverse environmental conditions imposed by climate, soil and water. Over last two decades gains coming from the research work and especially from genetic improvement have increased above 100%.

On the other hand, some comparisons help to better visualize the potentialities of plantation forestry in Brazil While the average mean annual increment (MAI) of Pinus taeda (loblolly pine) in Southern Brazil is around 25 m^3/ha.year while in the United States the MAI reaches about 10 m^3/ha.year. More remarkable differences, can be seen for eucalypt MAI compared to other countries, especially to the forest productivity observed in countries of its origin – Australia and region (see figure 2.03).

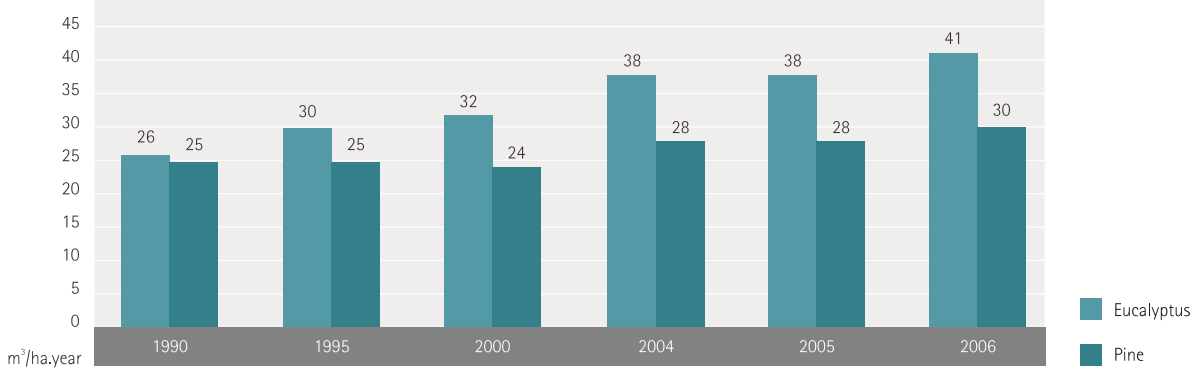
Graph 2.03 | Comparison of Softwood and Hardwood Forest Productivity in Brazil and in Selected Countries



Source | STCP
¹ Eucalyptus

The evolution of forest productivity gains among ABRAF member companies is shown in figure 2.04.

Graph 2.04 | Evolution of Mean Annual Increment (MAI) of Forest Plantations by ABRAF Member Companies (1990-2006)



Source | ABRAF member companies; STCP, 2006

The average MAI of eucalypt plantations in 1990 was approximately 26 m^3/ha.year increasing to 41 m^3/ha.year in 2006. Pine plantations also experienced a significant growth in MAI over the last ten years, increasing from 25 m^3/ha.year in 1990 to 30 m^3/ha.year in 2006 (7.5% growth over the period). Such productivity gains are the result of investments in R&D in the country, both at company level and research centres.

As a conclusion it could be stated that ABRAF member companies have expanded their planted areas and invested in technological innovations, resulting in forest productivity gains. According to this logic it is implicit that with such gains, companies have produced about 7.5% more timber in the same area than in the last decade.

2.4 | Investments

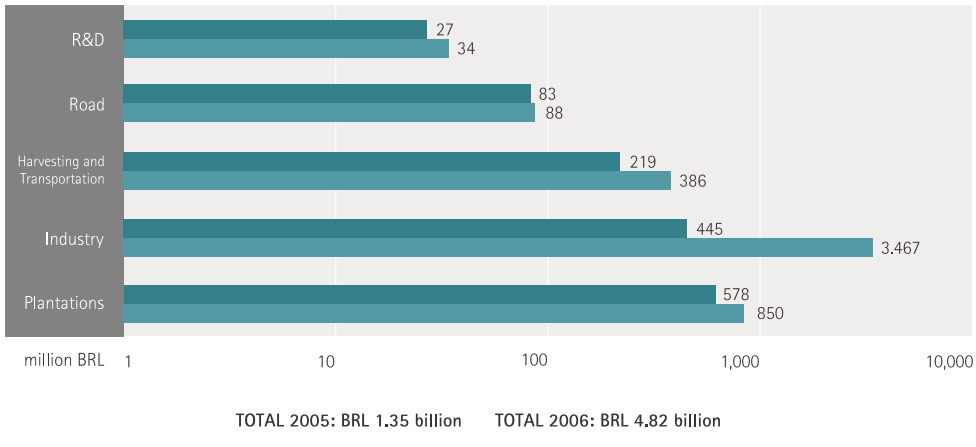
Over the past several years, the Brazilian forest sector has announced and carried out significant investments compared to other countries.

In 2007 investments amounting to BRL 6 billion are expected to be carried out by the pulp and paper sector. For 2008 to 2012 the sector's investments area expected to reach BRL 16 billion, yet by 2012 investments within the segments of solid wood and wood panels and iron smelting are to amount BRL 8 billion.

The national Accelerated Growth Plan (PAC) counts on for an important growth of the Brazilian economy. For the last four years the Brazilian Gross Domestic Product (GDP) has grown by 2.6% per year, The PAC intends reaching growth rates of at least 5%, and in order to create the necessary conditions a substantial increase in public and private investments is planned. Today the investment rate is around 20% of the GDP and the plan considers increasing it to 25%. The Brazilian primary superavit from 2003 to 2005 reached 4.25% of the GDP and it will be reduced for 3.75% to expand public investment. Thus the Federal Government with the actions of PAC wishes to increase the GDP to 4.5 % in 2007 and 5% in the following years until 2010. This will have a positive influence on the perspectives of the forest sector in coming years.

In 2006, the ABRAF member companies invested a total of BRL 4.8 billion in both Forest and industrial plants. Figure 2.05 shows the distribution of forest investments made by these companies.

Graph 2.05 | Investments in Industrial Forestry by ABRAF Member Companies (2005 and 2006)



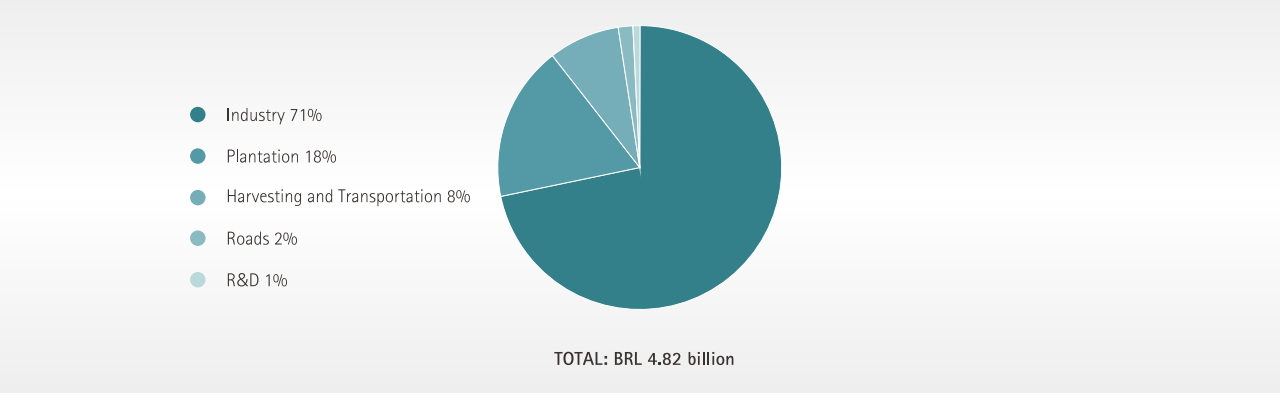
TOTAL 2005: BRL 1.35 billion TOTAL 2006: BRL 4.82 billion

Source | ABRAF member companies; STCP, 2006

The largest ABRAF member companies investment share in 2006 was oriented ate the industrial segments of the companies summing up a total of BRL 3.5 billion (72%).

Graph 2.06 allows understanding the composition of investments done by ABRAF member companies, and these were industry (71%), plantations (18%), harvesting and transportation (8%), roads (2%) and research & development (1%).

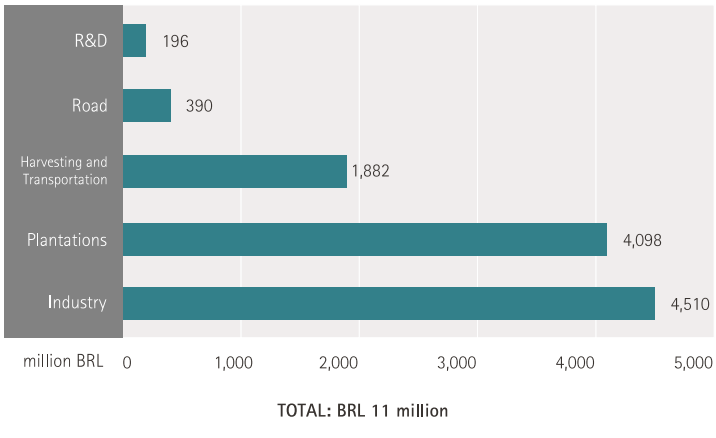
Graph 2.06 | Investments in 2006 by ABRAF Member Companies



Source | ABRAF; STCP, 2006

The estimate for future investments by ABRAF member companies up to 2010 reaches BRL 11.075 billion, out of which BRL 3.0 billion will be driven to increase the installed capacity of industrial plants (figure 2.07).

Graph 2.08 | Distribution of Future Investments by ABRAF Member Companies up to 2010

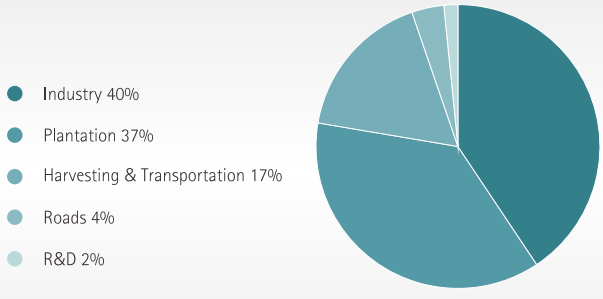


Source | ABRAF member companies; STCP, 2006

As result of future industrial expansion, the forest plantation area will likely increase to supply the demand for timber by new industrial plants. It is estimated that ABRAF members will invest approximately BRL 4.098 billion in forest reform and expansion of forest plantations (37% of the total) until 2010. On the other hand, investments in industrial plants are estimated in BRL 5.5 billion (40%).

As a consequence of the industrial expansion forest plantations are expected to increase for the surge on demand of newly established industrial plants. It is estimated that ABRAF member companies will invest around BRL 4.098 billion in forest reform and in the expansion of the forest base (37% of the total) (graph 2.08). On the other hand, industrial investments are estimated in BRL 4.5 billion (40%). Taking into account the already announced and ongoing pulp and paper investments the sector's investments will reach BRL 17 billion by next decade.

Graph 2.08 | Distribution of Future Investments by ABRAF Member Companies up to 2010



TOTAL: BRL 11 billion

Source | ABRAF member companies; STCP, 2006

Investments in harvesting and transportation should represent 17% of that total, while investments in roads and R&D should reach respectively 4% and 2%. The investments in roads and R&D will likely remain at the current level over the next few years: roads (BRL 390 million) and R&D (BRL 196 million)

It is estimated that the total investment up to 2012 by ABRAF member companies will generate around 1.164 million of new jobs, out of which 142 thousand will be direct, 372 thousand indirect and 650 thousand generated to other sectors of the economy (income-effect jobs).

Chapter 3

Forest Products Market

Roundwood

Roundwood Production

Roundwood Consumption

Main Products form Plantation Forests

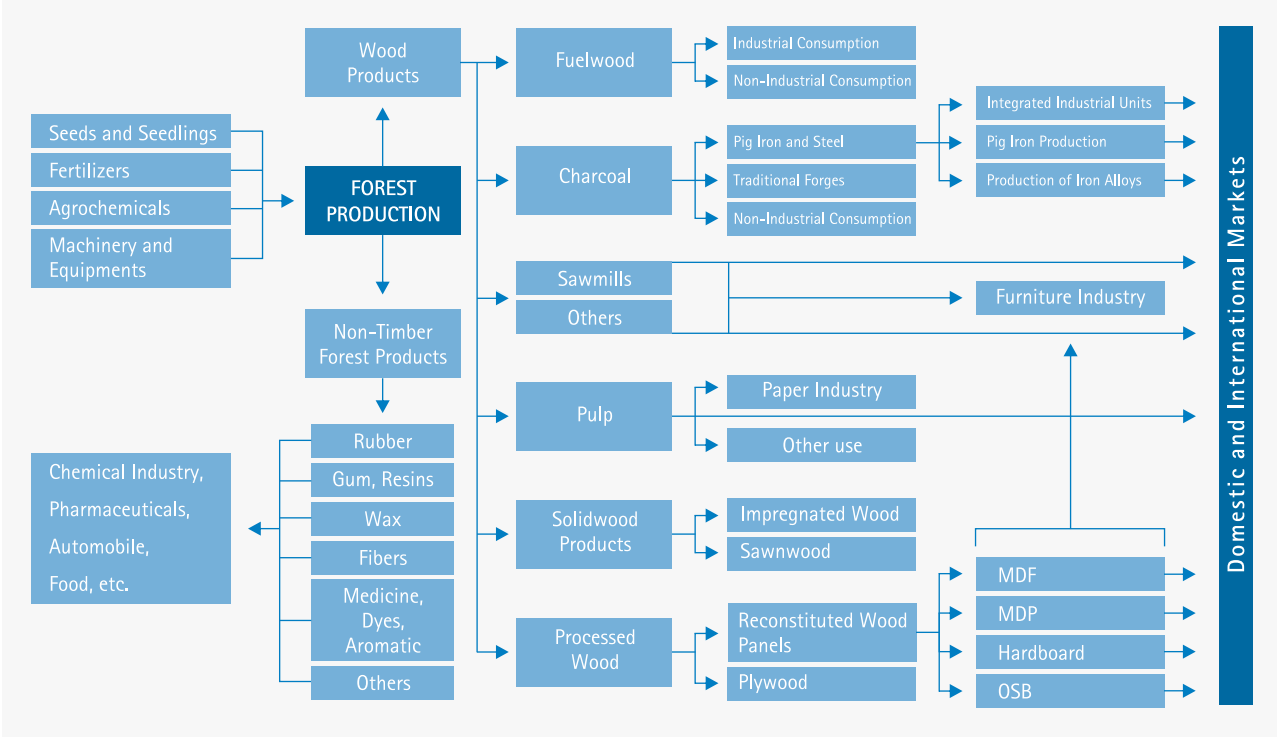
International Trade

3 | Forest Products Market

Forest plantations are a major source for forest raw material and represent an important aspect for competitivity for the industrial segments of pulp and paper, wood panels, charcoal for iron melting, industrial energy, solid wood products, and furniture among others.

The different segments of the production chain of the planted forests segment are presented in figure 3.01.

Figure 3.01 | Forest Sector Productive Chain



Source | VIEIRA, L. Setor Florestal em Minas Gerais: Caracterização e Dimensionamento do Setor Florestal. Belo Horizonte – Federal University of Minas Gerais, 2004. Adapted by ABRAF, STCP

An important contribution from planted forests is represented by non-wood forest products. Under these products are identified several economic activities related to the production of natural resins, honey, fibers, and essential oils, among others which are normally family-based.

3.1 | Roundwood

3.1.1 | Roundwood Production

The potential sustainable production of Brazilian plantation forests is high, estimated around 390 million m^3/year. Out of this total, pine and eucalypt forests contribute to nearly 184 million m^3/year (table 3.01). The sustainable production of a species is the potential growth from a forest area given by its corresponding MAI. For Brazil, out of the total annual sustainable production, 49.3 million m^3 (27%) refer to pine timber and 134.9 million m^3 (73%) to eucalypt timber, as shown in table 3.01.

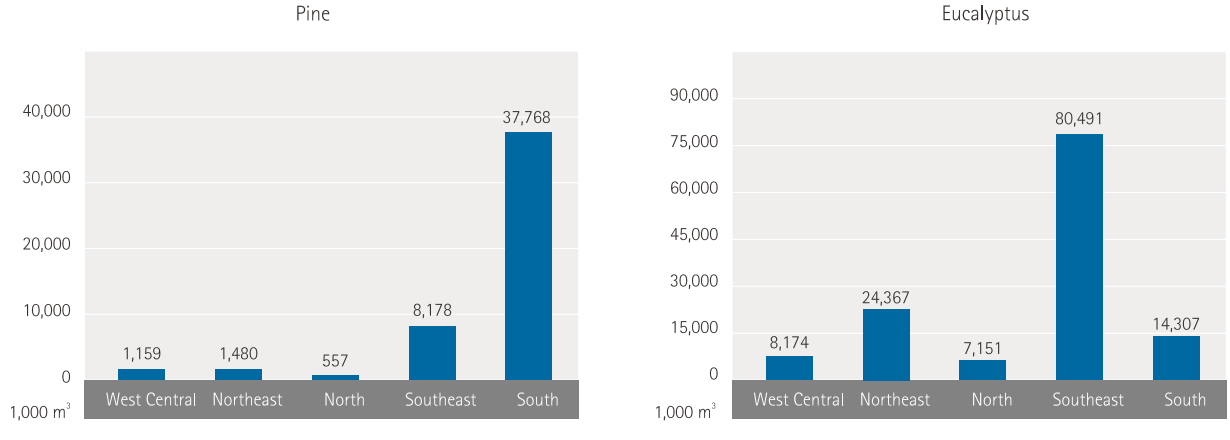
Table 3.01 | Estimate of Sustainable Production of Pine and Eucalyptus Roundwood in Brazil (2006)

Species	TOTAL Planted Area (1,000 ha)	IMA[1] (m^3/ha.year)	Sustainable Production (1,000 m^3/year)	%
Pine	1,824	27	49,225	27
Eucalyptus	3,549	38	134,868	73
TOTAL	**5,373**	**-**	**184,123**	**100**

Source | FAO, STCP, 2006
[1]MAI – Mean Annual Increment

The production pine roundwood is concentrated in the Southern and Southeastern regions, which respond for near 93% of the Brazilian sustainable pine production as depicted in graph 3.01. Such a fact is the result of the development of the wood-processing industry in these regions, especially in the production of sawnwood, plywood and reconstituted wood panels in Southern Brazil.

Graph 3.01 | Estimate of Sustainable Production from Forest Plantations by Region in Brazil (2006)

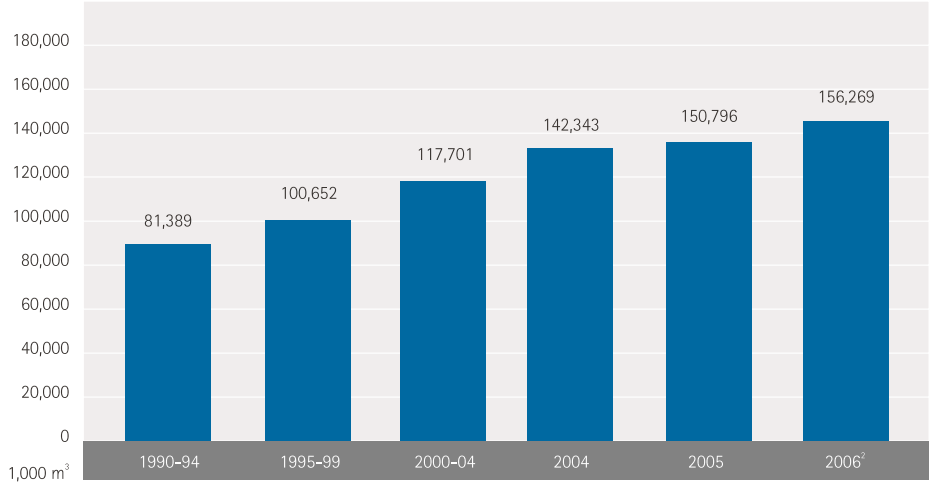


Source | STCP Data Bank

As for eucalyptus roundwood, the production is notably concentrated in the Southeastern, Northeastern and South regions representing 70% of the sustainable national eucalypt wood production. Most plantations with this genus are associated with the pig-iron & steel industry, and the pulp and paper and reconstituted wood panels manufacturing.

The panorama for roundwood production from planted forests from 1990 – 2006 shows a growth tendency as graph 3.02 indicates. It is estimated that for year 2006 the annual roundwood production for industrial purposes increased 4% compared to 2005.

Graph 3.02 | Annual Roundwood Production for Industrial Uses in Brazil – Planted Forests (1990-2006)[1]



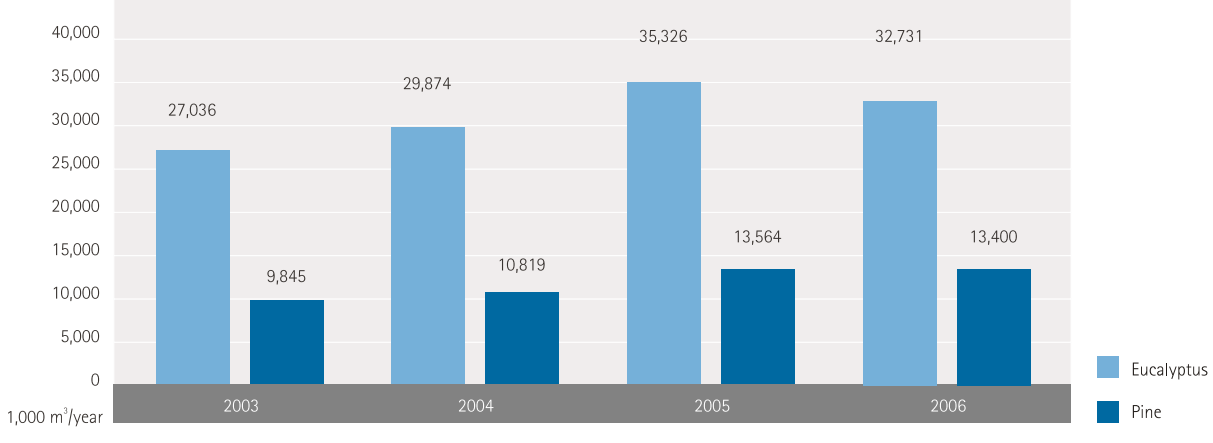
Source | IBGE, 2006
[1] Annual averages for 1990-94, 1995-99, 2000-04 and for 2004 include fuelwood, chips and roundwood. Adapted for years 2004, 2005 and 2006 by STCP
[2] Estimative STCP

As in relation to the expansion of the forest industry installed capacity over the last years, the companies of the segment are keeping their own forest plantations and increasing outgrowing programs. The graph 3.03 presents the evolution of the production of pinus and eucalypt roundwood by the member companies of ABRAF for years 2003 -2006.

According to graph 3.03 there is a decrease for eucalypt roundwood production of 7,3% in 2006 comparatively to 2005. For pinus the decrease was 1,2% for the same period.

It is worth mentioning that 84% of the utilized raw material in the industrial processes is from the companies' own forest plantations and outgrowers and 16% include independent forest producers and outgrowers, as shown in graph 3.4.

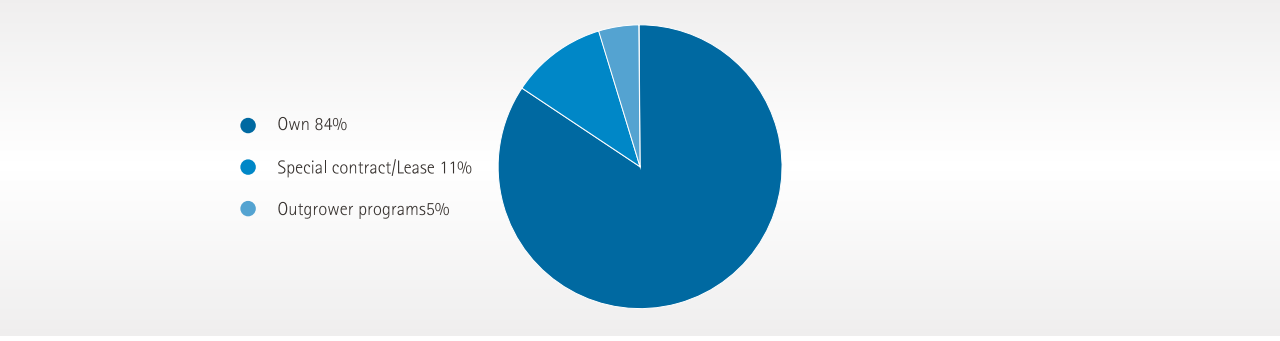
Graph 3.03 | Roundwood Production by ABRAF Member Companies (2003-2006)



Source | ABRAF member companies; STCP, 2006

Despite the fact that ABRAF member companies are controlling most of their required roundwood supply for industrial processes, outgrowing schemes is becoming more and more a safe and sustainable production option for small and medium-sized forest owners as depicted in section 4.7.

Graph 3.04 | Source of Raw Material for ABRAF Member Companies - 2006



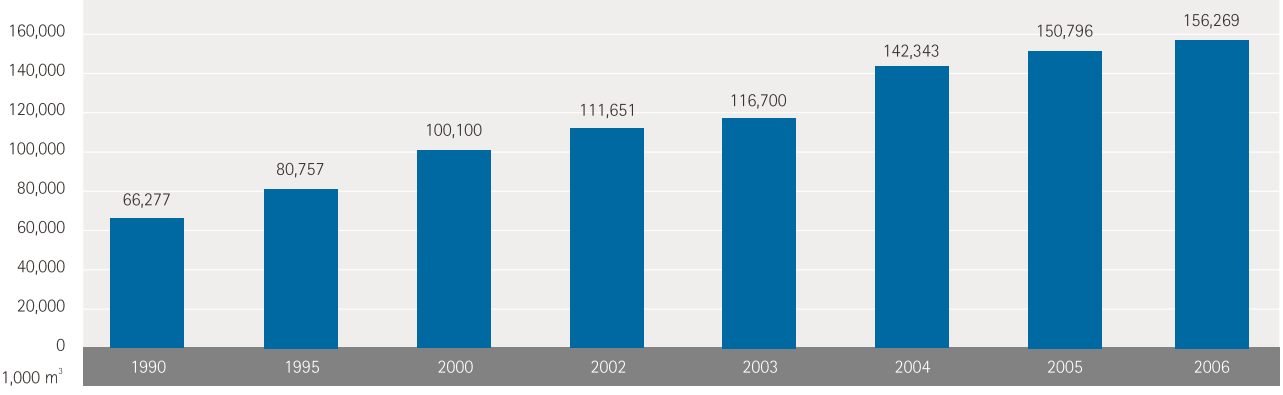
Source | ABRAF member companies; STCP, 2006

3.1.2 | Roundwood Consumption

Two types of companies characterize the Brazilian forest industry. On one side are large companies, represented mainly by the pulp and paper and reconstituted wood panel segments that adopt modern forest and industrial technology and are vertically integrated, from forest harvesting to industrial processing. On the other side are the small and medium-sized companies, represented in the majority by sawmills, plywood mills, and furniture producers, mostly family companies operating without modern technology and with a low degree of mechanization.

The consumption of industrial roundwood grew 136% from 1990 to 2006. In 1990, Brazil consumed approximately 66 million m^3 of roundwood, increasing to 156 million m^3 in 2006. The growth in consumption of industrial roundwood from planted forests in Brazil between 1990 and 2006 is shown in graph 3.05.

Graph 3.05 | Roundwood Consumption from Forest Plantations for Industrial Utilization (1990-2006)[1]



Source | STCP Databank
[1] Includes fuewood, chips and roundwood

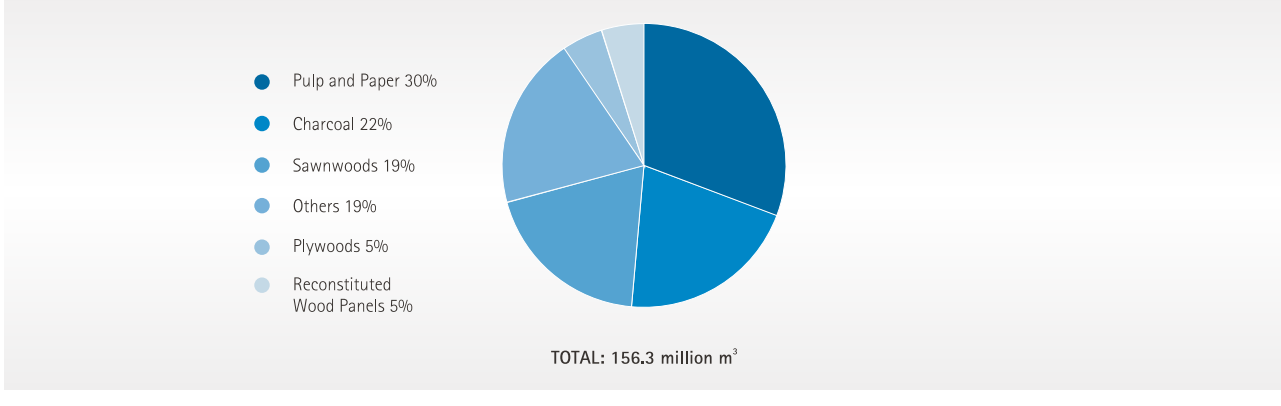
The consumption of industrial roundwood from planted forests in Brazil is distributed between 66% for eucalyptus (103.3 million m^3) and 34% for pine (53 million m^3). The major consuming segment is the pulp and paper (30%), followed by pig-iron & steel (22%) and sawmilling (19%). The share of plywood and reconstituted wood panel companies represent about 10% of the consumption (table 3.02 and graph 3.06).

Table 3.02 | Roundwood Consumption for Industrial Use in Brazil by Segment and Species (2005 and 2006)

Segment	Roundwood Consumption (1,000 m^3) - 2005			Roundwood Consumption (1,000 m^3) - 2006		
	Pine	Eucalyptus	TOTAL	Pine	Eucalyptus	TOTAL
Reconstituted panels	5,275	1,795	7,070	5,509	1,718	7,226
Plywood	6,950	150	7,100	7,228	178	7,406
Sawnwood	25,647	3,118	28,765	26,545	3,336	29,881
Pulp and paper	7,139	38,893	46,032	7,185	39,576	46,761
Charcoal	0	31,934	31,934	0	34,537	34,537
Others	6,358	23,537	29,895	6,470	23,988	30,458
TOTAL	**51,369**	**99,427**	**150,796**	**52,937**	**103,332**	**156,269**

Source | STCP, AMS, 2006

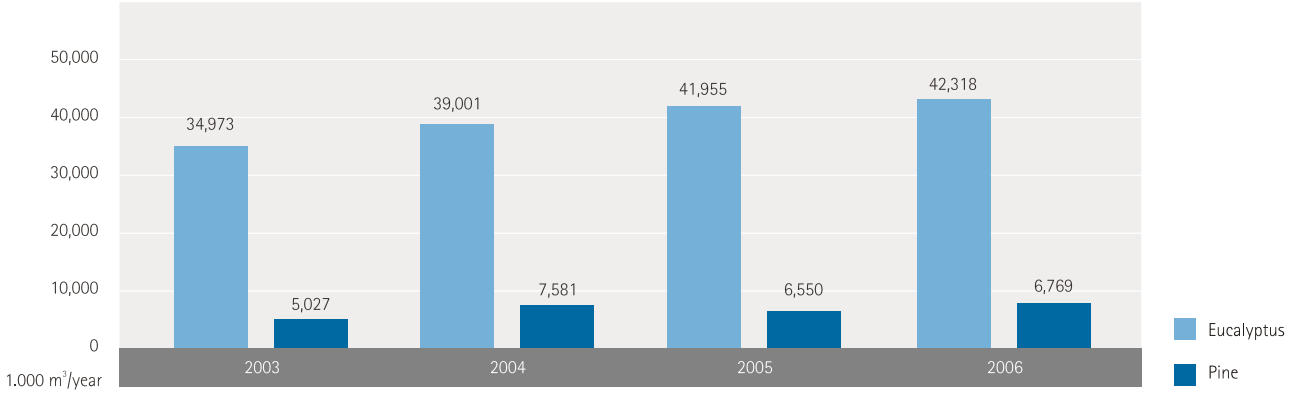
Graph 3.06 | Percent of Roundwood Consumption from Planted Forests by Segment (2006)



Source | STCP, ABIPA, BRACELPA, AMS, 2006

In 2006 ABRAF member companies consumed around 49.1 million m^3 of pine and eucalypt timber that were mostly directed to the production of pig iron & steel, pulp and paper, reconstituted wood panels and solid wood products (Graph 3.07).

Graph 3.07 | Roundwood Consumption ABRAF Member Companies (2003-2006)



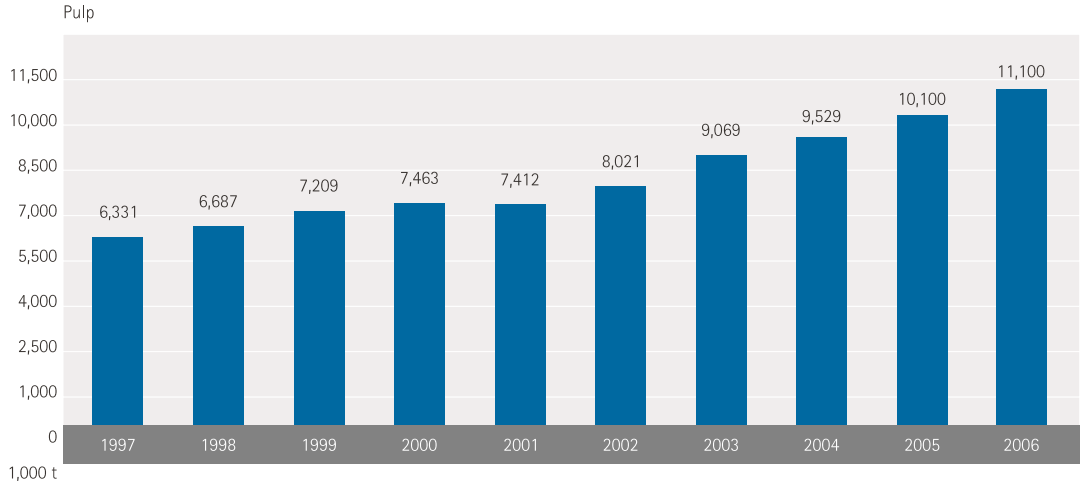
Source | ABRAF, STCP, 2006

3.2 | Main Products form Plantation Forests

3.2.1 | Production and Consumption

Graphs 3.08 and 3.09 point out the evolution of the production of various segments of the forest sector (energy, and charcoal, pulp and paper, wood panels for the furniture industry, civil works and housing and solid wood products among others), based on forest plantations. All these segments have presented a growing tendency from 1997 to 2006.

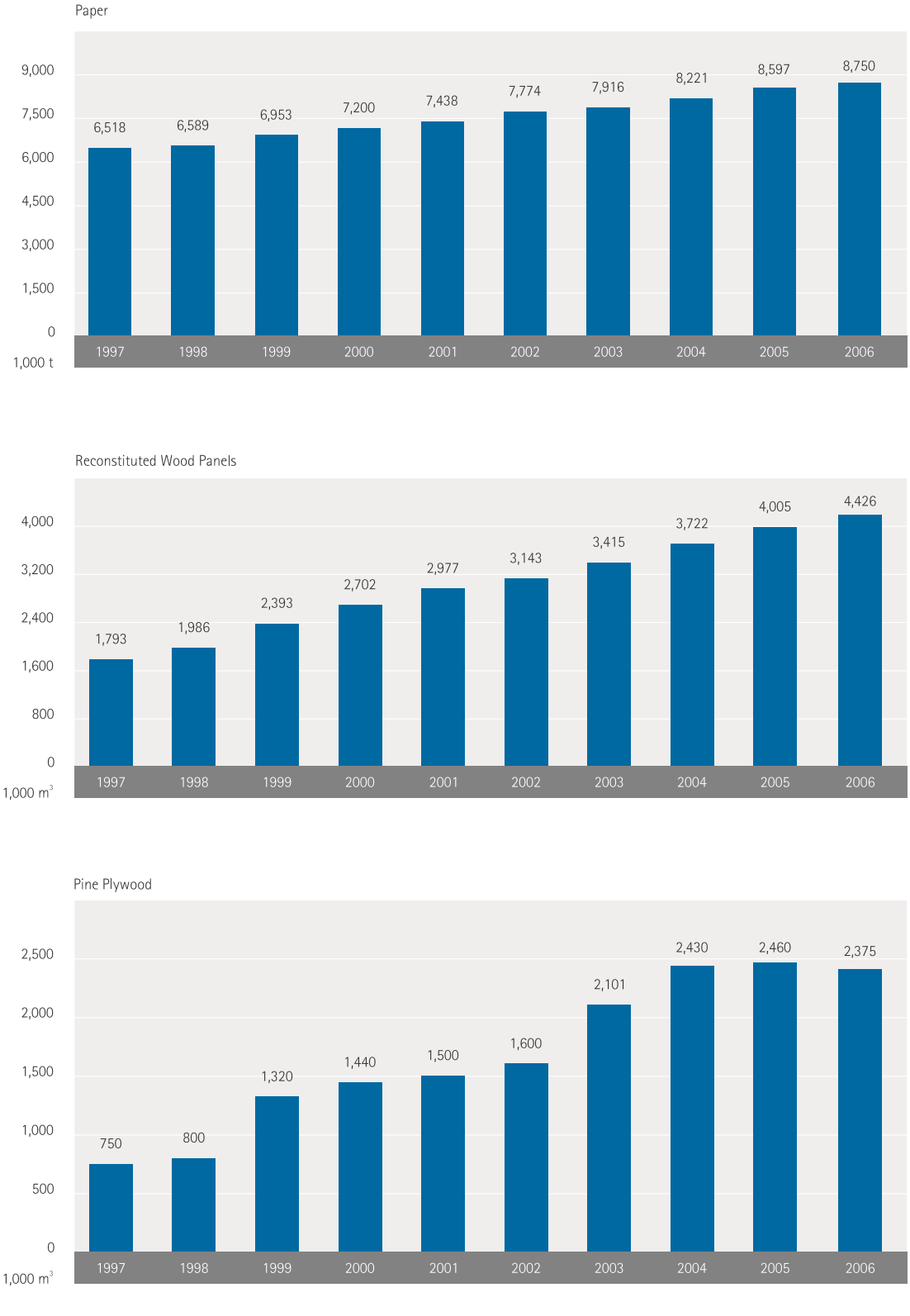
Graph 3.08 | Evolution of the Main Forest Plantation Based Products in Brazil (1997-2006)



Source | BRACELPA, 2005

Graph 3.08 | Evolution of the Main Forest Plantation Based Products in Brazil (1997-2006)

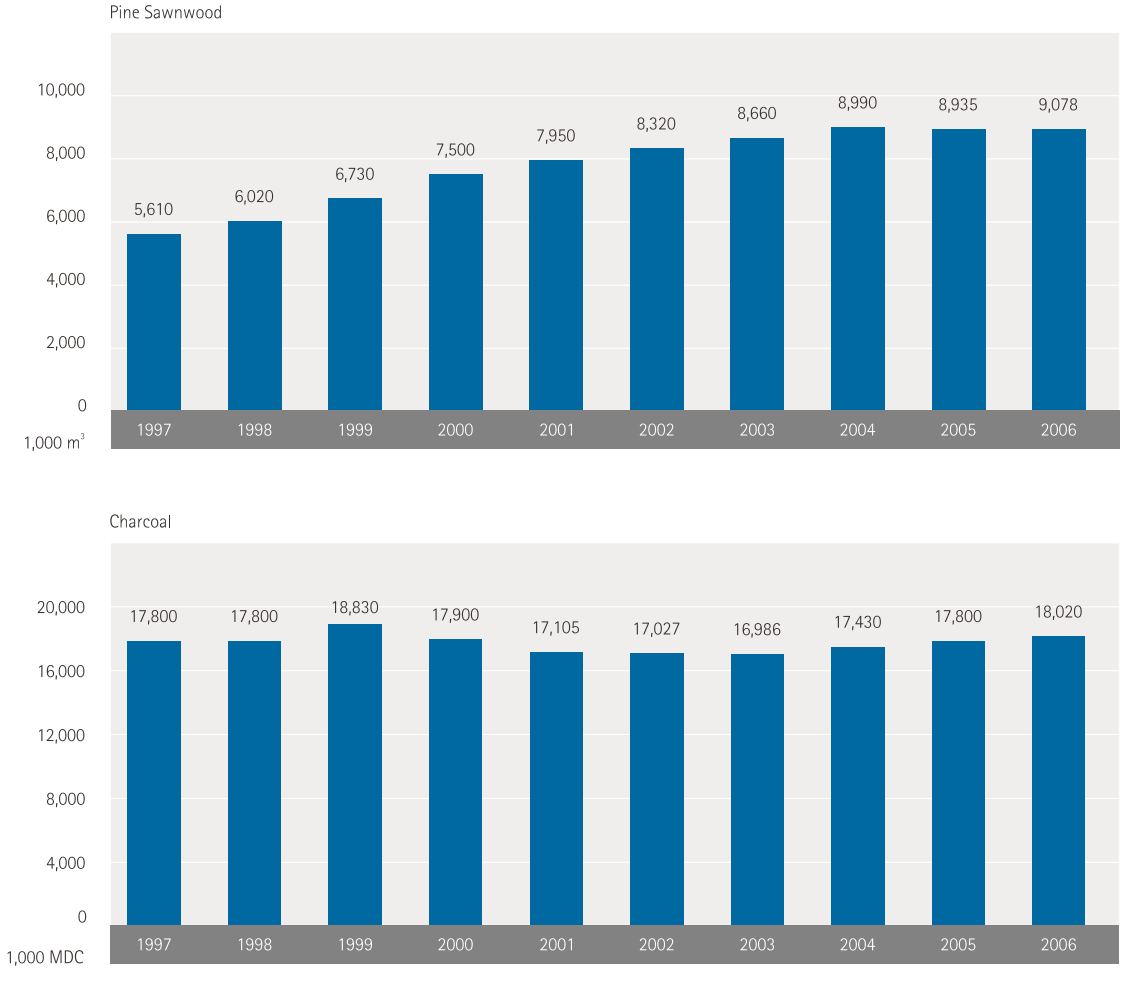
Continuation



Source | BRACELPA, ABIPA, ABIMCI, 2006

Graph 3.08 | Evolution of the Main Forest Plantation Based Products in Brazil (1997-2006)

Continuation



Source | ABIMCI, AMS, SINDIFER, 2006

The Brazilian pulp production grows at 6.4% since 1997. In 2006 the national production reached 11.1 million tons and domestic consumption was half of that of 5.35 million tons. Brazil occupies a 7th position as pulp producing countries, and the first position as short fiber producer.

The Brazilian paper production closed at 8.75 million ton in 2006 and an annual increment of 3.3% from 1997 to 2006. The main paper types produced in the country are packing, printing, and cardboard and sanitary papers.

Despite the fact that the Brazilian wood panels production has been around 4.1 million m^3 in the last three years, present production is more than twice the volumes reached in the last ten years. The furniture industry as one of the main wood reconstituted panels' consumers has been responsible for most of the increases in the domestic consumption of the product. In 2006, the domestic consumption of reconstituted panes was 4.3 million m^3.

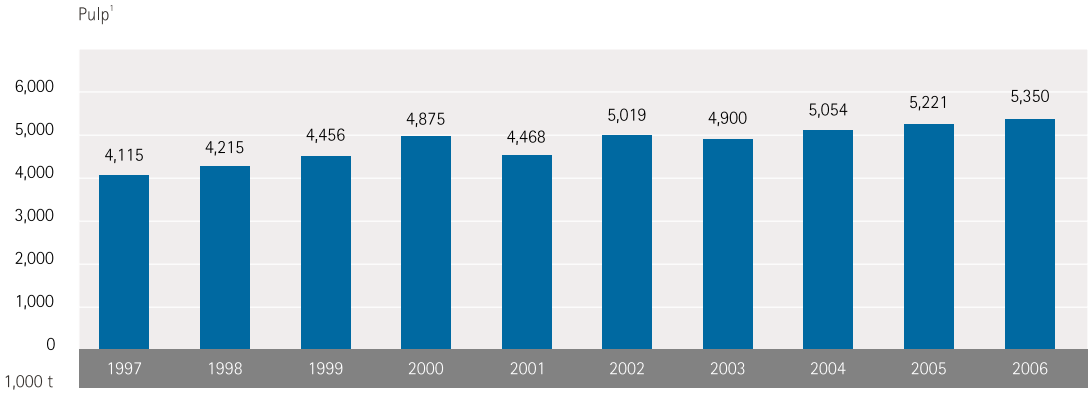
The Brazilian pine plywood production experienced a decrease of 3.5% from 2005 to 2006 in reason of the Brazilian currency growing appreciation as the segment is strongly tied to exports. World market fall in prices also affected production in Brazil provoking the closing of many industrial units. From 1997 to 1998 the plywood production was stable and started to grow in 1999. By 2006 the domestic plywood consumption was around 430 thousand m^3, a rather low proportion of the whole production, which is mostly directed to foreign markets, mainly the United States.

The production of pine sawnwood in 2006 reached 9.078 m^3 and it was concentrated in Southern Brazil. The domestic market has a great importance in the consumption of the product and in 2006 it demanded 7.5 million m^3 (85% of the national production). A reason is found on the fact that Brazilian industry have specialized on further wood processing delivering wooden moldings for the external markets.

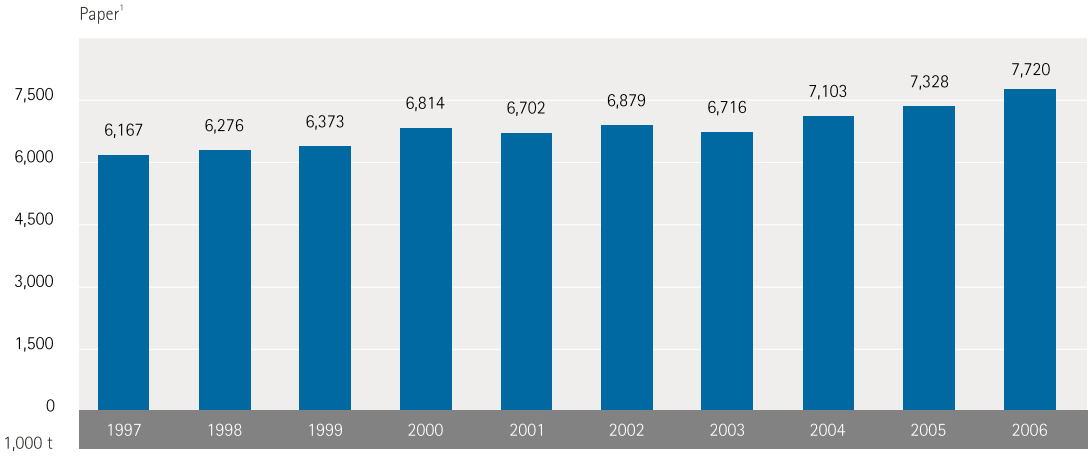
The Brazilian forest plantation-based charcoal production was around 18 million mdc in 2006 showing a slight increase of 0.1 % comparatively to 1997. As graph 3.09 shows, the production of charcoal has oscillated for the last ten years. This fact is linked to the higher or lesser utilization of mineral coal partly by metallurgic companies and mostly because of the variation of the pig iron demand.

The charcoal consumption is equivalent to its national production, mainly stimulated by metallurgy. Almost 6.3 million tons of pig iron was exported in 2006. The United States are responsible for about 70% of the Brazilian exports. As a tendency, it can be said that large consuming agro industrial complexes tend to promote diesel and other fossil fuels replacement by charcoal and this will consequently increase its consumption and production as well as for the coming years.

Graph 3.09 | National Consumption of Forest Plantation Based Products (1997-2006)



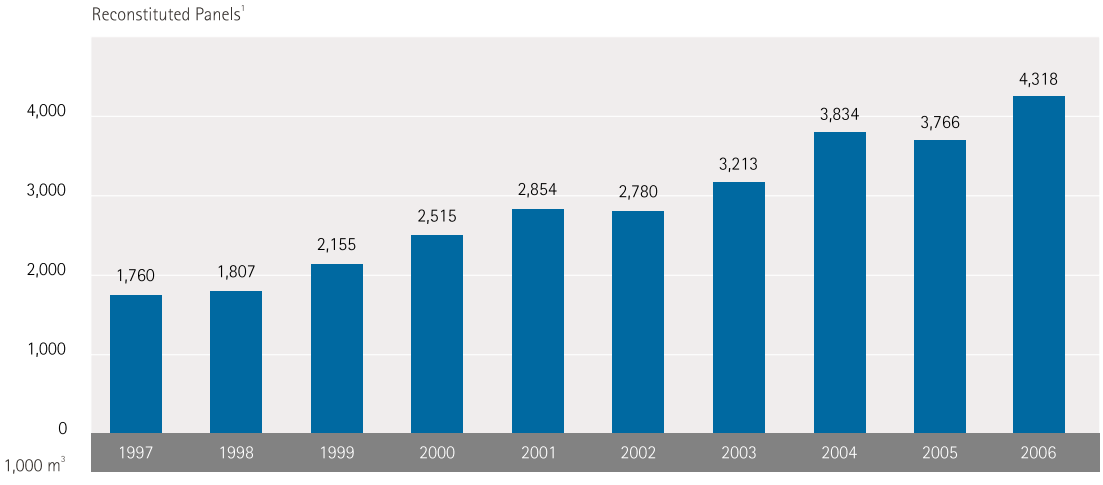
Source | BRACELPA, 2006
[1]Apparent Consumption = ((Production + Imports) – Exports)

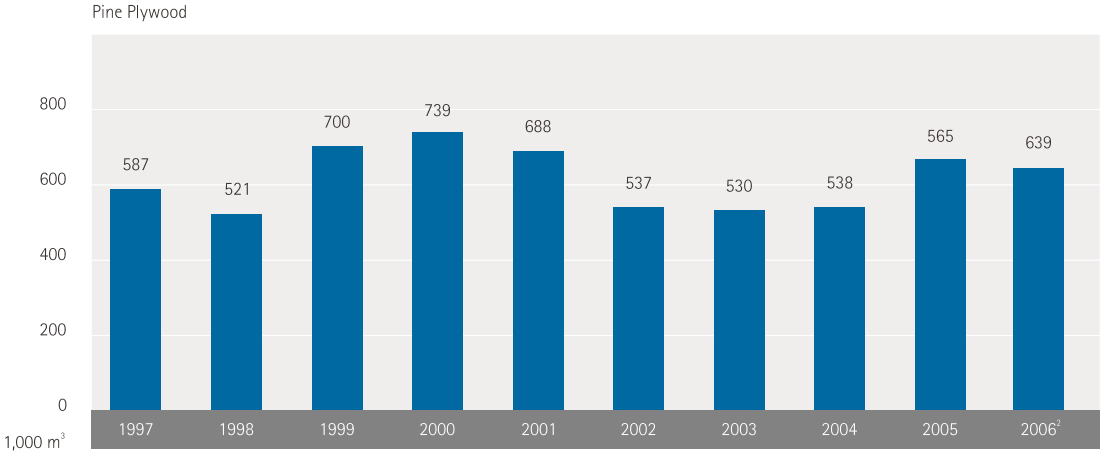


Source | BRACELPA, 2006

Graph 3.09 | National Consumption of Forest Plantation Based Products (1997-2006)

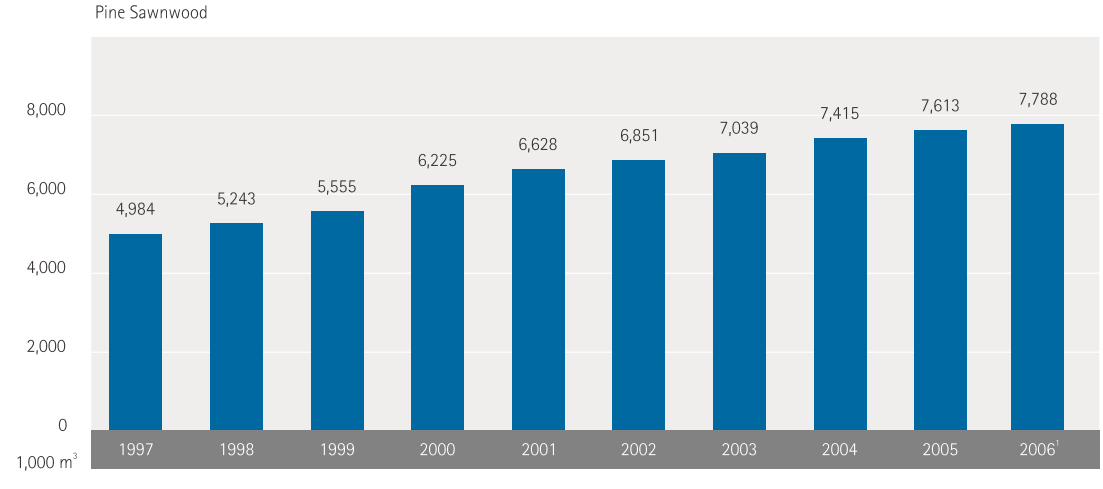
Continuation





Source | ABIPA, ABIMCI, BRACELPA, 2006

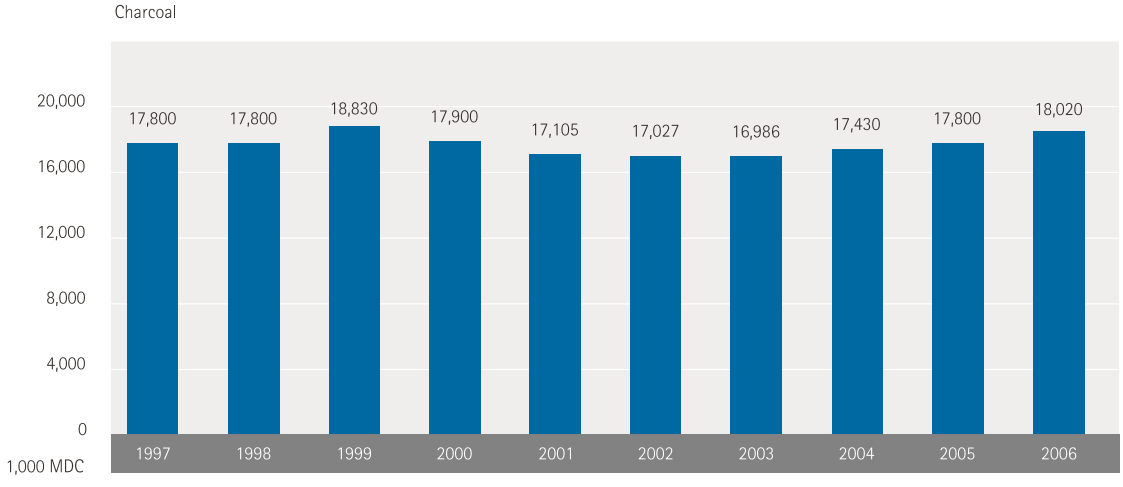
[1] Apparent Consumption = ((Production + Imports) – Exports)



Source | ABIPA, ABIMCI, 2006

Graph 3.09 | National Consumption of Forest Plantation Based Products (1997-2006)

Continuation



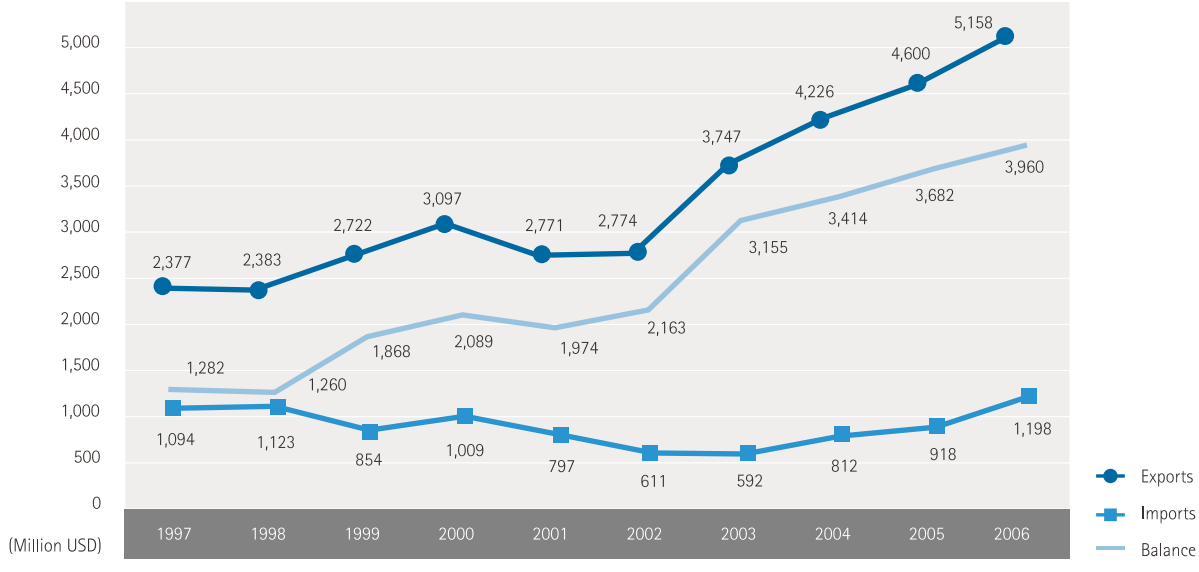
Source | AMS, SINDIFER, 2006

3.3 | International Trade

In 2006, Brazilian exports had a new record reaching USD 137.5 billion compared to USD 118.3 of 2005, the increment was of 16.2%. In 2006 the forest sector exported USD 7.72 billion representing 5.6% of the country's total exports. The sector of planted forests exported the equivalent to USD 5.16 billion and in 2005 the same sector exported USD 4.68 billion resulting in a 10% increase from 2005 to 2006.

When compared to the exports, the imports of Forest products are negligible. These are restricted to some products as in the case of long fiber cellulose and some types of paper (see graph 3.10). The sector's imports are mostly composed of machinery and forestry equipment (harvesting and transportation) and for expanding industrial capacities of the segments linked to planted forests.

Graph 3.10 | Commercial Balance of Forest Plantation Based Products in Brazil (1997-2006)



Source | SECEX, 2006

It is remarkable the high competitivity of Brazilian Forest products in the international market. It results from the good and continuous performance of Brazilian plantation-based forest products, mostly notably represented by pulp and plywood of pinus.

Checking on table 3.03 is evident that pulp and paper are the products with a higher participation in Brazilian exports (51.9% of total exports). The participation of other products in the exports is lower because most of these are oriented towards domestic markets.

Table 3.03 | Exports of Brazilian Forest Products (Million USD) (2000-2006)

	Exports - Million USD						
Product	2000	2001	2002	2003	2004	2005	2006
Cellulose	1,602	1,247	1,160	1,744	1,722	2,034	2,484
Paper	941	943	894	1,087	1,187	1,371	1,521
Sawnwood[1]	213	229	245	255	294	304	275
Reconstituted panels	70	71	97	121	161	176	175
Plywood[1]	156	156	211	344	521	510	438
Charcoal	1	2	2	2	6	4	3
Others	1,351	1,327	1,537	1,768	2,559	2,708	2,820
TOTAL[2]	**4,333**	**3,974**	**4,145**	**5,322**	**6,450**	**7,107**	**7,716**

Source | SECEX, 2006. Adapted by STCP

[1] Pine

[2] Total exports of the forest sector (Natural and Planted)

Chapter 4

Importance of Planted Forests for Brazil

Taxes

Gross Product Value (GPV)

Job Generation

Financing Mechanisms for Forest Plantations

Human Development Index (HDI)

Environment

Social Responsibility

Forest Outgrower Programs

Health Programs

Non-Wood Forest Production

Environment

Education and Culture

4 | Importance of Planted Forests for Brazil

The planted forest sector in Brazil is noted on the social-economic scenario for its significant contribution to responsible social-economic development as well as in tax, foreign currency, and job generation. Planted forest activities are integrated into various industrial timber transformation chains and such diversification has lead to a multiplier effect to the overall Brazilian economic panorama.

4.1 | Taxes

The industrial segments associated with planted forests are important generators of government revenue, as taxes, contribution, and fees.

The main Federal, State and Municipal taxes are the IRPJ (Corporate Income Tax) ICMS (Tax on Sales and Services), PIS/COFINS (Contribution for the Social Integration Program/Tax for Social Security Financing), PASEP (Public Servant Fund), ISS (Municipal Service Tax) IOF (Federal Tax on Financial Transactions), CPMF (Temporary Federal Tax on Financial Movement) and ITR (Federal Rural Property Tax).

In 2006, planted forests in Brazil contributed with BRL 9.26 billion in taxes which represents about 1.1 % of total taxes collected by the Brazilian government (BRL 815 billion) – see table 4.01 and Methodological Notes (5.5).

Table 4.01 | Estimative of Taxes Paid by the Planted Forest Segments in 2006

Segment	BRL (million)	%
Forest Industries (Planted Forests)	9,264	1.1
Brazil (Federal, State and Municipal taxes)	815,070	100

Source | IBPT (Brazil), BRACELPA, ABIMCI, ABIPA, SINDIFER, 2006. Adapted by STCP, 2006

4.2 | Gross Product Value (GPV)

The Gross Product Value quantifies the value of gross revenue from different sectors of the economy.

In 2006, the planted forest segment had gross revenue of about BRL 6.4 billion. The Gross Product Value (GPV) generated by the all the industrial planted timber transformation chain exceeded BRL 56.6 billion in 2006, as shown in table 4.02 (for reference see Methodological Notes Item 5.4). This includes the gross production value of the primary forest sector.

The pulp and paper segments together with the solidwood industry responded for 71% of the total gross revenue. The other segments such as furniture, reconstituted wood panels and pig-iron & steel responded for respectively 19%, 8% and 2% of the total GPV.

Table 4.02 | Estimates of Gross Product Value for the Industrial Planted Forest Transformation Chain in 2006

Segmento	BRL (million)	%
Pulp and paper	25,211	45
Solidwood Industry[1]	15,032	27
Reconsittuted panels[1]	10,544	19
Furniture	4,800	8
Pig iron and Steel	1,000	2
TOTAL	**56,587**	**100**

Source | AMS, BRACELPA, IBGE, ABIPA, SINDIFER, STCP, 2006
[1] Only products form planted forests

4.3 | Geração de Empregos

The activities carried out by the planted forest transformation chain and the diversified timber transformation industries in Brazil result in significant job creation. Some estimates show that the planted forests productive chain (primary and secondary transformation industry) responded in 2006 for about 4.3 million jobs, including direct (680,000), indirect (1.7 million) and jobs resulting from the so-called income effect (1.9 million) (See table 4.03 and Methodological Notes – Item 5.7).

Table 4.03 | Estimates of the Number of Direct, Indirect and Income Effect Jobs by the Planted Forests Sector in 2006

Segment		Total Jobs in the Planted Forests Sector			
		Direct	Indirect	Income-Effects	TOTAL
Planted Forests	Silviculture [1]	239,801	940,085	615,592	1,795,478
Industry	Pig iron & Steel	15,263	257,555	494,124	766,941
	Solidwood Products	167,264	125,020	167,835	460,118
	Furniture	147,726	110,416	148,230	406,372
	Pulp and Paper	109,860	288,615	504,611	903,086
TOTAL		**679,913**	**1,721,691**	**1,930,391**	**4,331,995**

Source | Estimate by ABRAF/STCP, 2006
[1] See the Methodological Notes section 5.4 about the methodology used to calculate the number of jobs in Silviculture

The number of jobs in table 4.04 highlights the job generation capacity of the planted forest sector. A study carried out by BNDES in 2004 about job generation, and titled Estimates of the BNDES Job Generation Model ("*Estimativa do Modelo de Geração de Empregos do BNDES*"), pointed out that the solidwood and furniture segments rank as the 5th largest job generating in Brazil out of 41 economic sectors. According to BNDES methodology, for investments of BRL 10 million to increase production capacity in this sector, the creation of new 293 direct jobs, 219 indirect jobs and 294 income-effect jobs (in order sectors of the economy) is estimated as shown in table 4.04. The pulp and paper and the pig-iron & steel segments rank respectively in the 20th and 27th positions.

In this scenario ABRAF member companies currently maintain a total of 57.5 thousand jobs (directly employed and outsourced) in silviculture. Besides there are 34.7 thousand direct jobs in the industry, as shown in graph 4.01.

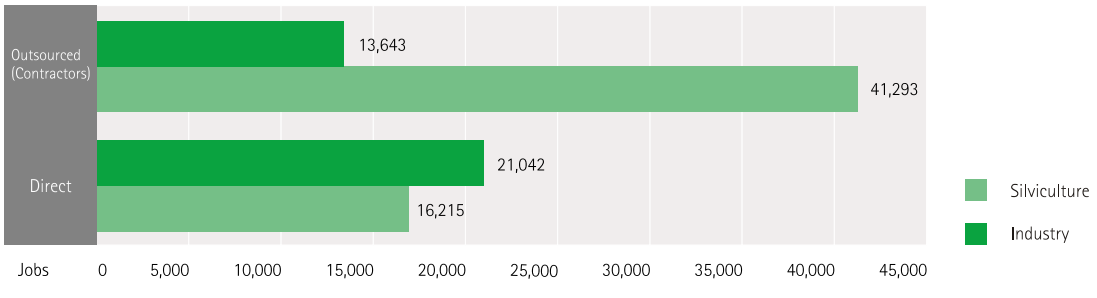
According to this scenario the ABRAF member companies generated in 2006 a total of 57.5 thousand direct jobs (own + outsourced) in silviculture besides 34.7 thousand direct industrial jobs (graph 4.01).

Table 4.04 | Ranking of the Main Industries as Job Generators (for Each BRL 10 Million Invested)

Ranking	Setor	Job Generation (number)			
		Direct	Indirect	Income-Generated Effects	TOTAL
1º	Family assistance	665	104	311	1,080
2º	Clothing	613	136	250	1,000
3º	Farming and livestock	393	131	303	828
4º	Trade	449	84	278	810
5º	Sawnwood and Furniture	293	219	294	805
6º	Coffee industry	41	356	323	719
7º	Shoemaking	246	174	290	711
8º	Sugar industry	32	307	337	677
9º	Meat	36	358	270	664
10º	Support service to companies	293	63	288	645
20º	Pulp and Paper	59	155	271	485
27º	Pig iron and Steel	8	135	259	402

Source | BNDES, 2004, adapted by STCP, 2006

Graph 4.01 | Jobs generated by ABRAF Member Companies



Source | ABRAF Member Companies, 2006

Taking into consideration that investments prospects for 2012 reach BRL 24 billion, it is estimated that the planted forests sector will be able to generate around 1.164 million new jobs (direct, indirect and in other areas of the economy), thanks to the income increase provoked by hired workers (Income effects). Out of this total 141.6 thousand jobs will be direct contracted by the companies or outsourced.

Table 4.05 | Estimates of Jobs to be Generated by the Planted Forest Sector by 2012

Sectors	Investments (BRL million)	Job Generation			
		Direct	Indirect	Income-Generated Effects	TOTAL
Pulp and Paper	16,000	94,400	248,000	433,600	776,000
Solidwood Industry	4,000	117,200	87,600	117,600	322,400
Pig-iron and Steel	4,000	3,200	54,000	103,600	160,800
TOTAL	**24,000**	**141,600**	**372,000**	**650,400**	**1,164,000**

Source | ABRAF Member Companies, STCP, 2006, BNDES, 2004

4.4 | Financing Mechanisms for Forest Plantations

There are several financing mechanisms for planted forests in Brazil. Most relevant national institutions include the National Economic and Social development Bank (BNDES - *Banco Nacional de Desenvolvimento Econômico e Social*, Banco do Brasil (BB), The Ministry of Agrarian development (MDA) and the Ministry of the Environment (MMA) have created and developed financing programs for forest plantations through loans to producers and forest companies.

The National Agricultural Family Strengthening Program (PRONAF Florestal – *Programa Nacional de Fortalecimento da Agricultura Familiar*) and the Commercial Plantation and Forest Recovery Program (PROPFLORA – Programa de Plantio Comercial e Recuperação de Florestas) have desimbursed over BRL 60.5 million for Forest plantations in 2006 (see table 4.06).

Besides, there are specific credit lines for Forest activities in different regions and states including commercial financing and resource transfers coming from forest taxes.

Table 4.06 | Disembursements Pronaf Florestal and Propflora (2005 and 2006)

State	2005				2006			
	PRONAF - Florestal	PROPFLORA	TOTAL	%	PRONAF - Florestal	PROPFLORA	TOTAL	%
	(1,000 BRL)	(1,000 BRL)	(1,000 BRL)		(1,000 BRL)	(1,000 BRL)	(1,000 BRL)	
BA	6	265	271	0.5	1,069	113	1,182	2.0
ES	3,118	3.863	6,981	13.9	2,738	3,901	6,639	11.0
GO	6	17	23	0.0	73	4	77	0.1
MT	60	807	867	1.7	46	85	131	0.2
MS	-	230	230	0.5	0	0	0	0.0
MG	2,028	4,777	6,805	13.6	2,579	7,087	9,666	16.0
PR	523	2,051	2,574	5.1	1,449	8,920	10,369	17.1
RJ	32	-	32	0.1	38	0	38	0.1
RS	4,348	16,583	20,931	41.8	4,358	17,613	21,971	36.3
SC	1,580	6,838	8,418	16.8	2,415	4,136	6,551	10.8
SP	613	2,351	2,964	5.9	1,176	2,134	3,310	5.5
Others	-[1]	-[1]	-[1]	-[1]	443	143	586	1.0
TOTAL	12,314	37,782	50,096	100.0	16,383	44,136	60,519	100.0

Source | MMA, BNDES, 2006
-[1] Non-identified resources

4.5 | Human Development Index (HDI)

The Human Development Index (HDI) is an indicator that measures the quality of life in a country, region or municipality. It is composed of three sub-indexes: education, life expectancy at birth (longevity) and per capita income (income), and it serves as a comparison among countries and regions and for monitoring the quality of life over time.

The HDI varies from 0 to 1. If the index is smaller than 0.5, human development is considered low. If it is between 0.5 and 0.799, it is considered average and if it is larger than 0.8, human development is considered high.

Table 4.07 provides the HDI-M (Municipalities) for the state capital and selected cities of major States with planted forests, for different grouped forest products segments. It can be seen that the HDI-M by segment for selected municipalities with forest

plantation activity show that the pulp and paper and pig-iron & steel segments have a significant level of development.

It can also be noted from table 4.07 that the HDI-M growth in municipalities with planted forests (linked to pulp and paper, pig-iron & steel, solidwood products and reconstituted wood panel) associated to the wood transformation industry was higher than the average for selected States and capital cities. This is true both for HDI-M as a whole and for its component HDI-I (income). Overall, the growth observed in selected municipalities with planted forest activities is above two digits, well above the average growth for the states as a whole.

Table 4.07 | HDI-M for Selected States, Capitals and Municipalities with Planted Forest Activities

Federal States and Municipalities	HDI-M (1991)	HDI-M (2000)	% Change HDI-M (1991-2000)	HDI-M Income 1 (1991)	HDI-M Income 1 (2000)	% Change HDI-M (1991-2000)
BAHIA	0.590	0.688	16.6	0.572	0.620	8.4
Salvador	0.751	0.805	7.2	0.719	0.746	3.8
ESPÍRITO SANTO	0.690	0.765	10.9	0.653	0.719	10.1
Vitória	0.797	0.856	7.4	0.793	0.858	8.2
MINAS GERAIS	0.697	0.773	10.9	0.652	0.711	9.0
Belo Horizonte	0.791	0.839	6.1	0.779	0.828	6.3
PARANÁ	0.710	0.790	11.2	0.680	0.740	8.8
Curitiba	0.799	0.856	7.1	0.793	0.846	6.7
RIO GRANDE DO SUL	0.753	0.814	8.1	0.702	0.754	7.4
Porto Alegre	0.824	0.865	4.9	0.818	0.869	6.2
SANTA CATARINA	0.748	0.822	9.9	0.682	0.750	9.9
Florianópolis	0.824	0.875	6.2	0.803	0.867	7.9
SÃO PAULO	0.778	0.820	5.4	0.766	0.79	3.1
São Paulo	0.805	0.841	4.4	0.822	0.843	2.6
Selected Municipalities with Planted Forest Activities						
Pulp and Paper						
Itapebi - BA	0.505	0.636	25.9	0.455	0.520	14.3
Itabela - BA	0.524	0.637	21.6	0.493	0.543	10.1
Curiúva - PR	0.581	0.675	16.2	0.521	0.590	13.2
Cambará do Sul - RS	0.676	0.760	12.4	0.617	0.682	10.5
Canoinhas - SC	0.696	0.780	12.1	0.608	0.697	14.6
Siderurgia						
Antônio Dias - MG	0.557	0.661	18.7	0.515	0.569	10.5
Bom Despacho - MG	0.721	0.799	10.8	0.654	0.729	11.5
Curvelo - MG	0.685	0.755	10.2	0.613	0.665	8.5
Carbonita - MG	0.593	0.679	14.5	0.533	0.561	5.3

Source | Atlas do Desenvolvimento Humano no Brasil (PNUD). Adapted by STCP, 2006

[1] HDI-M Income – category that analyses access of population to needed resources to achieve a decent life standard.

Table 4.07 | HDI-M for Selected States, Capitals and Municipalities with Planted Forest Activities

Continuation

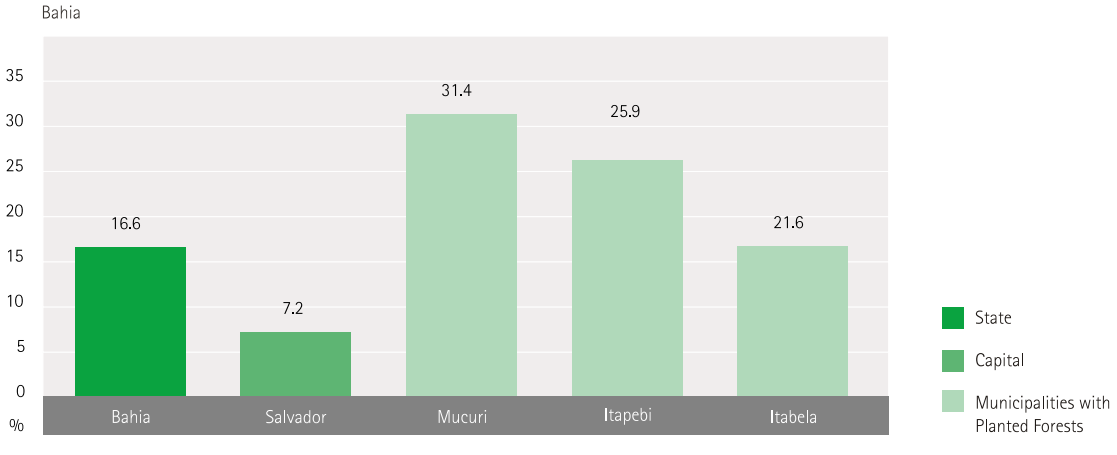
Federal States and Municipalities	HDI-M (1991)	HDI-M (2000)	% Change HDI-M (1991-2000)	HDI-M Income 1 (1991)	HDI-M Income 1 (2000)	% Change HDI-M (1991-2000)
Solidwood Products						
Bituruna - PR	0.621	0.715	15.1	0.554	0.622	12.3
Rio Negro - PR	0.710	0.801	12.8	0.659	0.706	7.1
Palmas - PR	0.677	0.760	12.3	0.617	0.682	10.5
Reconstituted Wood Panels						
Jaguariaíva - PR	0.679	0.757	11.5	0.657	0.671	2.1
Santa Cecília - SC	0.674	0.746	10.7	0.620	0.644	3.9
BRAZIL	**0.696**	**0.766**	**10.1**	**0.751**	**0.850**	**13.2**

Source | Atlas do Desenvolvimento Humano no Brasil (PNUD). Adapted by STCP, 2006

[1] HDI-M Income – category that analyses access of population to needed resources to achieve a decent life standard.

Graph 4.02 shows the percentage growth of HDI-M between 1991 and 2000 for selected states and municipalities with concentration of planted forest activities. In all cases, it can be seen that the growth of HDI for municipalities with planted forests is higher than the average for the states as a whole and their respective State capitals.

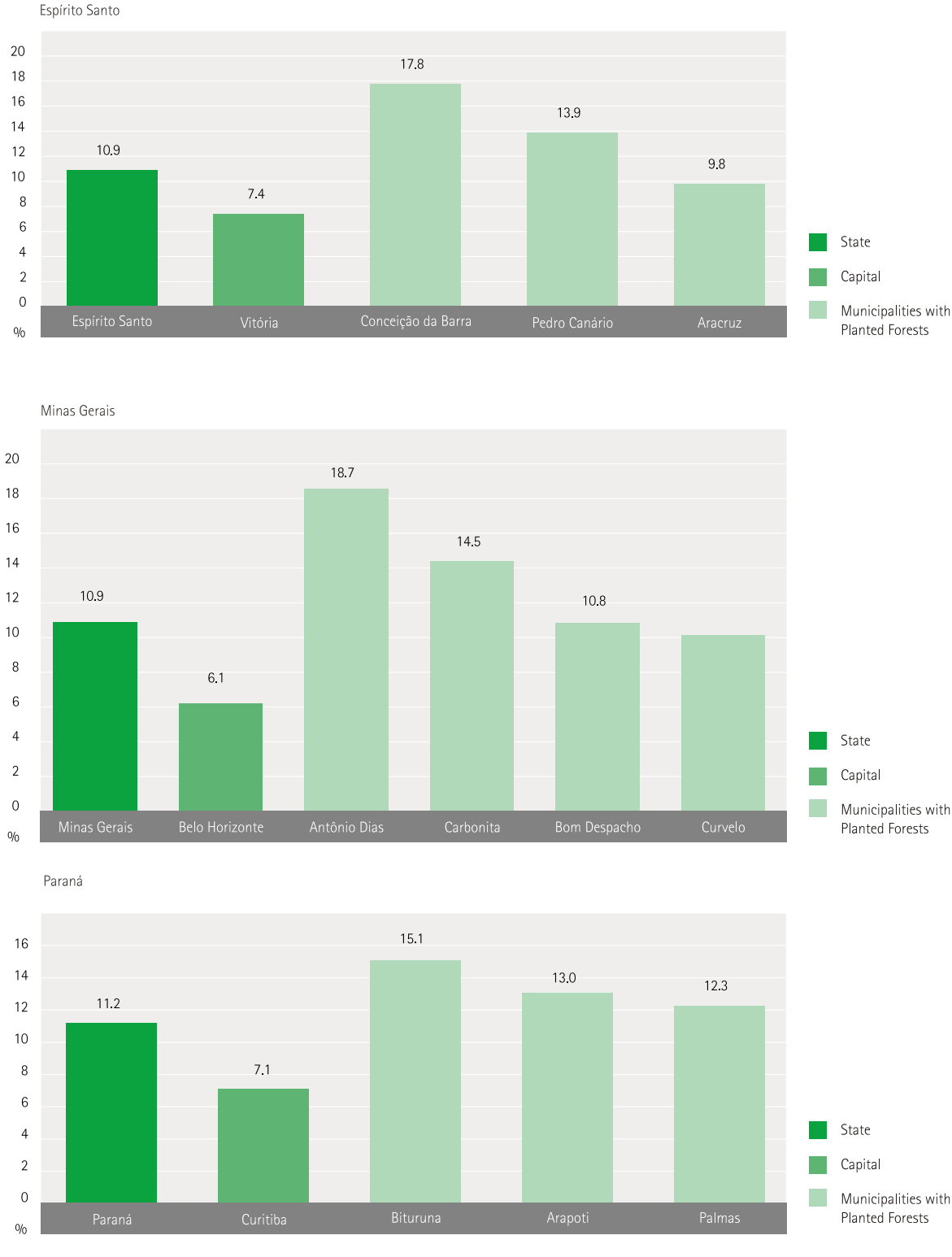
Graph 4.02 | HDI-M Percentage Growth in State, Capital and Municipalities with Planted Forest Activities (1991-2000)



Source | Atlas do Desenvolvimento Humano no Brasil (PNUD). Adapted by STCP, 2006

Graph 4.02 | HDI-M Percentage Growth in State, Capital and Municipalities with Planted Forest Activities (1991-2000)

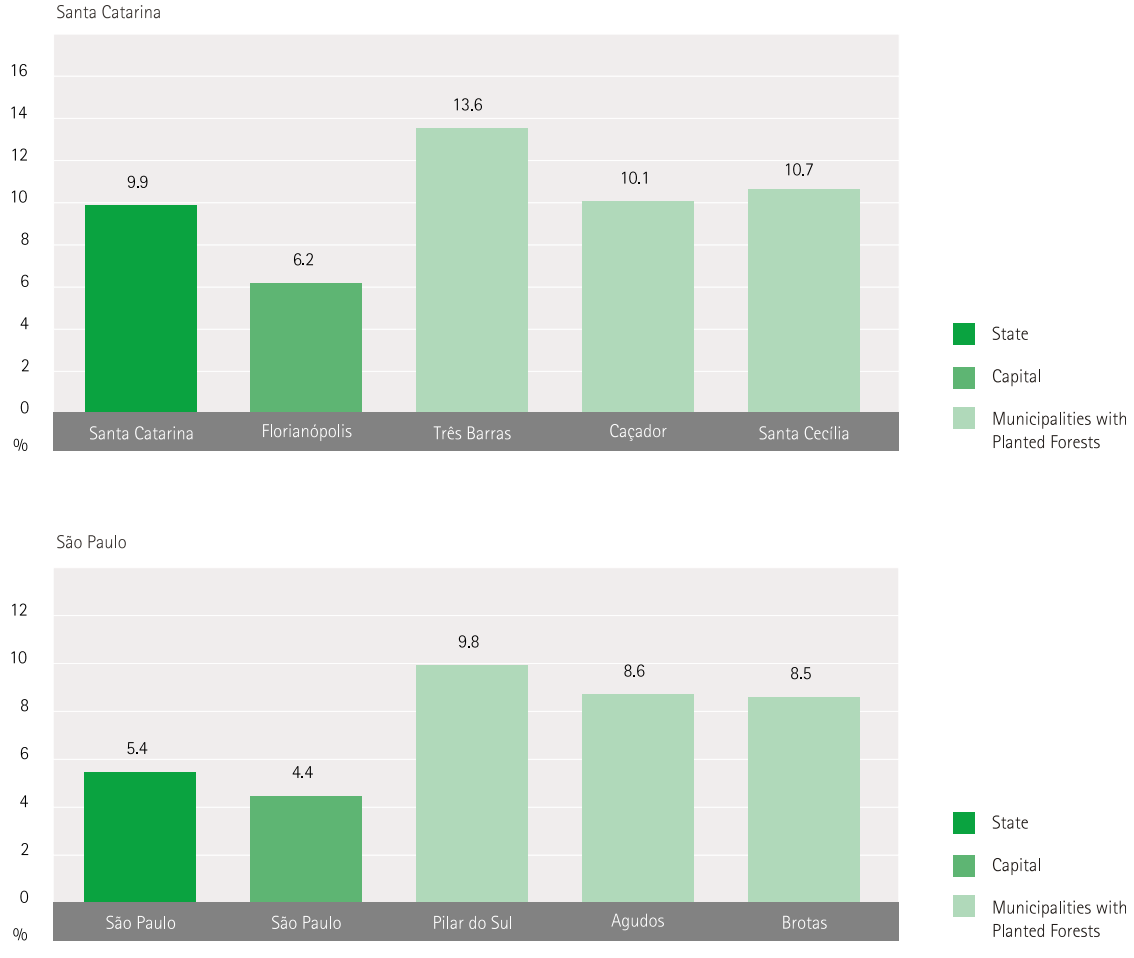
Continuation



Source | Atlas do Desenvolvimento Humano no Brasil (PNUD). Adapted by STCP, 2006

Graph 4.02 | HDI-M Percentage Growth in State, Capital and Municipalities with Planted Forest Activities (1991-2000)

Continuation



Source | Atlas do Desenvolvimento Humano no Brasil (PNUD). Adapted by STCP, 2006

4.6 | Environment

Natural Brazilian forests cover 538.7 million hectares and out of this total around 0.8% are protected by companies belonging to the plantation forests sector. The modalities for preservation are considered by law as Permanent Preservation Areas (APP - *Áreas de Preservação Permanente*), Legal Reserves (RL - Reserva Legal) and Private Reserves of Natural Protection (RPPN - *Reserva Particular do Patrimônio Natural*) among others, as shown in table 4.08.

Table 4.08 | Participation of the Planted Forest Segment and ABRAF Member Companies in the Protection of Natural Forests (2005 and 2006)

Environmental Preservation by Segment	Protected Areas - Natural Forests (2005)		Protected Areas - Natural Forests (2006)	
	ha (1,000)	%	ha (1,000)	%
Planted Forests	3,711	0.69	3,795	0.70
ABRAF Member Companies	1,282	0.24	1,345	0.25
Other Segments	533,754	99.07	533,607	99.05
TOTAL – Brazil	**538,747**	**100**	**538,747**	**100**

[1]check on methodological notes
Source | FAO (2004), ABRAF e STCP (2006)

Certification

In a period of globalisation and high competition, where market requirements dictate industrial production rules, the Brazilian forest sector has sought to follow this rhythm of changes. Therefore, it has become more appropriate to react to the new models and trends, investing in increased product value in the domestic and international markets. The growing awareness of the Brazilian society as for forest protection has led consumers to drive forest practices and their resulting products to be produced under a sustainable manner and contribute somewhat to forest resources protection.

In order to meet these requirements, forest and environmental certification programs have been defined as market instruments for companies of the sector. Forest certification is a voluntary process on the part of companies that certify the origin and main features of their forest products according to established principles and criteria.

Certification is therefore a recognition and guarantee for consumers and the society as a whole that the certified product comes from sustainable managed forests as for environmental, social and economic aspects. Products with forest certification seal are those produced from certified forest timber.

Forest certification requires the implementation of a sustainable forest management system and a forest policy by the certified company. In general, the main advantages of forest certification are the increased environmental and social credibility and responsibility of the certified company, adjustment to market requirements, access to new markets, product differentiation and value-added, reduction of environmental impacts, and greater protection and conservation of environmental resources.

There are two forest certification systems in operation in Brazil, which respond for certification of planted and natural forests: (i) The Forest Stewardship Council (FSC); and (ii) The Brazilian Program of Forest Certification (CERFLOR - *Certificado Nacional de Qualidade Ambiental de Florestas*). The total area of certified forest in Brazil in 2006 reached 5.7 million hectares with most of the area certified under the FSC scheme. Out of this total, 3.0 million hectares correspond to pine and eucalypt. Up to 2006, ABRAF members accounted for approximately 68.3% of the total certified planted forests in Brazil, totaling 2.0 million hectares.

4.7 | Social Responsibility

ABRAF member companies as many other Brazilian companies of the sector have increased their investments in social responsibility, especially in relation to social and economic needs of the populations in the areas of influence of forests and production units. This is a key issue at present, for the importance of sustainable development is fully acknowledged in correspondence with social and economic needs

ABRAF associated companies, on other words, besides economic development are implementing social development actions locally focused and established on the participation of diverse actors including the company itself, public institutions and the civil society.

In this particular some projects are to be highlighted like initiatives related to family agriculture targeting small holders and native communities with the purpose of income and job generation within the companies lands. Partnerships with peasant communities and individual farmers are also another type of local arrangement developed by ABRAF member companies including honey production and other alternative projects with the purpose of adding value to the local production. The companies' social action furthers into training personnel with especial needs and professional upgrading for wood utilization including the production of handcrafts.

Summing up, ABRAF member companies promote hundreds of programs in different Brazilian states and investing around BRL 76.3 million and assisting 1.088 million people in 2006, as shown in table 4.09.

The differences between figures of 2005 and 2006 are due to a better quantification of the many programs carried out by ABRAF member companies in reference to people and to the assisted municipalities assessed in 2006.

Table 4.09 | Main Results of the Social Programs Promoted by ABRAF Member Companies (2005 and 2006)

Year	TOTAL Number of Beneficiaries	TOTAL Number of Assisted Municipalities	Investments (BRL 1,000)
2005	652,827	579	36,334
2006	1,088,457	742	76,264

Source | ABRAF Member Companies, adapted by STCP
Note | Data furnished by ABRAF Member companies

4.7.1 | Forest Outgrower Programs

Forest outgrower programs and forest partnerships between forest companies and rural landowners are two forest production schemes with a growing trend in Brazil. These forest development schemes came about after the end of the forest fiscal incentive program, with the objective of guaranteeing sustainable wood supply for forest companies.

Forest outgrower scheme is an innovative form of partnership between forest companies and farmers in different regions of the country favoring wood production, social development and joint-efforts for environmental conservation of natural areas within the companies influence regions. Currently, in addition to guaranteeing the industrial roundwood supply for forest companies, forest outgrower programs respond to the needs of the forest transformation chain and a sustainable socio-economic development, relying not only on economic performance.

The features of the most common forest outgrower schemes are: (i) seedling donations and sale to landowners; (ii) anticipated income programs to support forest planting in family farms; (iii) company-landowner partnership allowing anticipate roundwood-equivalent payments for services provided by the company on rural properties; (iv) guarantee of wood purchase at harvesting; or (v) full land leasing and operations carried out by forest companies.

Besides the forest outgrower programs sponsored by private companies, some states also have their own public forest development programs in order to generate benefits that include market outlets and income generation. Other benefits include jobs and income in areas with lesser economic opportunities and this creates synergies for other forest activities.

Moreover, communities benefit from the labour training, improved infrastructure and created jobs. Taking into account

environmental protection, forest outgrowers collaborate with the maintenance of local biodiversity on small and medium-sized properties, with the sustainable forest management by reducing pressure on natural resources, and with reduction of soil degradation, besides the transferring of sustainable practices from forest companies to small landowners.

In 2006, the ABRAF member companies were responsible for carrying out development programs in over 400 municipalities in several states, totaling 290,000 hectares of planted forests. This represents an increase of 12% of the planted area under forest outgrower schemes of ABRAF member companies compared to 2005 (258,200 hectares). It is estimated the program had the participation of 17,016 small and medium-sized landowners. Table 4.10 shows the results of the forest outgrower programs and new contracts by ABRAF member companies in 2006.

Table 4.10 | Results of Forest Outgrower Programs by ABRAF Member Companies in 2006

Type	TOTAL Beneficiaries	Number of Forest Outgrowing Contracts	TOTAL Planted Area (ha 1,000)
TOTAL up to 2006[1]	17,016	18,699	290
New Contracts (in 2006)	2,262	2,420	64.7

Source | ABRAF Member Companies, adapted by STCP
[1]Including 2006
Note | Data furnished by ABRAF member companies

4.7.2 | Health Programs

In tune with its social responsibility vision, ABRAF member companies are in charge of programs, projects and health campaigns at the communities belonging to the companies influence areas. Currently, company employees receive benefits from programs oriented towards disease prevention, medical and dental assistance and maintenance of health care centres and hospitals in their regions of influence. As presented in table 4.11, about 364,000 people received assistance by health programs promoted by ABRAF member companies in 2006.

Table 4.11 | Results of Health Programs Carried Out by ABRAF Member Companies in 2006

Year	TOTAL Number of Beneficiaries	TOTAL Number of Assisted Municipalities	Investments (BRL million)
2006	364	100	23,636

Source | ABRAF member companies, adapted by STCP
Note | Data furnished by ABRAF member companies

Support to health programs relies on prevention programs and campaigns, which include actions coordinated in association with official national programs for the well-being of the population. Forest companies promote health campaigns through talks, support to health weeks, vaccination and campaigns against diseases, as well as in some cases, producing and selling medicines to employees and local communities. It is worth mentioning the efforts of ABRAF member companies for the promotion of hygiene habits in less-assisted population zones.

As for preventive health, it is worth noting the role of the forest companies in the combat of sexually transmitted diseases and the support to vaccination campaigns.

The challenges faced and the produced results have stimulated the companies' efforts in supporting the dissemination of information and the education of the population together with local sanitation agents, municipal authorities and civil society.

4.7.3 | Non-Wood Forest Production

The production and consumption of non-wood forest products (NWFP) has grown over the last decades as result of the growing importance given to products from sustainable production processes. Among the NWFP produced by forest planted companies in Brazil, are herbal medicines, resins, honey, essential oils, rubber, and tannin. Such products have played an important role in income generation and job maintenance in a number of communities nationwide.

The possibility for the production of non-wood forest products (NWFP) in areas belonging to forest companies is an option aside the main industrial wood production carried out by the forest companies. Among the successful experiences by ABRAF members are phyto-therapy and honey production. According to table 4.12, a total of 1,300 people have benefited from NWFP production in 30 municipalities spread across various states.

Table 4.12 | Results of the production of NWFP ABRAF Member Companies (2005 and 2006)

Year	TOTAL Number of Beneficiaries	TOTAL Number of Assisted Municipalities	Investments (BRL 1,000)
2005	1,310	35	353.8
2006	1,342	30	71.8

Source | ABRAF member companies, adapted by STCP
Note | Data furnished by ABRAF member companies

Phyto-therapy has a recognized impact on health of employees of forest companies involved in the activity and of communities in their regions of influence. Beekeeping is an example of a successful partnership with social-economic benefits for farmers, participating communities, and forest companies. The process generates jobs and income for rural workers as well as gains for forest companies in terms of larger production of improved forest seeds.

Some of the non-wood forest products have been exported through the help of ABRAF member companies and government and local authorities.

4.7.4 | Environment

The contribution of ABRAF member companies to the maintenance of natural forest resources and its biodiversity throughout Brazil is highly significant. The results can be measured through the protection of almost 1.4 million hectares of natural vegetation, to a large extent representing important Brazilian biomes. Moreover, there are riparian zones and other important natural domains under the protection of the forest companies in accordance with the requirements of Brazilian legislation, including taking into consideration the guiding criteria for Permanent Preservation Areas (APP) and Legal Reserves (RL).

These areas have been under scientific investigation in partnership with foundations and universities as well as environmental protection and education programs. Furthermore, they provide society with a wide range of environmental services including water quality, biodiversity maintenance and soil quality.

Among different environmental programs and actions carried out by ABRAF members, the most notable are the fauna and flora protection and the environmental education programs developed with local communities, which have benefited over 131,000 people as shown in table 4.13. The actions taken for fauna protection have major importance in the activities developed by some companies. Overall, the investigative activities in this field are coordinated in liaison with IBAMA and are notably for the recovery and re-introduction of wildlife in their natural habitats.

Table 4.13 | Results of Environmental programs Undertaken by ABRAF Member Companies (2005 and 2006)

Year	TOTAL Number of Beneficiaries	TOTAL Number of Assisted Municipalities	Investments (BRL thousand)
2005	167.3	98	11,156
2006	131.2	232	26,912

Source | ABRAF member companies, adapted by STCP
Note | Data furnished by ABRAF member companies

Additionally, a number of ABRAF member companies, in partnership with universities and international conservation organisations, have established non-profit institutes focusing on environmental conservation. The main objective of these institutes has been to encourage environmental protection on private property in various Brazilian biomes and ecosystems. Another work of outstanding scientific merit undertaken with the support of ABRAF member companies is the appraisal of wild birds as bio-indicators of environmental quality in eucalypt plantations. This is an example of pioneering research project with a highly strategic value for future plantations in interaction with natural vegetation, RL and APP.

Regarding wildlife recovery and re-introduction, it should be noted the work carried out by ABRAF member companies with wildlife research institutions on RPPN. Under such projects, different endemic birds and mammals have naturally bred in forest plantations. Projects of this nature have resulted in awards for a number of companies for their efforts undertaken for biodiversity protection.

Environmental education programs are actions taken by all ABRAF members fulfilling societal needs of better knowledge and awareness as for the adoption of a responsible attitude towards environmental protection. For instance, one can cite programs that stimulate the use of ecological trails for environmental education, programs and actions that promote recycling and selective collection of solid waste, rational use of water, and rehabilitation of degraded areas.

4.7.5 | Education and Culture

ABRAF, through its members, has contributed to education programs in the companies' region of influence. The support provided by companies in education reflects their social role in human development of their employees, families and communities. In addition to the large economic effects from industrial investments nationwide, forest companies have supported the implementation of education programs that have helped reduce illiteracy in Brazil and improve educational teaching in all school levels in the country.

It is noteworthy the contribution of ABRAF members' programs developed with support of BNDES and/or in partnership with SESI to increase literacy of a significant number of people over the past several years. Of equal importance is the assistance to public schools in various States that have stimulated education and technical training of thousands of students through the financing and donation of equipments for construction of new schools. On the other hand, employees of ABRAF member companies have benefited from such programs by having access to secondary education through partnerships with outstanding institutions and State learning foundations.

A trend in education programs by ABRAF member companies is to support the participation of poor students of the public education system in pre-university courses. Companies of the forest sector make the access to college education easier for students through grants or scholarships to employees' children. Other contributions by the forest companies include significant financial donations to the establishment and functioning of municipal schools and universities.

In 2006, ABRAF member companies invested around BRL 20.4 million in educational and Cultural programs, which benefited 308 thousand people in different regions of the country. The table 4.14 allows perceiving ABRAF commitments favoring education and culture.

Table 4.14 | Results of Education and Cultural Programs Undertaken by ABRAF Member Companies (2005 and 2006)

Year	TOTAL Number of Beneficiaries	TOTAL Number of Assisted Municipalities	Investments (BRL thousand)
2005	397.4	296	14,615
2006	308.9	273	20,454

Source | ABRAF member companies, adapted by STCP
Note | Data furnished by ABRAF member companies

Chapter 5

Methodological Notes

Planted Forests in Brazil

Total Preservation Area Linked to Planted Forests

Roundwood Production and Consumption Balance

Gross Product Value (GPV)

Tax Collection

Trade Balance of Forest Products

Job Generation

5 | Methodological Notes

The Statistical Yearbook 2007 – Year Base 2006 presents the information contained in Yearbook 2006 that were prepared according to year Base 2005 and updated for 2006. Despite not pretending to prepare a scientific publication, the guiding principle adopted for its elaboration relied on rigorous approaches in order to make the Yearbook a reference for the sector. In this regard, especial care was taken for only assessing reliable information sources or estimates from sound representative professionals of Brazil's planted forests sector. Otherwise, differing data were cross checked and interpreted with transparency and coherence. In brief, this section presents the methodology used for data collection, compilation, and comparison and data evaluation.

Due to the difficulties in assessing the primary data necessary for the elaboration of this document, ABRAF relied on the close collaboration of many member and non-member companies and institutions of the forest sector, which can be grouped in:

- Sector Contacts: ABRAF member and non-member companies and sectors' representatives and independent consultants;
- Institutional Contacts: State secretaries and other institutions; foundations, research institutes, universities and forestry associations, among others.

All data presented refers to base year 2006 and methodologies applied for the data treatment and analysis are described in the next sections, according to the major topics presented in the 2007 Statistical Yearbook (base year 2006): (i) planted forest areas in Brazil; (ii) total protected areas linked to planted forests; (iii) roundwood production and consumption balance; (iv) gross product value (GPV); (v) tax collection; (vi) trade balance of forest products; and (vii) job generation.

5.1 | Planted Forests in Brazil

Reference: Table 1.02 – Chapter 1

As estimating the planted forest areas in Brazil would be an impossible task without using recent forest inventories and satellite images, planted forest area was estimated through the following sources of information:

- Statistical Yearbook 2006- Year Base 2005, which figures in good proportion helped to update the current publication mentioning that for some cases data base were obtained from forest inventories carried out for federal states;
- Questionnaires were used to assess ABRAF members and non-member companies;
- Forest industry's yearbooks and studies of different associations like ABIPA, ABIMCI, ABIMÓVEL, AMS, BRACELPA, SINDIFER were used;
- Official documents published by different institutions like government, research institutes, universities and foundations among others;
- Other information sources, companies and institutions.

Regarding the lack of comprehensive inventory data about current planted forest plantations in Brazil, it is worth mentioning that in 2006 The National Forestry Program (PNF – *Programa Nacional Florestal*) and Embrapa Florestas supported by several federal state universities, of the *Universidade Federal do Paraná* – UFPR, *Universidade Federal Rural do Rio de Janeiro* – UFRRJ and *Universidade Federal de Santa Maria* – UFSM agreed on the bases for the implementation of a so called New National Forest Inventory of Brazil. Although not yet implemented, its results will assist public policies for conservation of natural forests and will influence on planning the sustainable use of production forests. Many countries are already making full use of this planning tool, while Brazil despite his forest vocation has its last national inventory carried out in the 1980's.

For the elaboration of the Yearbook, primary data were obtained through the sending of a specific questionnaire prepared by ABRAF together with STCP and keeping the same variables applied in the previous year.

Besides targeting ABRAF individual member companies, the questionnaire was also sent to collective member associations, to whom further distribution to all affiliated (estimates in 182) was also requested in order to have their information assessed.

Additionally, STCP in agreement with ABRAF contacted 45 selected companies among the members of Collective Associated with forest plantations. Further, data were also assessed from 25 independent forest plantation producers.

Several government institutions like environmental agencies and state secretaries specialized on natural resources from different states were consulted. The collection and compilation of the information was followed up by a validation process of the results and are presented by state and species at Chapter 1 of this yearbook.

The data collection and compilation of forest planted areas was cross checked in order to avoid errors in their calculation. It is worth to remember that data published by the Ministry of Environment shown in table 2.01 of chapter 2 of the yearbook only reports **forest planted areas effectively established in 2006.** No distinction is done between reform areas and newly planted forests; accordingly felling areas of the same years are not reported for pinus, eucalypt and other species (section 2.2. of this yearbook). On the other hand, data presented on tables 1.02 and 1.03 of chapter 1 present **total area with planted forests.**

To maintain the confidentiality of information provided by individual companies, statistics presented in this Yearbook are aggregated by State or for the whole country. A summary of sources consulted in each major state with planted forests and the methodology applied to estimate the total planted forest area by species is presented as follow:

- Amapá
  Forest plantations in these states were identified based on responses from questionnaires sent to ABRAF member companies and direct contacts with non-member companies with significant plantation area in these states. The total estimated for the researched companies is shown as a representative sample of the state's companies. In this case an extrapolation for the state as a whole was done taking into account the planted area of previous year. (Yearbook ABRAF 2006 – Year Base 2005).
- Goiás
  Forest plantation of the State of Goiás were identified through direct contact with ABRAF non-members forestry companies taking into account new plantation effectively established in 2006.
- Bahia e Espírito Santo
  For 2006, existing plantations were identified through answers provided to the questionnaires forwarded by ABRAF members and through direct contact with ABRAF non-member companies.
- Maranhão e Pará
  Data on planted forests in the states of Maranhão and Pará were obtained from the Pig-Iron Producers Association of Carajás (ASICA - *Associação dos Produtores de Ferro Gusa do Carajás*) and direct contact with non-ASICA member companies with planted forests located statewide.
- Mato Grosso e Mato Grosso do Sul
  Area with forest plantation in these States were identified through direct contacts with forest companies and responses to a questionnaire survey applied to ABRAF member companies besides information supplied by the Forest Plantation Producers Association of Mato Grosso (AREFLORESTA - *Associação dos Reflorestadores do Estado de Mato Grosso*) and the Association of Planted Forest Consumers and Producers of Mato Grosso do Sul (*Associação Sul Matogrossense de Produtores e Consumidores de Florestas Plantadas* - REFLORE)
- Minas Gerais
  For 2006 the areas with planted forests for 2005 were considered. A positive saldo of 20.000 hectares of eucalypts was calculated by balancing new plantation areas and harvested areas. A negative saldo for pines was also estimated. This total was estimated after a meeting coordinated by AMS (*Associação Mineira de Silvicultura*) called for adjusting the referred data together with sector's representatives. The figures for 2005 were obtained from the Forest Inventory carried out by the *Universidade Federal de Lavras* (UFLA) and were discussed and validated by representatives for AMS member companies and public institutions.

- Paraná

  The existing forest plantation of the State of Paraná were identified through answers to the questionnaires forwarded to ABRAF member companies and through direct contact with forestry companies not associated with plantations. The total estimated pinus planted area for the researched companies is a representative sample of the companies of the state. In this case an area extrapolation was carried out for the whole state according to plantations done in the previous year (Statistical Yearbook ABRAF 2006 – base year 2005). For checking the information the data for plantation was collected from MMA and for felled were considered those areas under IAP (*Instituto Ambiental do Paraná*) and IBAMA.

  For the elaboration and validation of estimative for pinus and eucalypts contacts were established with the *Associação Paranaense de Empresas Florestais* (APRE), *Instituto Ambiental do Paraná* (IAP) and IBAMA.

- Rio Grande do Sul

  Associação Gaúcha de Empresas Florestais (AGEFLOR) supplied data related to forest plantations in the State of Rio Grande do Sul with update values for October 2006. Cadaster information referred to 161,066 ha for pinus and 164,298 ha for eucalypts and 118,962 ha for wattle, summing up 444,325 ha.

  Fort plantation extension in the state of Rio Grande do Sul was calculated according to the answers provided through the questionnaires forwarded by ABRAF. Consultations were also carried out for ABRAF non-members.

- Santa Catarina

  Forest areas with pine and eucalyptus in Santa Catarina were estimated from direct contacts with ABRAF member companies, consultations to the Forest Companies Association of Santa Catarina (*Associação Catarinense de Empresas Florestais* - ACR), and through direct contact with environmental and agricultural agencies that included the State Agricultural Research and Extension Organization (EPAGRI - E*mpresa de Pesquisa Agropecuária e Extensão Rural*), the Institute of the Harvest and Market Study Center (CEPA - *Centro de Estudos de Safras e Mercados*). Data collection was also oriented towards outgrowing schemes for small and medium-sized house holds, using for this purpose investment statistics of Pronaf Florestal and Propflora. Planted areas with eucalypt and pinus were estimated by ABRAF Yearbook 2006.

- São Paulo

  For 2006, the estimated area was based in the area planted in 2005 plus identified expansions recognized through the questionnaires and direct consultations to ABRAF member and non-member companies. Consultations were also carried out with Fundo Florestar, the Instituto Florestal de São Paulo and key companies of the sector.

Planted Forests Area of ABRAF Member Companies

The planted forest area of ABRAF member companies for 2006 was assessed, having into consideration:

- The area of ABRAF member companies: Consultations through questionnaire to each company and direct compilation of the obtained answers (to the applied questionnaires);
- Area of the member companies affiliated to the Collective Associations of ABRAF; For obtaining these data contacts were carried out by e-mail with all the affiliated companies (through the key collective associations). Requests for answers to the questionnaires of ABRAF were done by the collective associations (ABAF, ACR, AGEFLOR, AMS, APRE, REFLORE and FLORESTAR São Paulo).

5.2 | Total Preservation Area Linked to Planted Forests

Reference: Table 4.08 – Chapter 4

The total protection and preservation areas associated to planted forests in the country was estimated according to the total planted areas of eucalypt and other species (approximately 5.7 million ha) and according to the protected natural areas protected by ABRAF member companies. In average the protect percent was estimated in 32.2% according to the answers provided to the questionnaires.

The protection and preserved areas considered are the areas of Legal Reserve (Reserva Legal – RL), Permanent Preservation Areas (Áreas de Preservação Permanente – APP), their legal description is given below.

- Legal Reserve (RL – *Reserva Legal*)
  The Brazilian Forest Code (Law 4.771/65) defines the Legal Reserve concept as: "*area inside a property or rural possession, except that of permanent reserve, necessary for the sustainable use of natural resources, preservation and rehabilitation of ecological processes, biodiversity preservation and sheltering and protection of natural flora and fauna.*"
  The definition of Legal Reserve was revised Law 7.803 from July 18, 1989, which required that the registering or recording of the Legal Reserve is noted on the margin of the property deed, whereby being prohibited "*change of its use, in cases of sale, for any reason, or dismemberment of the area*", (Art. 16, paragraph 2).
  Specific legislation determines that the percentage of the property to be allocated as Legal Reserve varies according to region and vegetation type.
- Permanent Preservation Area (APP – *Área de Preservação Permanente*)
  Permanent Preservation Area is the area protected by Federal Law n.º 4.771/65 (articles 2 and 3 altered by Federal Law n.º 7.803/89), "*covered or not by natural vegetation, with the environmental function of preserving water resources, landscape, geological stability, biodiversity, and the gene pool of flora and fauna, as well as soil protection and ensuring the well-being of human population.*"
  Riparian forests or gallery forests are considered APP and can be for the effects of this Law, forest and other natural vegetation located along the river banks or any other water course, depending on their width.
- Particular Natural Heritage Reserve (RPPN–*Reserva Particular do Patrimônio Natural*)
  RPPN, as described in Decree Law 1.922/96, is a conservation unit in private areas, with objective of preserving biological diversity. It is a voluntary measure that is a property as a whole or part of it, without loss of ownership rights.
  RPPN are one of the first initiatives to involve society in the preservation of biological diversity. It is an instrument by which private properties contribute to environmental protection.
  Moreover, and also because its ease registration, RPPN are important environmental conservation units, because: (i) helping increasing protected areas countrywide; (ii) ensuring ecological corridors around conservation units; (iii) making easier private initiatives towards conservation efforts; and (iv) contributing to the biodiversity conservation of Brazilian biomes. Many benefits are granted to institutions/property owners who establish RPPN's.
  Up to 2005, 425 RPPN had been registered with the Brazilian Institute for the Environment and the Natural Renewable Resources (IBAMA - *Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis*), covering 442,853 hectares of protected area.

5.3 | Roundwood Production and Consumption Balance

Reference: Graph 3.02 and 3.05 – Chapter 3

Roundwood production was obtained from IBGE Automatic Retrieval System (SIDRA - *Sistema de Recuperação Automática*) databank of the Brazilian Geographic and Statistics Institute (IBGE - *Instituto Brasileiro de Geografia e Estatística*). The specific category of data was the so-called Production from Silviculture for year 2004, which refers to roundwood production from planted forests. Industrial roundwood production for 2005 will be available on November, 2006. In order to estimate industrial roundwood production for this 2005 Yearbook the annual growth for the 1991-2005 period was used.

Industrial roundwood consumption was estimated from production of manufactured forest products, provided by different planted forest segments, and converted to roundwood-equivalent using conversion factors for each forest industrial process (see table 5.01). Depending on the process, a specific factor was used to estimate only consumption of planted forest roundwood, separating the consumption of natural forest roundwood.

Table 5.01 | Conversion Factors Used in the Statistical Yearbook ABRAF 2007

Industrial Segment	Unit	Roundwood Volume /Industrial Production (m^3/ industrial unit)
Short-fibre pulp	t	4.56
Long fibre pulp	t	4.60
High-yield pulp	t	2.66
Sawnwood	m^3	2.80
Charcoal	MDC	1.33
Particleboard	m^3	1.70
Plywood	m^3	2.75
MDF	m^3	2.10

Source | STCP and others

Para os produtos florestais utilizaram-se séries históricas divulgadas pelas associações de classe (ABIPA, ABIMCI, ABIMÓVEL, AMS e BRACELPA), atualizadas. Os valores apresentados para o ano 2006 referem-se a estimativas.

5.4 | Conversion Factors Used in the Statistical Yearbook ABRAF 2007

Reference: Table 4.02 – Chapter 4

All attempts to calculate Gross Domestic Product of the Brazilian forest sector (GDP – Forest) meet some difficulties. They are related to the lack of proper characterization of the entire sector and all its interconnections as well as the IBGE Product-Input Matrix that aggregates a large part of forest products within the Agribusiness GDP.

For this reason the calculation of the forest sector's Gross Product Value (GPV) in this Yearbook, as has been done for major agriculture and fishery products. In this sense, the Forest GPV serves as a proxy for measuring the forest sector performance, as the calculation of Forest GDP, with current available data is not possible.

The Agribusiness Gross Product Value is calculated annually, with monthly statistics, by the Brazilian Agricultural and Animal Farming Confederation (CNA - *Confederação de Agricultura e Pecuária do Brasil*) with support of ESALQ / CEPEA. The indicator represents revenues from sale of the 25 main agricultural products.

The Gross Product Value for the different planted forest segments was obtained by different methods according to data availability.

In order to estimate the GPV of the primary forest sector the Brazilian Agricultural and Animal Farming Confederation methodology was applied, by multiplying the industrial production of each planted forest segment by the weighted average product price. To obtain forest products volumes and average weighted prices, the following sources were consulted: Minas Gerais Silviculture Association (AMS), Brazilian Institute of Geography and Statistics (IBGE) and the STCP Databank.

When available, the GPV of the productive chain of the planted forest sector was obtained directly from national forest products associations, which reported total sale in their publications: statistical yearbooks and sector studies. In such case, the following sources of information were contacted: Brazilian Association of Pulp and Paper (BRACELPA), Brazilian Association of the Mechanically Processed Timber Industry (ABIMCI), Brazilian Association of Wood Panel Industries (ABIPA), Brazilian Association of the Furniture Industry (ABIMÓVEL) and State of Minas Gerais Class Association of Iron Industry (SINDIFER).

5.5 | Tax Collection

Reference: Table 4.01 – Chapter 4

Currently, there are 60 different taxes incident on economic activities in Brazil. They are taxes, fees and contributions charged by the federal, state and municipal governments. The difficulty of calculating the taxes is due to the high number of regulatory rules (300 a year) containing 55,000 articles and 34,500 paragraphs. The distribution of the tax load on companies is another factor that makes it difficult to do the calculation: 32.25% on revenues, 47.14% on costs, and 53.23% on profit.

Furthermore the geographic location of the companies have also influence on the value of taxes. ICMS is a tax that represents 22% in average of the tax load is differentiated according each one of the states of the Brazilian Federation.

Data on taxes paid by forest plantation companies was obtained from the ABRAF collective associations, including statistic yearbooks and sector studies.

Two methodologies were used to obtain the estimated taxes paid by the planted forest sector:

- **Methodology 1** - Starting with the Gross Product Value for each planted forest segment, a percentage of the estimated contribution of taxes collected by each segment was applied to estimate the value corresponding to the taxes collected by the planted forest sector. These percentages were obtained from a study undertaken by the *Folha de São Paulo* newspaper, in 2005 for different sectors of the economy. For the forest segments, not indicated in that study, a percentage for related segments was used. For roundwood and charcoal, the percentage applied was the percentage of tax load for agribusiness (0.0994), while for the forest product industry; the percentage chosen was relative to diverse industries (0.2300). The exception was for the pulp and paper industry, as the total value used was that published by BRACELPA: BRL 2.2 billion in 2005. The total estimate for taxes paid for the forest plantation sector, using this methodology, was BRL 9.8 billion in 2006 (see Table 5.02).

Table 5.02 | Estimated Paid Taxes by Planted Forest Manufacturing Segments (2006) – Methodology 1

Products/Sectors	GPV (BRL)	Planted Forests Tax Factor	Estimation of Taxes Collected Methodology 1 (BRL)	Source
Roundwood	5,388,090,151	0.0994	535,576,161	IBGE/FOLHA
Pulp and Paper (1)	25,211,400,000	0.0833	2,100,000,000	BRACELPA
Solidwood Industry	15,031,733,251	0.2300	3,457,298,648	ABIMCI/IBGE/FOLHA
Panels	4,800,000,000	0.2300	1,104,000,000	ABIPA/STCP/FOLHA
Furniture	10,544,106,667	0.2300	2,425,144,533	ABIMÓVEL/SECEX/FOLHA
Pig-iron & Steel	999,525,565	0.2163	216,197,380	SINDIFER/AMS/FOLHA
TOTAL	**61,974,855,635**	**-**	**9,838,216,722**	

Source | ABIMÓVEL, ABIPA, FOLHA de São Paulo, SECEX, SINDIFER. Adapted by STCP, 2006

- **Methodology 2** – This methodology for estimating the taxes collected by the planted forest sector took into consideration the total taxes paid and stated by forest sector associations. For each segment a factor relative to the contribution of planted forest within the segment was applied. Exception was for the furniture segment due to lack of available information. In this case, taxes were estimated by applying methodology 1. Factors were estimated by STCP based on data available for each sector: for pulp and paper and wood panel sectors, 100% of the taxes are from segments linked to planted forests; for the solidwood segments, the proportion was gotten by ration between planted timber production and the total timber supply according to IBGE; and for pig-iron & steel the factor was the percentage ratio of planted forest charcoal and the total charcoal consumption for pig-iron production, given by SINDIFER. According to AMS, the share of charcoal from planted forest in relation to the total charcoal consumption is 46.2%. The total estimated taxes paid by the planted forest sector, using this method, was BRL 9.2 billion for 2005 (Table 5.03).

The results obtained by both methodologies converged for the totals of BRL 9.8 billion and BRL 9.3 billion of collected taxes respectively through methodologies 1 and 2. The difference of BRL 574 million refers to a little more than 6.2% of the estimated total. The data disseminated by the class associations are still preliminary as the values obtained through methodology 2 may be bigger after being consolidated by the respective associations.

Thus, the obtained difference between both methods can be smaller. Methodology 2 was adopted in the preparation of the yearbook for utilizing total tax information channeled by most class associations.

Table 5.03 | Estimated Taxes Paid by the Planted Forest Manufacturing (2006) – Methodology 2

Products/Segments	TOTAL Tax Collected (BRL)	Planted Forests Tax Factor	Estimation of Taxes Collected – Methodology 2 (BRL)	Source
Pulp and Paper	2,100,000,000	1.00	2,100,000,000	BRACELPA
Solidwood Industry	4,134,765,385	0.85	3,525,962,121	ABIMCI
Panels	1,104,000,000	1.00	1,104,000,000	ABIPA/Methodology
Furniture	2,425,144,533	1.00	2,425,144,533	ABIMÓVEL/Methodology 1
Pig-iron and Steel	698,241,140	0.16	108,711,956	SINDIFER
TOTAL	**10,462,151,058**	**-**	**9,263,818,610**	**-**

Source | ABIMCI, ABIMÓVEL, ABIPA, BRACELPA, SINDIFER. Adapted by STCP, 2006

5.6 | Trade Balance of Forest Products

Reference: Table 3.10 – Chapter 3

Data on exports and imports of forest products were obtained from the Secretary of Foreign Trade (SECEX - *Secretaria de Comércio Exterior*) ALICEWEB System provided by the Ministry of Development, Industry and Trade (MDIC - *Ministério do Desenvolvimento, Indústria e Comércio*). The data was based on the Common Mercosur Standards (NCM - *Normas Comum do Mercosul*) related to forest products for 2006, selected for products from planted forests.

5.7 | Job Generation

Reference: Table 4.03 – Chapter 4

In order to determine the number of jobs generated by the planted forest sector, the methodology utilized was that published in a study undertaken by National Economic and Social Development Bank (BNDES). BNDES considered the job generation as a result of investments in different industrial sectors in the economy. The methodology took into account the total direct, indirect and income-effect jobs for investments that result in an increase in production of BRL 10 million in each industrial and/or rural segment.

The jobs generated can be classified, according to the BNDES methodology of the Job Generation Model, into three categories:

- Direct Jobs: Needed labour compatible with the production level of the financed companies (own jobs);
- Indirect Jobs: Jobs generated as function of increase in production resulting from the growth in demand for inputs used by the financed companies (jobs in the forest products productive chain);
- Jobs due to the Income-effect: The increase in production generates a growth in worker and company income, which results in an increase in the demand for consumer goods and services, generating an increase in the demand for additional labour in other sectors of the economy.

In order to calculate the number of jobs generated in the planted forest sector (in the pig-iron & steel, solidwood products and furniture, and pulp and paper segments), percentages related to the direct, indirect and income- effect jobs were utilized from the BNDES methodology (table 5.04). For the primary forest sector (Silviculture), job generation factors for the year 2004 were utilized.

Table 5.04 | Percentage of Job Generation of Planted Forest Sector and Forest Industrial Segments

Sector	Source	Jobs (%)			TOTAL
		Directs	Indirects	Income - effects	
Forest Sector [1]	AMS-Yearbook	14%	54%	32%	100%
Pig-iron & Steel	BNDES	2%	34%	64%	100%
Solidwood Products & Furniture	BNDES	36%	27%	36%	100%
Pulp and Paper	BNDES	12%	32%	56%	100%

According to AMS percentages.
Source | AMS e BNDES. Adapted by STCP, 2006

The total direct jobs in the pig-iron & steel, solidwood and furniture, and pulp and paper segments was estimated, from the a labour ministerial register (CAGED - *Cadastro Geral de Empregados e Desempregados*) of Ministry of Labour and Employment (MTE - *Ministério do Trabalho e Emprego*) for 2006 and the percentages from table 5.04 served as a basis for the estimation of the jobs linked to the planted forest sector,. As a result, the total indirect and income-effect jobs were calculated and consequently the total jobs for the forest-industrial segments and for the forest sector (table 5.05).

In order to estimate the total jobs for the planted and natural forest sectors, industrial segment-specific factors that identify only the forest component within the segment were used. For pig-iron & steel, a 33.7% factor corresponds, according to the AMS Yearbook, to the pig-iron & steel parcel relative to charcoal (excluding the consumption of coal). For solidwood and pulp and paper production, a 100% factor was applied, assuming that the segment consumes only wood and wood fibre in its production. In the case of furniture, an 81.5% factor was applied, estimated as the parcel within the segment only related to wood products for 2006 (table 5.05).

Table 5.05 | Estimated Job Generation by the Forest-Industrial Segments (Planted and Natural Forests)

Segments	Industrial Sector (TOTAL)				Forest Sector	
	Direct[1]	Indirect	Income - effects	TOTAL	Factor	TOTAL
Pig-iron & Steel	98,029	1,654,237	3,173,684	4,925,949	33.7%	1,660,045
Solidwood Industry	196,144	146,606	196,813	539,563	100%	539,563
Furniture	196,144	146,606	196,813	539,563	88.3%	476,538
Pulp and Paper	109,860	288,615	504,611	903,086	100%	903,086
TOTAL	**600,177**	**2,236,064**	**4,071,922**	**6,908,162**	**-**	**3,579,233**

Source | Various sources, adapted by STCP
[1] From MTE

In order to determine jobs generated only totalling in the planted forest sector, specific factors were used that distinguish between the parcels related to natural and planted forests. For the primary segment, Silviculture, three calculation methods were initially applied, which are briefly described as follows:

- Method 1 – Estimates based on the average of ABRAF member companies, totalling 220.361 direct jobs linked to planted forests in Brazil;
- Method 2 – Estimates based on average jobs generated by the planted forest segment in State of Minas Gerais, obtained from the 2005 AMS Yearbook, totalling 239,801 direct jobs related to planted forests in Brazil;
- Method 3 – Estimates based on an estimated average of 2 ha per job (personal communication with a forest sector company in Minas Gerais) totalizing 358,832 jobs.

Table 5.06 provides that job estimates for the planted forest sector according to the three methodologies (silviculture). The factors applied were 100% for silviculture and for pulp and paper production. For pig-iron & steel the AMS/SINDIFER factor of 46.2% for planted forest charcoal was used and for solidwood products and furniture segments, 72% was applied based on estimates of the natural and silviculture harvesting by IBGE/SIDRA – as the proportion of roundwood production from Silviculture in the total planted forest production (table 5.04).

The Silviculture lines in table 5.06 (method 1, 2 and 3) provide the direct, indirect and income-effect jobs and the grand total estimated by the above-mentioned methods respectively. The Totals 1, 2 and 3 of the table represent the total direct, indirect and income-effect jobs adding jobs from each industrial segment (pig-iron & steel, solidwood products, furniture and pulp and paper) to the jobs from Silviculture (methods 1, 2 and 3).

Table 5.06 | Estimated Jobs in Silviculture and Industrial Segments linked to Planted Forests According to Various Methods

Sector	Planted Forests				
	Direct	Indirect	Income-effects	TOTAL	Factor
Silviculture					
1. Method 1	220,361	863,875	565,688	1,649,924	100%
2. Method 2	239,801	940,085	615,592	1,795,478	100%
3. Method 3	358,832	1,406,720	921,156	2,686,709	100%
Forest Industry					
Pig-iron and Steel	15,263	257,555	494,124	766,941	46.2%
Solidwood Industry	167,264	125,020	167,835	460,118	85.3%
Furniture	147,726	110,416	148,230	406,372	85.3%
Pulp and paper	109,860	288,615	504,611	903,086	100%
TOTAL 1	**660,473**	**1,645,481**	**1,880,487**	**4,186,441**	**-**
TOTAL 2	**679,913**	**1,721,691**	**1,930,391**	**4,331,995**	**-**
TOTAL 3	**798,945**	**2,188,326**	**2,235,956**	**5,223,226**	**-**

Source | Various sources, adapted by STCP

In the preparation of this yearbook it was adopted the total estimated through method 2 (Silviculture – method 2 and TOTAL 2), bearing in mind that it presents the most feasible scenario for the planted forest segment.