

Pulp and Paper Industry

FOREST PLANTATIONS: OPPORTUNITIES AND CHALLENGES FOR THE BRAZILIAN PULP AND PAPER INDUSTRY ON THE PATH OF SUSTAINABILITY

INDUSTRY MEETING FOR SUSTAINABILITY



CNI – NATIONAL CONFEDERATION OF INDUSTRY – BRAZIL

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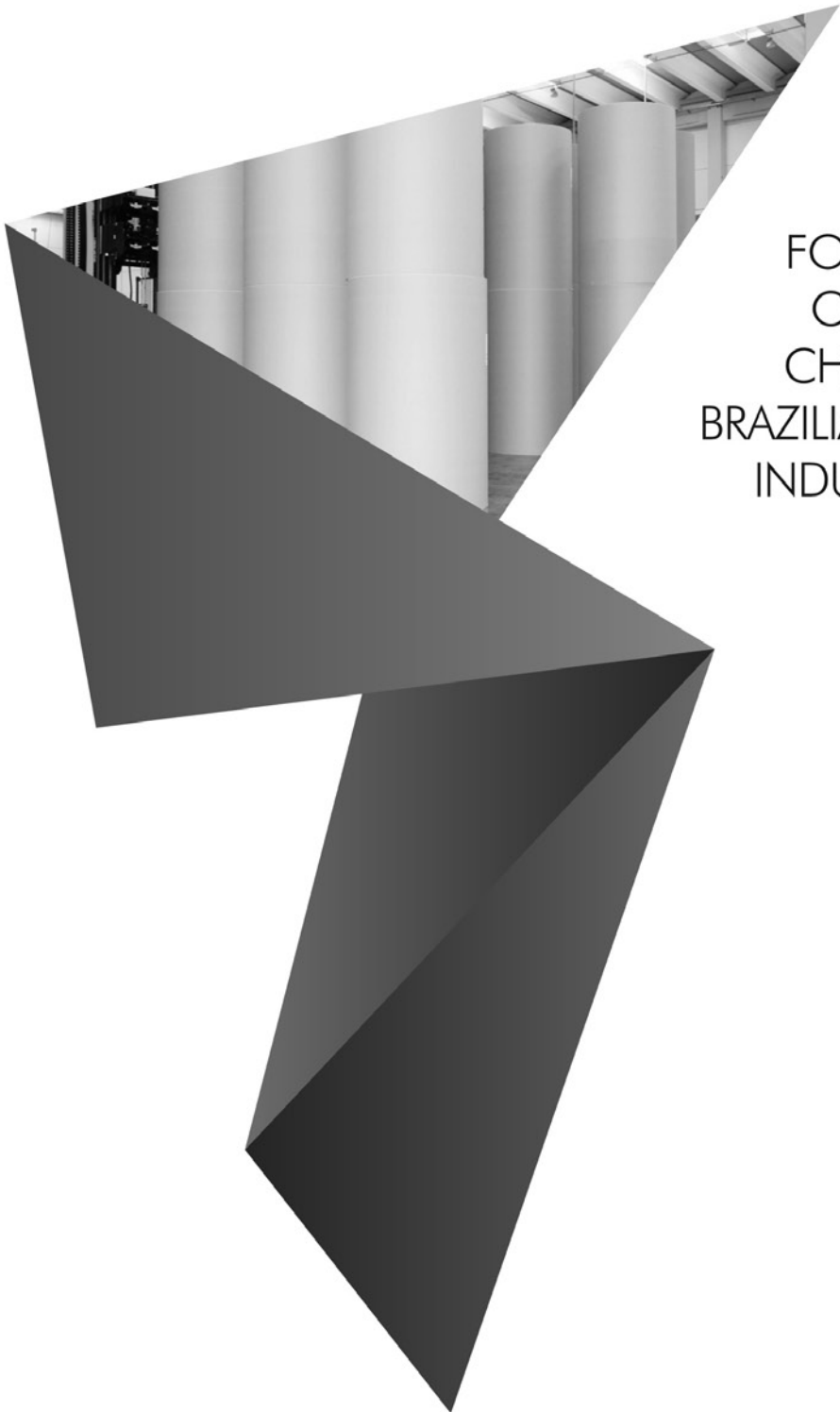
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CNI PRESENTATION

The diversity of the national industry and the significant availability of natural resources reveal excellent opportunities for the sustainable development of Brazil, combining economic growth, social inclusion and environmental conservation. The materialization of concerns related to sustainability in the strategic agenda of enterprises and governments is a reality. Apart from isolated cases of success, the consequences of this attitude are felt in entire sectors of the economy. Further advances are still needed, but the path has already been identified and going back is impossible.

After coordinating an unprecedented critical thinking process on sustainability with 16 industry associations, the National Industry Confederation (CNI) delivers to the Brazilian society a wide range of information on progress, challenges and opportunities yet to come. The results presented here may not portray the significance of the discussion process experienced by the industry in preparing these documents. Developments on the process will be beyond the Rio+20 Conference, and are definitely incorporated on the daily lives of companies.

The subject of sustainability is inserted differently in each of the industrial sectors. However, some elements are common to all. The continuous pursuit for efficiency in use of resources and the need to increase industrial competitiveness are on the agenda of all the sectors. Encouraging innovation and scientific and technological development is strategic on the transition to more sustainable patterns of production.

Strategies to intensify actions coordinated internally in the industrial sectors and with governments and civil society organizations are no less important. The dissemination of sustainable practices by means of the supply chain and incentives for companies to undertake the role of integrated management of the territories are powerful tools.

The sectorial volumes developed by industry associations are valuable contributions to addressing subjects such as sustainability and competitiveness of domestic industry. One of the most representative results of this process will certainly be the strengthening of structured programs of action with a focus on promoting sustainability in the

production. These initiatives will act as raw materials so that the industries involved and CNI are able to systematically publish documents presenting the national industry's developments towards the goals of sustainable production.

The documents presented here are intended to be a valuable contribution to enhance the debate on sustainability. Each of the sectorial associations is to be congratulated for their efforts.

Robson Braga de Andrade

President of the National Confederation of Industry – Brazil



SECTORIAL PRESENTATION

Dear reader,

Forest plantations for industrial purposes play a fundamental role to meet the demands of the growing world population without exhausting natural resources. For this reason, the Brazilian pulp and paper industry – that uses exclusively forest plantations in its forestry base – proposes that Rio+20 debates the importance of these cultivations within the framework of sustainable development.

Two points are prioritized: the valuation of carbon credits and the use of forest biotechnology to satisfy the needs for food, biofuel, fiber and forests. Proposals that have the potential to promote social and economic transformation that may deeply benefit businesses, communities and other stakeholders.

This section shows how the activities of the Brazilian pulp and paper industry are directly related to the green economy and the eradication of poverty, given that they are based on the belief that sustainability is the best way to generate and distribute wealth, and to keep a balance between businesses, society and the environment.

The texts highlight forest plantations as a key differentiator of the pulp and paper industry in Brazil. A renewable resource, they provide recyclable raw material for the manufacturing of different types of paper and hundreds of other products, while protecting biodiversity, conserving the soil and water, and fighting climate change through carbon sink. Socially, forests generate employment and income in the communities, contributing to the economy of municipalities, states and the government.

On behalf of the companies represented by the Brazilian Pulp and Paper Association (Bracelpa), we applaud CNI and the Dom Cabral Foundation for this work of bringing together Brazilian industry sectors to discuss a theme so current and challenging. Good practices and proposals presented by each of the segments will certainly create opportunities for a future that we want to build as a result of Rio+20.

Enjoy reading!

José Luciano Penido

Chairman of Board
Brazilian Pulp and Paper Association – Bracelpa



1 INTRODUCTION

1.1 Bracelpa's presentation

The Brazilian Pulp & Paper Association (Bracelpa) is the entity responsible for institutional representation of the Brazilian pulp and paper industry among its main stakeholders. Bracelpa's associate companies correspond to 100% of Brazil's pulp production and 80% of paper production. The sector is active in 539 municipalities and 18 states, directly employing more than 115,000 people (68,000 industrial and 47,000 forestry-based) and 575,000 indirectly.

Bracelpa operates in the agroforestry and industrial segment, generating products of high quality, which compete internationally in an extremely active market. The entity works to promote competitiveness, forest plantations and their byproducts in Brazil and abroad, to disseminate good practices and to represent associates in forums of interest and in negotiations with the primary national and international agencies through public, private or non-governmental organization representatives. Moreover, it participates in bilateral and multilateral trade negotiations and agreements and represents the sector in Brazil and partner countries' government agencies.

In order to strengthen the sector's relations with its stakeholders, Bracelpa continually promotes and encourages dialogue among associates through topic-based committees and meetings with social and environmental entities, related entities, government agencies, representatives from other sectors of the economy, universities, schools, consumers and the press – both in Brazil and abroad.

The association is also responsible for communicating and disclosing sector information and data that cover political, economic, social and environmental questions related to the industry's activities.

PHOTO 1. FOREST PLANTATION



Forest plantations are the major assets of the Brazilian pulp and paper industry.

Credit: Veracel/Clio Luconi

1.2 Objectives of this publication

Given that forest plantations are the basis for all pulp and paper production in Brazil and also given that they are characterized by their sustainable nature, they should figure into international dialogues concerning the green economy that will guide discussions at the United Nations Conference on Sustainable Development, Rio+20. Based on this premise, this document presents how Brazil's forest plantations meet the population's needs for different types of pulp and paper, in addition to timber, firewood, charcoal for energy and other basic commodities, while contributing to the conservation of native forests. Consequently, forest plantations correlate directly to the green economy and to the eradication of poverty.

The following chapters stress how the production of renewable timber and its byproducts are part of the core topics concerning the Conference, such as the use of biomass instead of fossil fuels, sustainable land and water-resource use, large-scale income and employment generation in rural areas far from urban hubs, the inclusion of small farmers in the rural economy, and the protection of biodiversity. They also address the importance of forest plantations in diminishing the pressures of deforestation, in consolidating sustainable production and consumption standards based on renewable raw materials, and in mitigating climate change.

The debate surrounding the importance of forest plantations in the context of sustainable development is even more important in light of the fact that the world population, according to the UN Food and Agriculture Organization (FAO), has just surpassed sev-

en billion inhabitants and continues to grow. International efforts are ever more a necessity to feed, clothe and provide comfort to all without exhausting natural resources.

In 2008, the federal government named the pulp and paper sector as one of the five most promising sectors for the future of the Brazilian economy. Among the other factors that influenced this choice was the sector's contribution to Brazil's industrial GDP, a chain of value that is responsible for 115,000 direct and 575,000 indirect jobs in 18 states throughout the country, maintaining a forest plantations area of 2.2 million hectares and another 2.9 million hectares of conservation area, making a total of 5.1 million hectares. In addition, the sector contributes to promoting family agriculture and environmental preservation.

Seeking sustainability is a fundamental aspect of the pulp and paper industry's business management. From the growing of trees to paper recycling, this sector's chain of production in Brazil is one of the world's most sustainable. Among the main differences with respect to other international producers is the fact that all raw materials used in the pulp and paper industry in Brazil come from forest plantations.

Furthermore, 2.7 million hectares of the pulp and paper sector's total forests have been certified by the Forest Stewardship Council (FSC) and by the Programme for the Endorsement of Forest Certification (PEFC/Cerflor), and 20% of the lumber consumed in pulp and paper production is supplied by forestry partners. Even more remarkable is that forest plantations corresponding to the sector and to other segments of the economy – steel, furniture and wood panels industries – that added up to 7 million hectares, occupy less than 1% of Brazil's total agricultural land.

For the Brazilian pulp and paper sector, the debate on the importance of forest plantations at Rio+20 should prioritize two points: valuing forest carbon and the debate on biotechnology.

For the potential of forest plantations in the absorption of carbon in the atmosphere, increasing the stock of CO₂ and generating social benefits, the pulp and paper sector advocates the appreciation of forest carbon. Accordingly, it proposes that the Brazilian government includes the mechanisms of forestry carbon credits among the strategies to meet the voluntary national commitments to lessen the negative impacts of climate change.

The use of biotechnology will be essential to meet the growing need for food, fuels, fibers and forests (the so called 4 Fs). It will allow the sector to better use land, water, energy and other resources in the search of an ever more sustainable production.

The pulp and paper sector's proposal goes beyond the insertion of structured and well-grounded silviculture in business and financing opportunities resulting from the new reality of climate change. It necessarily implies assuring counterparts and the ways that can value and pursue the necessary expansion of forest plantations in conjunction with other incentives. Thus, the sector can act as a starting point and catalyst for comprehensive, social, environmental and economic changes in the areas and communities where it operates.



2 THE SECTOR'S ECONOMIC, SOCIAL AND ENVIRONMENTAL PROFILE

PHOTO 2. PULP AND PAPER



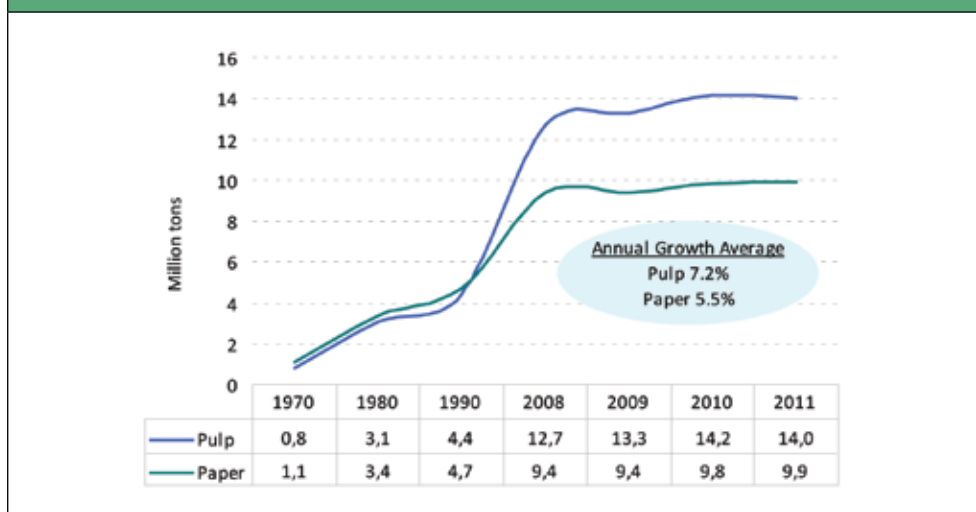
Pulp and paper, products from an industrial agroforestry sector.

Credit: Bracelpa/Guilherme Balconi

2.1 Economic profile

The Brazilian pulp and paper sector is part of an industrial agroforestry segment, which sells products of high quality in a globalized and active market. Since 1970, Brazilian pulp production has registered an average annual growth of 7.5%, while paper production has grown an annual average of 5.6%. This increase has led the country to occupy an important position among the world's producers.

CHART 1. AVERAGE ANNUAL GROWTH OF PULP AND PAPER IN BRAZIL



Source: Bracelpa.

2010 data from RISI, a consulting firm specialized in this sector, listed Brazil as the fourth largest pulp producer in the world; only in terms of eucalyptus pulp, the country ranks first internationally. As for paper, Brazil is the world's tenth largest producer.

TABLE 1. TOP PULP AND PAPER PRODUCERS WORLDWIDE

Pulp		Paper	
Country	1,000 tons	Country	1,000 tons
1. USA	49.243	1. China	92.599
2. China	22.042	2. USA	75.849
3. Canada	18.536	3. Japan	27.288
4. Brazil*	14.164	4. Germany	23.122
5. Sweden	11.877	5. Canada	12.787
6. Finland	10.508	6. Finland	11.789
7. Japan	9.393	7. Sweden	11.410
8. Russia	7.421	8. South Korea	11.120
9. Indonesia	6.278	9. Indonesia	9.951
10. Chile	4.114	10. Brazil*	9.844
11. India	3.931	11. India	9.223
12. Germany	2.762	12. Italy	9.146
— Other	25.313	— Other	89.771
Total world	185.582	Total world	393.899

Source: RISI / (*) Bracelpa.

TABLE 2. BRAZIL'S PERCENTAGE OF WORLDWIDE PRODUCTION		
	Pulp	Paper
Global Production	185,582	393,899
Brazilian Production	14,164	9,844
Percentage	7.6%	2.5%

Source: RISI.

In 2010, the pulp and paper industry accounted for 4% of Brazil's industrial GDP as shown here:

TABLE 3. THE SECTOR'S PERCENTAGE OF BRAZIL'S INDUSTRIAL GDP (MILLIONS BRL)	
Industrial GDP	841,024
Pulp & Paper	33,950
Percentage	4.0%

Source: IBGE.

Resultados 2011

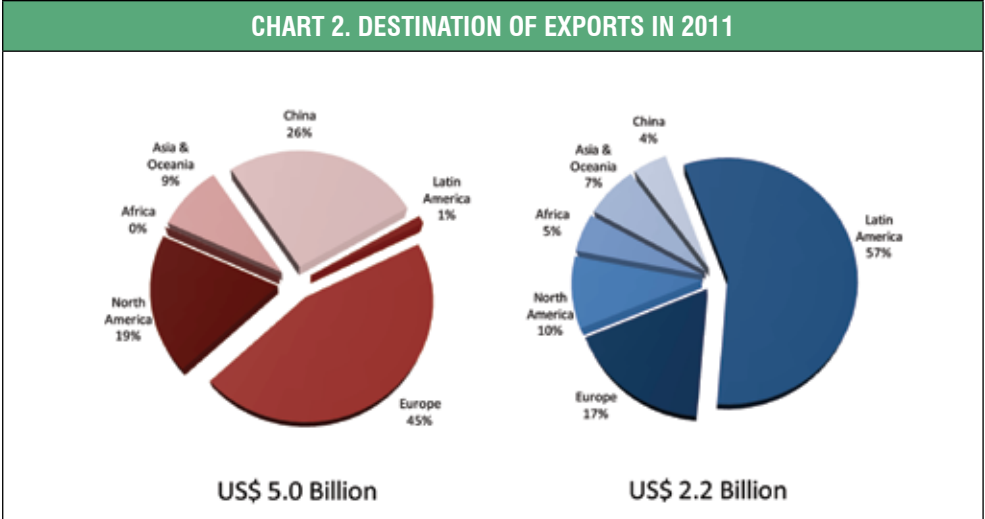
Pulp production in 2011, according to Bracelpa's data, added up to 14.2 million tons, keeping the same level as in 2010. Paper production reached 9.8 million tons, also remaining steady in relation to the previous year. In terms of international sales, the sector's export revenue totaled US\$7.2 billion, a 6.4% increase over 2010.



Brazil is ranked 10th in world paper production.

Credit: Suzano/ Ricardo Telles

In recent years, Europe has been the main market for Brazilian pulp, followed by China and North America. In terms of paper, the countries of Latin America compose the Brazilian sector’s primary market, followed by Europe and North America.



Source: Secex.

Forest plantations

100% of Brazil’s pulp and paper production comes from plantations of pine and eucalyptus. Pine produces long-fiber pulp that is very resistant and ideal for manufacturing papers for packaging, cardboard, printing paper, special papers and others. Eucalyptus produces short-fiber papers that are less resistant, highly supple, and absorb well. Ideal for printing and writing papers, sanitary uses (tissues, toilet paper, paper towels, and napkins), cardboard, special papers and others.

Sustainable forest management supported by technological and genetic development is one of the Brazilian sector’s pillars of global competitiveness to ensure the country’s notable ranking among the top pulp and paper producers worldwide.

In Brazil, this sector’s forest plantations report excellent productivity levels – the greatest yield of pulp per cubic meter of timber per hectare annually (m³/ha/year) – when compared with other countries. In new plantations of 2011, the average productivity of eucalyptus was 44 m³/ha/year, while that of pine plantations reached 38 m³/ha/year.

TABLE 4. WOOD FOR PULP – AVERAGE PRODUCTIVITY IN 2011 (M³/HA/YEAR)			
Species	1980	2011	Growth Rate.
Eucalyptus	24	44	83%
Pinus	19	38	100%

Source: Bracelpa.

Technology

The industrial process for manufacturing pulp is highly complex and demands high technology investment in addition to very close relationships with other sectors of the economy like silviculture, the chemical industry, capital goods, a number of engineering fields – forestry, chemical, mechanical, civil, electrical and production, and the services sector –, which makes a pulp mill seems like an applied version of an educational institution. One of the sector's important achievements in recent years was to balance environmental and social improvements with economic efficiency, seeking to better pursue the three pillars of sustainability.

Industrial pulp production is based on various vital technological aspects that are also key factors to ensure the sector's competitiveness: economies of scale, operating efficiency, established quality measurement in industrial and forestry processes, distribution and logistical capacity, maximum use of resources with minimum waste, and the continuous reduction of environmental impacts. The sector's technological evolution over the years, i.e. searching for constant improvement, has enabled innovations to become good practices. These have been adopted by all of the companies in a short span of time.

Moreover, forest plantations are ever more frequently viewed as an endless source of research for topics related to humanity's future. The multiple uses of forests in the coming years will lead the sector to a new reality in which forests will be critical to meet the demands from the growth of the world's population. A good indicator of this is the fact that trees are already the source of more than 5,000 everyday products, such as furniture, tools, medical products, cosmetics, cleaning products and others, not to mention their application to biofuel production, which makes forests a green alternative to oil.

The multiple uses of forests is one of the applications of nanotechnology, science that studies material at the atomic and molecular scale and whose basic principle is the building of new structures and materials from atoms. Thus, trees are an endless and renewable resource. It is believed that, in the coming years, there will be a new generation of forestry products, many of them more durable, lighter, stronger and more water resistant, just to name some of their features.

Investments

Given this scenario, in the medium and long term, the sector's expectation is to further advance its plans to expand forest plantations. Companies are seeking financial alternatives to implement projects to use even more advanced forest farming technologies – based on studies of genetics, and also to modernize factories and to build new facilities.

Notable among the factors that favor this perspective is the data from UN FAO, which reports that the planet will have eight billion people in 2025. This growth will need timber to produce firewood, charcoal for energy use, different types of paper (packaging, cardboard, sanitary uses, and printing and writing papers) and other widely used products, all of which can be supplied through forest plantations.

High productivity and the quality of timber harvested in recent years are characteristics that make Brazil stand out in the international scene and that attract investment. During this expansion process, promoting and economically valuing the climate, social and environmental benefits thorough multiple public and private instruments, including carbon markets, will be fundamental.

2.2 Social and environmental profile

In forest plantations, trees are cultivated in specific areas using quality raw materials and then harvested for industrial use. Subsequently, new forests are planted, perpetuating the planting and harvesting cycle. Forest farming meets the sustainable management plans that seek to reduce environmental impacts and to promote the economic and social development of neighboring communities.



Production process, from forest plantations to recycling.

The Brazilian pulp and paper sector practices are constantly being reviewed and improved, always pursuing sustainability and honoring applicable legislation, and ensuring that forest plantations remain great allies of rural, social and economic development as they decrease pressures on natural forests, especially in areas with greater population densities, such as the states in the southern and southeastern parts of Brazil.

The main benefits of forest plantations are that they:

- help in the recovery of degraded areas;
- increase agricultural efficiency;
- optimize the use of areas with high human density;
- capture and store high levels of carbon;
- encourage forest fostering production without impacting food production;
- help maintain and preserve biodiversity;
- help prevent soil erosion and river silting;
- use extensive areas that were degraded and economically unattractive for new cultivations.

RECOVERY OF THE ATLANTIC FOREST

Fibra uses the model of forest mosaics in the regions where it operates; this is a technique that integrates renewable eucalyptus plantations with native species areas, respecting and protecting the natural vegetation already in existence. This type of farming makes maintaining ecological corridors feasible and reduces environmental impacts. This is why the company maintains nearly 400,000 hectares of native forests (37% of the total area) and is betting on the recovery and conservation of one of Brazil's main biomes, the Atlantic Forest, encouraging the participation of local communities in this process.

The company participates in initiatives like the Pacto pela Restauração da Mata Atlântica (Atlantic Forest Recovery Pact) and the Corredor Ecológico do Vale do Paraíba (Vale do Paraíba Ecological Corridor) and it invests in the recovery of native areas in the states where it operates – São Paulo, Espírito Santo, Bahia and Minas Gerais – and where this biome exists. In 2011, the company began working to recover 3,500 hectares of the Atlantic Forest and, by 2023, it will have taken on the challenge of recovering approximately 25,000 hectares with the help of local communities, responsible for gathering seeds, maintaining community tree nurseries and monitoring recovery areas, which help generate income and improve the quality of life. The Pact, one of the country's most ambitious, contemplates the recovery, by 2050, of 15 million hectares of degraded area located in the 17 states containing the Atlantic Forest. In turn, the goal of the ecological corridor is, over the next ten years, to restore and conserve 150,000 hectares of Atlantic Forest in the São Paulo state portion of the Rio Paraíba do Sul water basin.

FOREST CERTIFICATIONS

The adoption of forest certification was initially developed internationally in 1980 as the result of initiatives that sought environmental conservation, decrease in deforestation and sustainable development of the world's forests through the rational use of forest resources to ensure their long-term existence. Forest certification slowly grew in importance for the sale of timber and forest products on the global market as a means of guaranteeing access to and maintenance of more restrictive markets, the chance to introduce new products, job preservation and enabling investments.

Following these trends, the Brazilian pulp and paper companies also came to invest in certifications. Currently, planted forests are certified by independent institutions, such as the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC/Cerflor). Of the sector's 5.1 million hectares of forests, planted and native, 2.7 million hectares are currently certified.

Forest certifications guarantee the sustainability of the pulp and paper production process, reflecting the sector's commitment to sustainability since they assure forest preservation and the maintenance of biodiversity, and contribute to the social and economic development of forest communities.

BREAKING DOWN MODELS IN RURAL ACTIVITIES

In 2011, a group of 16 farm producers of the Programa Produtor Florestal (Forestry Producers Program), set up by Veracel, recorded a victory unprecedented in the country. They were recognized with dual certification in Forest Management: FSC® and the Programa Brasileiro de Certificação Florestal (Brazilian Program of Forest Certification – PEFC/Cerflor).

The adoption of standards, which are voluntary, brings a positive impact on these producers, by placing them in line with the practices most valued by the market and the company. It is evidence of compliance with its production, meeting the best environmental standards and the transformation of its raw materials into a product acknowledged worldwide as a result of a process economically viable, socially correct and environmentally sound.

It also establishes a whole new level of maturity to the South and Extreme South of the state of Bahia, with regards to the management of farms. Certifications are a result of work undertaken in 2009, when, faced with the growing demand for certified raw material for pulp production, Veracel and growers, by means of the Associação dos Produtores de Eucalipto do Extremo Sul da Bahia (Eucalyptus Producers Association of Southern Bahia – Aspex), became aware of the opportunity to develop the business and initiated the work for the granting of licenses, which included stringent inspections by auditors and experts in the areas of forest plantations..

PHOTO 5 – CERTIFICATIONS



The forest certifications reflect the industry's commitment to sustainability.

Credit: Bracelpa/Guilherme Balconi

Certifications offer consumers the certainty that the best practices and those practices with the least impact have been adopted. In other words, that no tree has been illegally felled to manufacture paper, that the rights of workers involved in harvesting the trees have been honored and that the communities living within the forest have not been damaged by the company's operations.

Employment and income

The sector is responsible for 115,000 direct jobs (68,000 industrial and 47,000 forestry based) and 575,000 indirect ones. In order to meet the country's increasing demand for qualified employees in the medium to long term, the pulp and paper industry has been forming partnerships with the federal and state governments, universities and vocational schools in order to create or improve courses to meet the sector's demands, to train individuals and to attract talent.

PROFESSIONAL TRAINING

To inaugurate its mill in Três Lagoas in 2009, International Paper do Brasil, in partnership with the Serviço Nacional de Aprendizagem Industrial (National Industrial Apprenticeship Program – SENAI) of Mato Grosso do Sul, invested in ten months of training the local community. The objective was to develop labor both for the facilities' construction and for factory operations. In the course's early stages, the students learned basic concepts in math, physics, chemistry, Portuguese language and the environment. The later stages dealt with the details of pulp and paper manufacturing with a special focus on the second one, covering such topics as refining, processing, pressing, drying, spooling, finishing, etc. As far as the results of the training, of the 150 students in the course, 90% were hired by the company.

The sector also provides basic education in the numerous communities in which it operates, including offering academic-support programs, providing educational material and even building schools or lending support to those already in existence. In addition, the companies have adopted a number of practices to ensure the health and quality of life of employees and their families.

PHOTO 6. SOCIAL PROGRAMS



The pulp and paper sector runs educational programs in the communities where it operates.

Credit: Suzano/Divulgação

In the sector's Letter of Principles (see chapter 4), the pulp and paper industries stress their repudiation of child and slave labor. Formal prohibitions have been established in the companies' policies, codes of conduct and suppliers' contracts. The use of under-age labor is only permitted as part of a formal apprenticeship program in accordance with Brazilian legislation.

With respect to suppliers, the sector's companies make 80% of their purchases within the states in which they operate, thus notably contributing to the local economy. The choice of suppliers takes into consideration criteria like quality, costs, delivery times, services, social responsibility and respect for the environment.

APICULTURE PROJECTS PARTNERSHIPS

Stora Enso has been developing, since 2009, an apiculture (beekeeping) program to increase communities participation in the company's activities and to promote the multiple use of forest farming, enabling an increase in income and bettering the dietary quality, through partnerships with local apiculture associations. The company offers plantation areas that are in the early stages of growth, trees that have reached an age of over three years, in proportion of five hectares per beehive. To take part, the producer must be a member of an apiculture association in the region – the practice of moving the apiculture is not allowed, nor the underletting of such areas.

In accordance with the program, the apiculturists give in return to the company part of the produced honey as a way of payment for the use of the land. The collected honey is donated by the company to municipal social entities in the region, such as schools, day-care centers, shelters, etc., improving the daily diet of the included communities.

Forest Fostering Programs – inclusion in the chain of value

The pulp and paper industry found a way to promote regional development and the inclusion of rural small-and medium-sized farmers in the industry's chain of value by means of forest partnerships. This is a win-win situation that both extend forest plantations while reducing land concentration. In addition, the fostering programs benefit thousands of small farmers and supply nearly 20% of the timber used in pulp and paper production in Brazil.

This important initiative is implemented through partnership agreements with farmers whose lands are located on neighboring properties or within factories' area of influence and offer support to small farmers who plant trees to supply the companies with raw materials. These incentives are backed by trade contracts that guarantee the purchase of timber as well as the transfer of technology and knowhow, increasing farmers' level of productivity. It also promotes the development of other profitable agricultural activities related to the forest farming, such as maximizing land use by planting different food crops and the multiple uses of excess lumber.

PHOTO 7. FOREST FOSTERING



Forest Fostering Programs, inclusion of small- and medium-sized landowners in the industrial chain of value.
Credit: Celulose Riograndense/Rogério Gomes

Thus, companies reconcile financial gains with the promotion of social wellbeing and environmental protection. In particular among the benefits of this undertaking are the continuous improvements of levels of competition, the opportunity to reduce investments with the purchase of lands for farming and the promotion of other activities. This model also involves encouraging forest management certification and adjusting to the Forestry Code in effect in order to ensure the reliability of the sector's entire chain of value.

FOREST TECHNOLOGY FOR SMALL FARMERS

Created in the '80s in Santa Catarina and Paraná, o Programa de Fomento Florestal da Klabin (Klabin's Forest Fostering Program) arose from the need to promote the company's integration with the communities where it operates. It began with an offer to provide forest technology to small-and medium-sized farmers and the creation of opportunities for other industrial segments.

To provide all necessary support to the farmers, partnerships were established with the federal government and the Banco Nacional de Desenvolvimento Econômico e Social (Brazilian Development Bank – BNDES), the Associação de Preservação do Meio Ambiente do Alto Vale do Itajaí (Association for the Preservation of the Upper Itajaí Valley – Apremavi), the Instituto Paranaense de Assistência Técnica e Extensão Rural (Paraná Institute of Technical Assistance and Rural Expansion – EMATER-PR) and the Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina (Farming, Cattle Farming and Rural Expansion Research Company of Santa Catarina – Epagri).

The forest fostering areas are incorporated into the production process, increasing the company's forest base, and the program's participants are introduced to other practices, such as silviculture with forest plantations (both pine and eucalyptus, as well as native species), the enrichment of secondary forests, organic agriculture, green tourism and cattle farming. Given such practices, the farmers do not need to abandon their traditional activities since pine and eucalyptus plantations do not occupy the areas used for the farmer's main activity.

The company is currently partnered with around 19 thousand small-and medium-sized farmers who cultivate 15 thousand hectares of forest plantations. The lumber that the company purchases from these farmers totals 10% of the amount consumed. By the end of 2012, Klabin intends to increase the amount of lumber from these small farmers to 20% of its supply. Nearly 100 million seedlings were distributed in 94 municipalities close to forestry facilities in the states of Paraná, Santa Catarina and São Paulo.

The main benefits of the forest fostering programs are that they:

- preserve and protect the environment;
- promote social inclusion and an improvement in the quality of life;
- foster rural development;
- promote the planned and orderly use of the rural landscape;
- encourage agroforestry systems in seeking certification;
- create opportunities to generate jobs and income;
- expand knowledge through the exchange of experiences;
- encourage the preservation and monitoring of fauna, flora and water resources.

THE VALUE OF CULTIVATING AND CONSERVING FORESTS

The Grupo Orsa's forest fostering projects are located in the southeastern part of the state of São Paulo and in Vale do Jari, between the states of Amapá and Pará. The initiatives main objectives are the sustainable expansion of forest plantations, maintaining small farmers in their properties, ensuring raw-material supply in such a way to generate income for small farms, and the preservation of and respect for the environment. Since the Vale do Jari is located in the Amazon region, it is essential to help the small farmers see the value of cultivating and conserving forests, thus avoiding the illegal sale of native lumber.

Since 2001, the forest fostering program has encouraged rural farmers to plant eucalyptus and pine in fallow and degraded areas on the farmers' properties, with the commitment to purchase their tree production at market prices. Participants also receive seedlings and technical support. The farmer's average income is 2,000 Reais per hectare. In total, there are 16,000 hectares of forest plantations in the company's fostering program. Furthermore, while farmers wait for the eucalyptus and pine felling cycles, they are encouraged to work in other activities. After analyzing each participant's vocation and potential, the company suggests the best farming alternatives in terms of crops for food security, fruit tree, milk and other farming and production activities.

PHOTO 8. FOREST INCENTIVE FOSTERING II



The forest fostering programs reduce the concentration of land ownership.

Credit: Grupo Orsa / Agência Luz

Biodiversity

2010, the International Year for Biodiversity, saw the launch of the Movimento Empresarial pela Conservação e Uso Sustentável da Biodiversidade (Business Movement for the Conservation and Sustainable Use of Biodiversity – MEB). In a joint effort of non-governmental organizations (NGOs) and 50 organizations, including companies from the pulp and paper sector, the MEB released the Carta Empresarial pela Conservação e Uso Sustentável da Biodiversidade (Letter for the Conservation and Sustainable Use of Biodiversity) and presented it to the federal government and to Brazilian society in general. The signatories presented their commitments and proposals concerning the topic.

In addition to the myriad characteristics of the Brazilian pulp and paper industry, forest plantations help preserve, recover and protect nearly 2.9 million hectares of native forest, playing a fundamental role in maintaining the biodiversity of these areas. By employing the mosaic system of cultivation, which mix pine and eucalyptus plantations with native species, forest plantations form part of a set of ecosystems, many of which are rich in flora and fauna, and create ecological corridors – a phenomenon that is impossible when a stretch of native vegetation is interrupted by degradation. Forest plantations allow the movement of species characteristic of Permanent Protection Areas and Legal Reserve Areas feasible.



Biodiversity projects help to protect endangered species, such as the mutum bird.

Credit: Cenibra/Antonio Claret de Oliveira Neves

Forest farming in areas that were once used for other activities is another good example of the capacity for regeneration associated with forest plantations. Degraded lands are used for the cultivation of pine or eucalyptus, which helps control environmental impacts and even to restore biodiversity in adjacent protected areas.

The sector's companies have reported a number of native bird sightings and the return of mammals and reptiles to their original *habitats*. Like a two-way street, the quality of the forest plantations is linked to conservation of the natural environment since it is this natural environment that shelters the natural enemies to the plagues that can affect tree farms.

THE MUTUM PROJECT PRESERVES A BIRD COMMON TO THE ATLANTIC FOREST

Celulose Nipo-Brasileira (Cenibra) is betting on biodiversity projects at Macedônia Farm, located right on the banks of the Rio Doce in the municipalities of Bugre and Ipaba in the state of Minas Gerais and which includes 600 hectares declared by the Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazilian Institute of the Environment and Renewable Natural Resources – IBAMA) as a Private Natural Heritage Reserve. Noteworthy among the activities at Macedônia Farm is the Mutum Project to reintroduce wild birds threatened by extinction. For twenty years, the company has spearheaded the project with the technical and scientific aid of the Sociedade de Pesquisa e Manejo e da Reprodução da Fauna Silvestre (Society for Research into Wild Fauna Reproduction and Management – CRAX), a non-governmental entity based in Contagem (MG).

The project is now on its fourth generation of the mutum, species of birds in the wild and has already enabled the release of the mutum-do-sudeste (*Crax blumembachii*), the macuco (*Tinamus solitarius*), the capoeira (*Odontophorus capueira*), the jaó (*Crypturellus n. noctivagus*), the inhambuaçu (*Crypturellus obsoletus*), the jacuaçu (*Penelope obscura*) and the jacutinga (*Pipile jacutinga*). This initiative represents hope for survival of the mutum, a common bird to the Atlantic Forest that was abundant in the colonial period in Brazil's Southeast and that currently faces extinction.

Recycling

Since all paper produced in Brazil comes from forest plantations, the recycling process has its source in renewable resources. In other words, after use, the fibers from these trees are once again transformed into raw material. In addition, paper is one of the products that boost the highest recycling rate in Brazil.

In total, 43.5% of all paper used in Brazil in 2010 was destined to post-consumer recycling. The statistics do not account for paper that, once recycled, is used to manufacture other products, such as shingles, nor do they exclude paper that cannot be recycled, such as toilet paper. If these aspects were properly accounted for, the recycling rate would increase dramatically.

This percentage indicates that recycling is well rooted in the paper sector. Companies are supplied with a large network of refuse collectors (many of them homeless), coopera-

tives and other post-consumer paper suppliers that collect, sort and prepare the material. The chain of production involving this activity fuels the economy by generating jobs and income. Recycling reduces the costs of production, distributes wealth and promotes the recovery of raw materials that are once again inserted into the consumption cycle.

RECYCLED PAPER PACKAGING RETURN TO STORE RACKS

On the shelves of one of the most important supermarket chains in Brazil there is packaging produced from recycled papers, collected from the brand's very own stores and produced by Papyrus, the cardboard company that also uses paper leftovers to manufacture recycled cardboard. This project, known as the Ciclo Verde Taeq (Taeq Green Cycle), consists in transforming paper residues into packaging and labels for products that feed back into the stores for sale.

It is a process that involves the consumer, who kicks off the process by discarding the cardboard packaging in one of the recycling stations located in the supermarkets. Part of this material is then separated by cooperatives chosen by the supermarket chain that then sell the paper separately to Papyrus, which is in charge of recycling the material. Subsequently, the recycled paper is purchased by printing companies that produce the packaging for some of the brand products that are then sold in its supermarkets. This process minimizes the extraction of natural resources and reinforces the company's mission, a company that for 50 years has been producing the packaging for its products by recycling cardboard leftovers.

PHOTO 10. RECYCLING



Brazil has a high rate of paper recycling.

Credit: Klabin/Enio Tavares

Another environmental aspect of recycling, which is aligned with other factors, such as using waste for producing energy and forest farming to absorb carbon, is that it helps ensure a positive environmental balance in pulp and paper production. Recovery of post-consumer material also helps decrease the volume of waste caused by discarding material in already saturated garbage dumps and landfills.

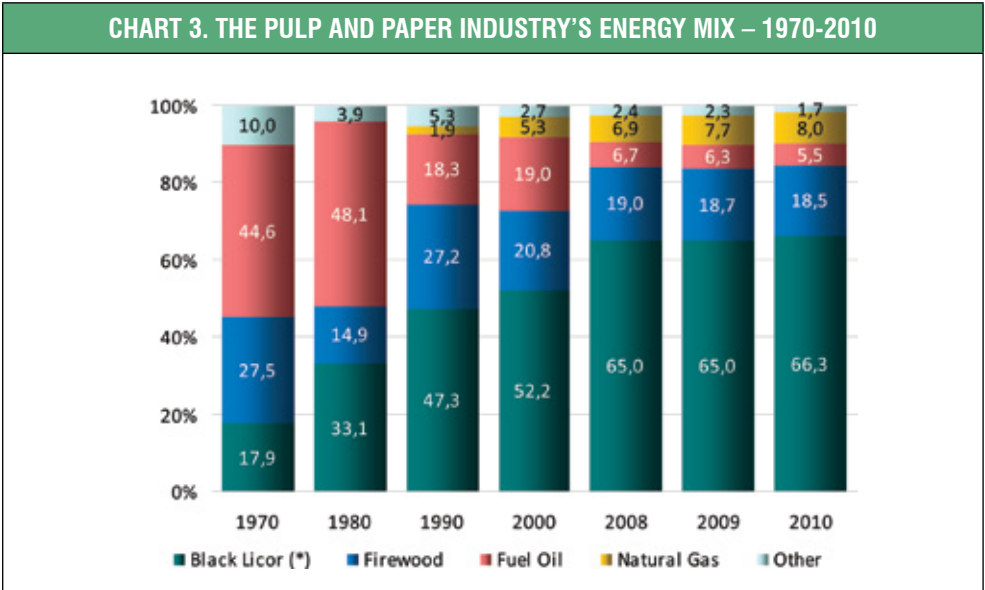
Since paper cannot be recycled indefinitely, given that fibers lose their resistance and the features that define the different types of product they manufacture, it is always necessary to use original, virgin fibers from forest plantations to enable production and to meet the population’s consumption needs.

Energy efficiency

Brazil has one of the cleanest energy mixes in the world. Given this positive national context, the pulp and paper industry is constantly investing in new technologies and in the development of sustainable production processes. The goal is to continue to reduce energy consumption generated by sources that greatly impact the environment like fossil fuels.

As a result of these efforts, the industry is coming close to full energy self-sufficiency, with increasing energy consumption from renewable resources, like biomass. In areas where it is not possible to use biomass, industries have sought to use natural gas, which, despite being a fossil fuel, is considered clean.

The sector also uses the byproducts from factories’ boiler processing and cogeneration to reduce carbon emissions. It must be stressed the role of black liquor; a lumber residue generated from the extraction of pulp, which is a clean, alternative fuel.



(*) Sub Product (Firewood) / Source: Brazilian National Energy Balance.

BIOMASS BOILER

The industrial processes implemented by Lwarcel Celulose and all the Grupo Lwart, use steam to generate the heat needed for production. It is common practice to generate steam by burning oil. In an attempt to improve its processes, reduce emissions, meet environment standards, increase energy self-sufficiency and reduce costs, the company opted in 2010 to change its steam generation mix by investing in a new boiler that runs on biomass, a renewable fuel that comes from the region's agroindustrial waste. The new boiler was built at Lwarcel Celulose and provides energy via a steam pipeline to the group's other companies in Lençóis Paulista, located in the state of São Paulo.

Sustainability gains from the project can be analyzed along three fronts: emissions reductions due to the deactivation of the old boilers; a decrease in the generation of solid waste; and the generation of income for small farmers and companies involved in the region's agroindustrial activities. The biomass used as fuel, comprising basically waste from pulp production, chipboard production, sawmills and lumber companies, as well as from sugarcane bagasse, is purchased from regional suppliers.

Water resources

As water is used since the cultivation of eucalyptus and pine seedlings and throughout the different stages of the industrial process, it is an essential input for the sector's activities. Aware of water's importance, the pulp and paper companies have worked steadfastly in recent years to reduce their consumption of this precious resource both in factories currently under construction and in facilities that are more than 20 years old.

The industry also invests in the continuous improvement of the use of this resource in its production processes, by means of technological upgrades, effluent management and the processing of waste filtered into usable byproducts.

The practice of reusing water in the pulp and paper industry, in addition to increasing the availability of water resources for other activities, decreases production costs, diminishes losses of both final and intermediary products, and lessens the load of pollutants that must be treated.

It is also important to reiterate that the water used in the process of production is treated before it is put back into the river, in a purer state than when it was collected.

PHOTO 11. WATER TREATMENT



Water, companies invest in the ongoing improvements of this resource.

Credit: Arquivo International Paper

Waste recycling

The companies are constantly adjusting their processes and also reducing and reusing inputs, in addition to reuse waste in order to protect the soil and to recycle materials, generating other products for the businesses' different chains of production. The pulp and paper sector works incessantly to eliminate waste and leftovers generated during the various stages of production and to significantly reduce environmental impacts.

Forest waste from production – branches, leaves and bark – are left in the fields to protect and fertilize the soil. At the factory, part of the bark and wood chips not used in pulp production are then burned in boilers that generate steam for the production process, substituting the use of fossil fuels.

Another substitute to fossil fuels is black liquor, generated when pulp is separated from lumber, which allows for the use of electric turbines to generate all the electricity used in modern pulp mills. Part of the non-hazardous waste is sent to the landfills, where it is adequately buried, or to other industrial segments to serve as raw materials for, for example, shingles and other materials used in the construction industry.

By using renewable raw materials, the pulp and paper industry does not generate a large amount of hazardous waste. The small quantity generated is disposed of properly, being either recovered or incinerated in accordance with legal guidelines.

Climate change

Global warming caused by the increase of greenhouse gases due to human activities is one of the main environmental problems of our day. Scientific studies ordered by the United Nations (UN) have warned that climate change may produce severe environmental, economic and social effects. According to scientists, there are two ways to combat global warming: reduce pollution and remove carbon dioxide (CO₂) released into the atmosphere. Forest plantations are great allies of the planet, especially regarding this second issue.

A MECHANISM FOR CLEAN DEVELOPMENT

Celulose Irani prepares an inventory of its greenhouse gases in order to have the necessary information to pursue more sustainable actions. With the inventory, it can assess the balance between emissions and removal as well as the possibilities for neutralization given that the organization removes more carbon from the air than it emits, showing that its activities are carbon neutral. Irani was the first Brazilian company to certify its inventory according to the ISO 14.064-1:2006 .

Irani's removal of greenhouse gases occurs thanks to the forest farming and management implemented in accordance with the principles and criteria of the Forest Stewardship Council (FSC) and through innovative actions related to the Clean Development Mechanism (CDM) projects, such as CDM – Cogeneration Plant and CDM – ETE Modernization, which enable the company to reduce the emissions of nearly 217 tons of carbon dioxide equivalent annually.

PHOTO 12 – FOREST PLANTATIONS



Forest plantations, important allies in efforts to lessen negative impacts of climate change.

Credit: Arquivo International Paper

In Brazil, the forestry sector stocks per year approximately 1.3 billion tons of CO₂ equivalent (tCO₂e), with 440 million tons of tCO₂e coming from the pulp and paper segment alone, from the process of photosynthesis. In contrast, annual emissions in the sector's industrial processes do not surpass 7.4 million tons of tCO₂e, a practically irrelevant amount when compared to the benefits of net removals.

Furthermore, forest plantations are more efficient than native forests in capturing CO₂. Since the planting-to-harvest cycle lasts an average of seven years in the case of eucalyptus and an average of 14 years in the case of pine, the trees on these farms are constantly growing since, once harvested, new seedlings are planted in their place. The younger the plant, the greater the need for energy to grow, which consequently implies greater carbon absorption.

In addition to the climate benefits resulting from the tree plantations, the sector generates and maintains considerable carbon stocks in its 2.9 million hectares of preserved native forest (areas that are part of the legal reserve and permanent preservation). For this reason, Brazil's pulp and paper industry defends the use and recognition of carbon credits contained in the Kyoto Protocol. Due to its sinking potential, the sector believes it is extremely important that forest plantations are recognized when discussing climate policies. Thus it would be possible to consolidate the country's contribution to mitigation efforts and, at the same time, help the sector overcome the challenge of increasing the supply of national planted areas, which is still well below demand and the country's potential.

The sector's companies are also investing in projects to substitute their fossil fuel mixes with renewable fuels, such as the renewable biomass from its own tree farms, natural gas and black liquor, as well as working to report emissions inventories. Important incentives like the Clean Development Mechanism (CDM), which allows for the additional generation of emissions reductions and net removals of greenhouse gases, have played a crucial role. Through these and other practices, the sector has sought to innovate and increase the efficiency of the technology used throughout production, consolidating the values of climate sustainability throughout the chain of production.



3 ECONOMIC, SOCIAL AND ENVIRONMENTAL REGULATIONS AFFECTING THE SECTOR

3.1 Main accords and international regulations relevant to the sector: profile of the international regulatory environment

3.1.1 Kyoto Protocol and the Clean Development Mechanism (CDM)

The Kyoto Protocol is an international treaty created as part of the United Nations Framework Convention on Climate Change (UNFCCC) with rigid commitments to reduce greenhouse gas emissions (GGEs). It was ratified by 55 countries in 2005. Under the Kyoto Protocol, industrialized nations (referred to as Annex I) agreed to meet across-the-board objectives to reduce emissions while developing nations (referred to as non-Annex I) assumed the voluntary commitment to contribute to reducing global warming. In the first stage of commitment, from 2008 to 2012, the Kyoto Protocol proposed a schedule to reduce GGEs by at least 5.2% over 1990 levels.

The Clean Development Mechanism (CDM) defined in the Kyoto Protocol seeks to promote the reduction of GGEs or carbon capture, whereby developing countries can implement activities that focus on sustainable development and, at the same time, help comply with the goals of the industrialized countries by selling carbon credits.

The CDM generates opportunities for the forest plantations, pulp and paper sector in terms of both forestry and industrial activities. Therefore, together with various organizations from Brazil's civil society, Bracelpa and associated companies are participating in the Projeto Brasil Florestas Sustentáveis (Sustainable Forests of Brazil Project) with the objective of developing a methodology that values climate and social benefits related to the expansion of national forests by increasing inventory and generating carbon credits in forest plantations in Brazil.

3.1.2 Copenhagen Accord (COP-15)

This Accord resulted from the 15th Conference of the Parties to the United Nations on Climate Change (COP-15) held in Copenhagen, Denmark in December 2009 in which the signatory countries reinforced the goals to combat climate change and to keep the rise in global temperature below 2° Celsius.

This accord allowed the Annex I countries to reinforce their mitigation commitments and to donate funds to combat global warming (mitigation and adaptation actions) in developing countries. Developing countries accepted the opportunity to assume voluntary commitments that were measureable, reportable and verifiable (MRV) through the implementation of mitigation action – Nationally Appropriate Mitigation Actions (NAMAs) – based on emissions projections for 2020.

Under the Copenhagen Accord, Brazil agreed to promote mitigation actions (NAMAs) by reducing between 36.1% and 38.9% its projected emissions by 2020.

3.2 Main national legal instruments in effect in the sector's main external markets that affect the sector

3.2.1 Trade Agreements

The aim of trade agreements is to stimulate the growth of international trade in goods, services and investment and to increase economic cooperation among countries or economic blocks. Today, Brazil is party to nearly 20 and it is negotiating another three in conjunction with the other Mercosul countries, and it is working to review (tariff reduction) and expand (increase the supply of products) under agreements to which it is already a signatory.

The pulp and paper sector defends its interests before the Brazilian government for each agreement, accompanying negotiations as they develop, identifying risks and threats that could be harmful to the national industry, and seeking expansion opportunities in markets that offer large consumer potential.

3.2.2 Forest certification

Planted forests within the Brazilian pulp and paper industry are certified by the Forest Stewardship Council (FSC) and the Brazilian Forest Certification Program (Cerflor), which represents in Brazil the Program for the Endorsement of Forest Certification (PEFC). *(More information on this subject can be found in chapter 2 of this document).*

3.3 Main regulatory aspects and legal instruments that affect the sector in Brazil

3.3.1 National Policy on Climate Change (PNMC)

The Política Nacional de Mudanças Climáticas (National Policy on Climate Change – PNMC) was instituted under Law no. 12,187 on December 29, 2009, and establishes its principles, objectives, guidelines and legal instruments. Notable among the main objectives are the reduction of emissions and strengthening anthropic (environmental changes caused by man) removal through GGE sinks within Brazil. Mitigation plans and actions will be developed that take into consideration the intersection of the public and private sectors.

In order to meet this objective, Brazil has assumed a national voluntary commitment to promote GGE mitigation actions by reducing between 36.1% and 38.9% its projected emissions by 2020, according to the Copenhagen Agreement (see item 3.1) together with the United Nations Framework Convention on Climate Change in December 2009.

Participation by the production sector was established under Decree no. 7,390/2010, which partially regulated the PNMC and established the drafting of action plans for eight sectors of the economy, including the pulp and paper sector, which will be presented during 2012. For the pulp and paper sector, the directives take into account the carbon stocked in forest plantations and industrial emissions, which results in an emissions surplus (the planted forest base captures more CO₂ than the industry emits).

3.3.2 Forestry Code

Created under Law no. 4,771 on September 15, 1965, the Brazilian Forestry Code establishes limits and ways of using land in an attempt to conserve natural resources and native vegetation. As a contribution to the discussions on the review of the text by the National Congress, the pulp and paper sector – which operates with preservation and recovery-area percentages above those required by Brazilian law – developed in 2011, in conjunction with social and environmental organizations, proposals for specific points in the Forestry Code. The aim was to strike a balance between the development outlook of forestry companies that plan to expand in Brazil and the legitimate concern of social and environmental organizations regarding environmental conservation and the preservation of family agriculture.

3.3.3 National Policy on Solid Waste – PNRS

The *Política Nacional de Resíduos Sólidos* (National Policy on Solid Waste – PNRS) was established under Law no. 12,305 of 2010 for the purpose of promoting integrated and proper management of the solid waste generated in Brazil. It determines shared responsibility for waste among all participants in the chain of production, the implementation of municipal systems for selective collection and measures to promote the social inclusion of collectors. For the sector, which is already a big recycler, the PNRS represents an opportunity to consolidate good practices and process-management and production systems that are already in play as well as to strengthen paper's chain of production through selective collection and for the social, environmental and economic benefits it brings. Currently, the federal government, together with industrial sectors, is devising a plan of action to implement this law.

3.3.4 National Policy on Planted Forests – PNFP

The sector is following discussions to implement the *Política Nacional de Florestas Plantadas* (National Policy on Planted Forests – PNFP) whose objective is to affirm the country's forest potential and its respective contribution to mitigating environmental impacts. The topic is currently being discussed by the Interministerial Working Group on Planted Forests under the coordination of the Secretary of Strategic Affairs (SAE). The use of degraded areas for forest plantations is one of the main advantages of this policy, which also implies a series of opportunities, such as the generation of wealth and rural and urban employment, and the production of clean energy. Studies by the SAE demonstrate that forest plantations further reduces pressures on native forests, with farms combining exotic and native species in integrated agroforestry systems, and the net absorption of carbon.

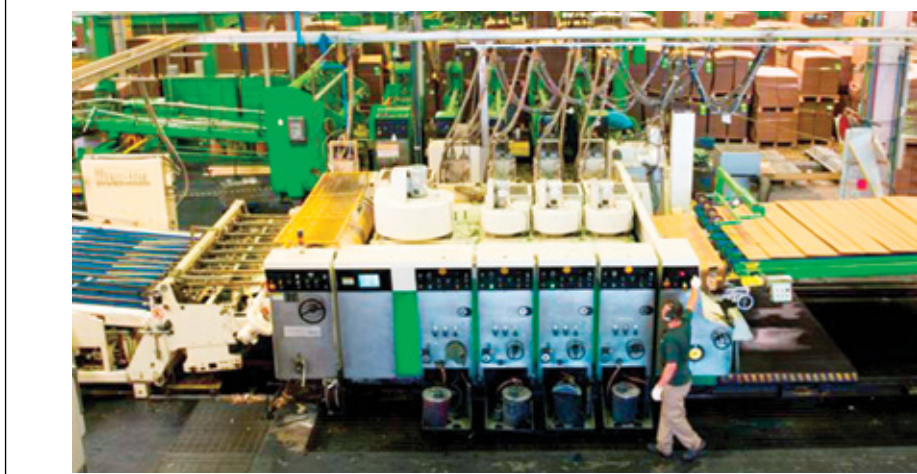


4 BUSINESS PRACTICES FOR SUSTAINABLE DEVELOPMENT (1992-2011)

4.1 Main technological transformation, innovation and management changes incorporated by the sector in its production

The major change in the sector in terms of environmental awareness took place following Eco92, the United Nations Conference that drew the world's attention to environmental questions. The world came to realize the potential and hazardous impacts on the health of ecosystems caused by mankind's actions as well as by cities, industries and agriculture. Since then, more sustainable solutions have been sought that address not only environmental aspects, but also the social and economic impacts of these activities.

PHOTO 13. TECHNOLOGICAL EVOLUTION



The new mills are planned from concepts of eco-efficiency.

Credit: Klabin/Enio Tavares

Another great change in this period was the shift of pulp production from the traditional countries of Europe and the North America to the more competitive countries of the Southern Hemisphere, such as Brazil, Chile, Uruguay and South Africa. New and modern mills with state-of-the-art technology are now part of these countries' development programs. These factories, which incorporate advanced designs, are very ecologically efficient and consume fewer natural resources per unit of manufactured product.

It is also possible that one of the justifications for this advancement has been globalization itself. Brazil has earned its place among the big world players and, as a consequence, faces more demanding consumers. Its efforts to show Europe a new business posture also required the country to seek out more environmental quality and new forms of relations with its various stakeholders.

Another point to consider is Brazil's environmental law, which is very strict compared with other countries, both in terms of forests and licenses and permits to install and operate factories. The sector chose to meet and go beyond these needs in its factories and forests. As an example: for each hectare of forest planted by the sector for production, between 0.7 and 1 hectare of natural environment is preserved, fully protected within the Permanent Preservation Areas and Legal Reserves Areas. All of this compounds a diversified ecological-forest mosaic.

A significant advance that guaranteed forests' productivity increase and competitive industrial gains was the adoption of vegetative propagation or the cloning of "superior" trees resulting from controlled crossbreeding and genetic improvement. In this process, vegetative parts of the plants, and not the seeds, are used to produce clones that retain all the genetic information of the mother tree. This technique improves quality and environmental performance in lumber production for use in manufacturing pulp and paper. The objective is to select trees with the best forestry and industry features, including vigor, form, resistance to disease and plagues, wood quality, industrial yield, etc.

Along this line of development, multiple uses for wood and biotechnology research have arisen. The companies in the sector are investing in new techniques for genetic improvement and arboreal biotechnology, which are essential to meet the growing demand for food, biofuels, fiber and forests. The goal is to improve the use of land, water, energy and other natural resources in the search for an ever more sustainable production.

Another important example of technological evolution that significantly reduced environmental damage was the substitution of chlorine for less harmful compositions in the process of whitening pulp to prepare it for the production of some types of paper. In the past, among other compounds, elemental chlorine was used to carry out this process, which generated toxic, chlorofied organic compounds that were damaging to ecosystems. The fibers are now whitened using processes that do not employ elemental chlorine, known as Elemental Chlorine Free (ECF) products, and instead use chlorine dioxide and oxygen-based oxidants (peroxides, ozone, etc.). Some types of pulp pastes are derived from processes that are entirely exempt from chlorine compounds; these are known as Total Chlorine Free (TCF). Studies show that the effluent from both processes, when treated, does not show a significant difference in terms of toxicity. Hence, both processes are of very low environmental impact.

Therefore, in just a short period, cleaner industrial processes used in pulp and paper production have emerged, as have environmental certification processes of factories and forests, programs for public dialogue and other initiatives. In 2002, when the World Summit was held in Johannesburg, South Africa, also known as Rio+10, one of the highlights was the advances demonstrated by Brazilian forestry industry, which has shown solid, sustainable development in a short period of time.

The pulp and paper industry also invests in new technologies and in the development of sustainable production processes, which contributes to reducing the consumption of energy from sources that severely impact the environment, such as fossil fuels. With the growing consumption of energy from renewable resources, like biomass, the pulp industry is nearing self-sufficiency in energy and is even known, in its more modern factories, as a collaborator for feeding excess energy back into the national power grid. In areas where the use of biomass is not possible, the sector has sought to use natural gas, which, though a fossil fuel, is considered clean.

PHOTO 14. TECHNOLOGICAL EVOLUTION II



The cloning of trees leads to improved quality and environmental performance.

Source: Grupo Orsa / Agência Luz

The use of organic byproducts from processes in the factories' boilers and the cogeneration factor are among the sector's actions to reduce carbon emissions and improve energy efficiency. Here, black liquor, a residue from the conversion of lumber to pulp using the kraft process, stands out as a clean, alternative fuel.

PRODUCTS THAT REPORT THEIR CARBON FOOTPRINT

In 2011, Suzano Papel e Celulose launched the Alta Alvura®, Paperperfect® and Report® Multiuso brand papers as well as Suzano Pulp, all of which report their carbon footprint. The objective is to effectively and precisely measure GGEs for products and to serve as an important tool for developing strategies that reduces these gases throughout the chain of production. This pioneering initiative in pulp and paper companies throughout the world takes the approach of lifecycle analysis, accounting for every step from raw material to product disposal.

Moreover, impartiality in calculations is ensured through basic principles and institutions like the ICF, an international consulting firm, which measured emissions along the chain of production based on the PAS 2050 methodology, the only methodology published to quantify products' carbon footprints. The products' carbon footprints were also subject to auditing by CarbonTrust, an independent institution with the mission to push for a low-carbon economy. As a result, Suzano received the Carbon Reduction Label certification.

4.2 Initiatives to disclose information and transparency regarding the sector's social and environmental performance



Sustainability reports, an important management tool.

Brazilian pulp and paper companies began publishing information regarding social and environmental activities in the 1990's, stepping up its efforts in 2000. The reports were referred to at the time as Annual Reports or Social Reports among other names, and always sought to provide transparency for the companies' operations, conservation and preservation actions, and relations with employees, communities, suppliers and other stakeholders.

The initiative spearheaded by the first companies to take on this challenge ultimately encouraged other pulp and paper companies to follow the same path mainly because it has become more and more obvious that, in addition to serving as an instrument for disclosing and sharing good social and economic practices, these reports are an important management tool.

In general, the model adopted initially by the companies was that of the *Instituto Brasileiro de Análises Sociais e Econômicas* (Brazilian Institute for Social and Economic Analyses – Ibase), which encompasses quantitative indicators regarding financial, social and environmental investments. The companies also used the *Guia de Elaboração do Balanço Social* (Guide for Preparing Social Balances), published by the *Instituto Ethos de Responsabilidade Social* (Ethos Institute for Social Responsibility) since 2001, along the lines of the Ibase. Currently, the model most frequently used is the one presented by the Global Reporting Initiative (GRI), which includes international guidelines for preparing sustainability reports.

The growth in demand for this information in companies has led to a sector-wide discussion of the topic. Between 2004 and 2006, Bracelpa published the *Relatório de Responsabilidade Social* (Social Responsibility Report) on companies in the pulp and paper sector. In 2010, the entity compiled its first *Relatório de Sustentabilidade* (Sustainability Report), and in 2011, it published its second. The goal was to present information regarding the advances and challenges facing Brazil's pulp and paper sector in its search for further pursuing its sustainable practices. For companies in the sector, preserving natural resources and promoting social inclusion in the industry's chain of value are fundamental to the success of the sector, whose forest plantations is the main attribute.

Like the sustainability reports, Bracelpa's other publications seek to create a relationship with the entity's stakeholders, disclosing the sector's messages, good practices, where it stands on topics of interest and negotiation schedules involving the industry. Associates, the press (national, regional and international), representatives from the federal and state governments, related entities, associations representing agribusiness and other segments of the industry, suppliers, social and environmental organizations, universities, and national and international forums are among the target audiences for these publications.

Two printed bulletins are also worth mentioning: *Folha da Bracelpa* and **BR Pulp & Paper News** – the latter in English. Both report on the industry's activities, good practices and topics to be discussed in negotiations involving Bracelpa. Electronic newsletters like **Bracelpa Online** are also published.

In 2009, Bracelpa produced the video **Planted Forests, Vital Allies of the Planet** which stressed forest fostering programs, the contribution of forest plantations in miti-

gating the effects of global warming, the role of the Brazilian forest base in this context, and the importance of recognizing the potential of forest plantations. Produced using simple language, in Portuguese and English, the video was shown at the United Nations Conference on Climate Change (COP-15) in Copenhagen in 2009. Since then, it has been shown in national and international events where Bracelpa participates.

In addition, more than 6,000 DVD copies of the video were distributed to opinion makers – representatives of the federal and state governments; Brazilian federations, confederations and associations; Brazilian ambassadors representing the country internationally, foreign ambassadors; teachers from public and private schools, university researchers, Brazilian journalists and foreign correspondents based in the country; representatives from social and environmental organizations, related entities, the financial market, suppliers of the sector's inputs; employees from Bracelpa associated companies and PR agents.

To further disclose its activities, the Bracelpa website (www.bracelpa.org.br) was updated with new content and layout in 2010. With its modern look and simple language, the new website brings together interesting content regarding the pulp and paper sector for the lay public, such as information on forest plantations, sustainability practices, paper recycling practices and other topics. The sector's performance is another topic addressed in other publications, like the bulletin *Conjuntura Bracelpa* and the *Annual Statistical Report*, which include national and state data on the industry's actions and performance indicators over the last 20 years.

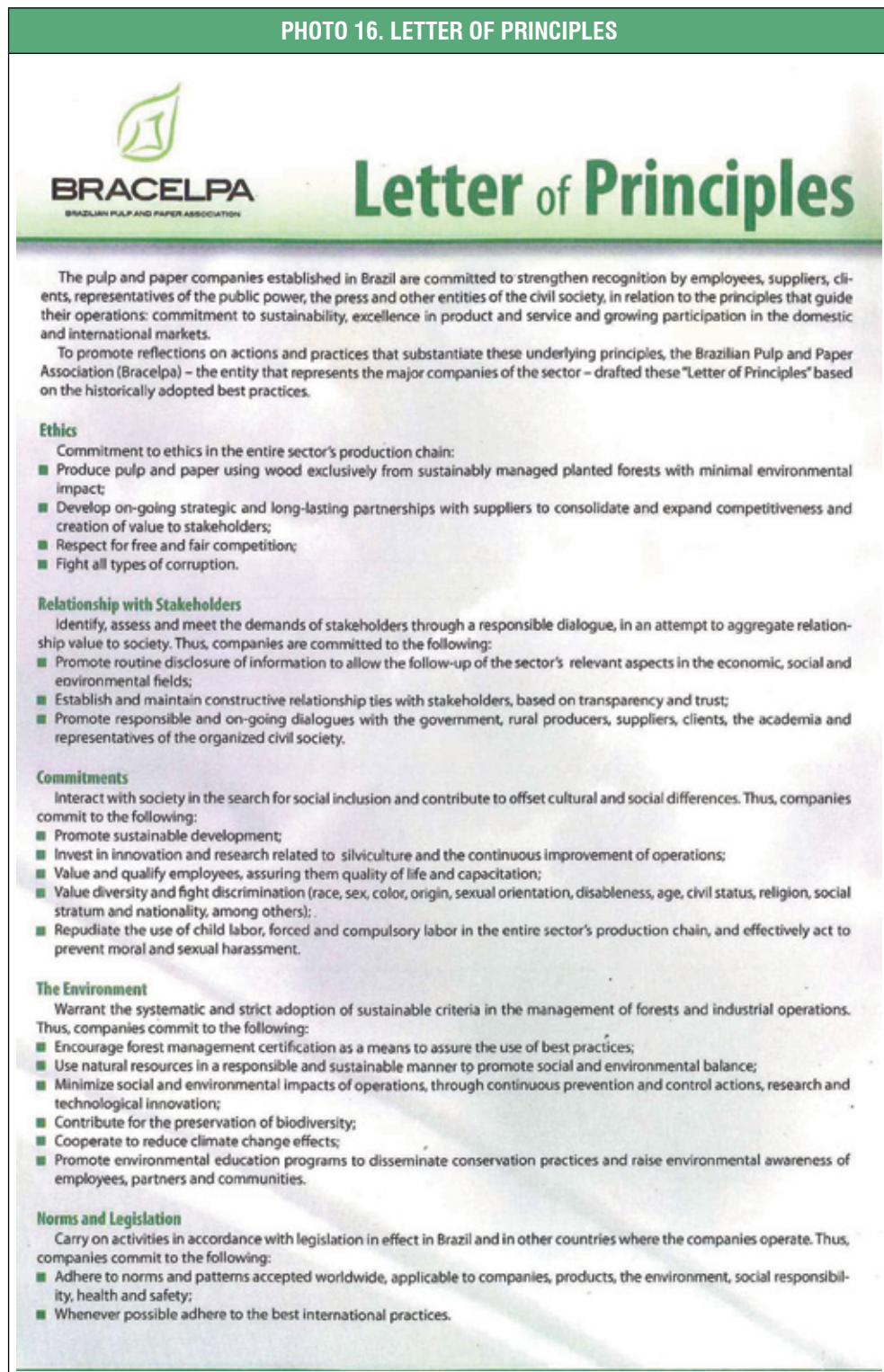
4.3 Certification and self-regulation initiatives developed by the sector

In order to demonstrate the pulp and paper companies' commitment to Brazil's sustainable development, in 2010 Bracelpa drafted the sector's Letter of Principles. A result of analysis and of a systematization of the environmental, sustainability and social-responsibility policies pursued by Bracelpa's associates, this document strives to promote and guide companies actions in five areas: ethics; stakeholder relations; commitments; environment; and legislation.

The Letter of Principles is also an important tool to reinforce disclosure of the sector's good practices since it shows continuous commitment to Brazil's sustainable development. Notable among its main points is the use of lumber from legal sources and exclusively from forest plantations that are sustainably managed and that produce the least possible environmental impact. It also reinforces the incentive to obtain forest certifications and to use natural resources responsibly and sustainably, seeking a social and environmental balance.

The text also discusses helping conserve biodiversity and reducing the effects of climate change – an ever more important topic for the pulp and paper sector. The document further addresses the importance of establishing and maintaining responsible dialogue with stakeholders, seeking to add value to society based on companies relations.

The following is the Letter of Principles in its entirety:



4.4 Initiatives spearheaded by Bracelpa

In order to help improve the Brazilian Forestry Code, Bracelpa coordinated a wide-spread debate on the topic in conjunction with the Forest Dialogue, an initiative that brought together companies in the forestry sector as well as social and environmental organizations. As a result of these efforts, a proposal was presented with 16 specific points for the new Forestry Code to representatives of the executive and legislative branches as well as to civil society in March 2011. What truly set this document apart was that it sought consensus among these sectors.

With 67 signatories, the Carta do Diálogo Florestal (Forest Dialogue Letter) sought a balance between forestry companies' pursuits to expand development in Brazil and the legitimate concern expressed by social and environmental organizations regarding preservation of the environment and family agriculture. It also reflected the interest of its signatories through legislation that values sustainability.

The document stressed the importance of reviewing, perfecting and updating the Forestry Code "since legislation fell short and was rather inefficient in uniting the aims of forest production and environmental protection." The letter stressed the role of Brazil's forestry industry and its importance in terms of climate change, making reference to forest plantations for industrial uses and native forests as important paths to promote sustainable development in Brazil. The document also reinforced the country's need for forestry legislation that is "strong, scientifically robust and backed by innovative public policies and institutions committed to protecting and expanding Brazil's forestry areas."

A summary of the proposals of the consensus are available for download on the Forest Dialogue site: www.dialogoflorestal.org.br.



5 CHALLENGES AND OPPORTUNITIES FOR THE SECTOR TO BE ON TRACK TOWARDS SUSTAINABILITY

In recent years there has been a proliferation of international dialogue on questions that will affect the future of mankind, principally the scarcity of natural resources that are essential to meet our food, water, land and energy needs. Various sectors, like the food, pharmaceutical, automotive, cosmetics and other sectors, use pulp in their products or in the manufacturing of their most important products for the world's population. So, for Brazil's forest plantations, pulp and paper sector, the greatest challenge is to meet the future demands of the forestry products industry while concurrently preserving the environment and ensuring social inclusion and economic viability.

In order to increase awareness of the multiple uses of forest plantations, the sector has been working intensely on projects to raise awareness regarding the importance of the forestry products industry and how they are relevant to people's lives. Besides, as consumers develop a greater perception of the importance of sustainability and conscious consumption, international competition becomes fiercer. Companies began to invest more in operational control and sustainable processes in order to strengthen their image and gain market share of their products.

Given this context, two important topics figure into the sector's agenda: valuing forest carbon and the use of biotechnology, which today is seen as one of the future solutions to increase the productivity of forest plantations, which will guarantee the supply of fiber and energy to meet future world demand. Complementarily, forest plantations, which already stock a considerable amount of carbon, also generate additional social benefits. Through a strategic program, the sector strives to promote the expansion and sustainable management of industrial forests, mostly encouraging activities involving forest incentives.

5.1 Valuing forest carbon in the context of the green economy – a proposal from the pulp and paper sector for discussion at the Rio+20

The strengthening of the planted forests-based economy, as a result of the solid social and environmental criteria, is directly related to the promotion of sustainable development. The production of renewable timber is part of the core of various environmental services and key topics for the green economy and the eradication of poverty, such as: the use of biomass instead of fossil fuels; the sustainable use of land and water resources; large-scale generation of income and jobs in rural areas; the inclusion of small farmers; protection of biodiversity; decreasing deforestation pressures; consolidating sustainable production and consumption pressures based on renewable raw materials; and, especially, mitigating world climate change.

Through photosynthesis and sustainable management, forests absorb CO₂ from the air and stock the carbon equivalent in the biomass and the planted areas, greatly aiding global mitigation efforts. In Brazil, for example, harvesting cycles generally occur every seven years. As such, while one seventh of the total stock in a given production area is being harvested, the other six sevenths are stocking carbon, generating average stocks that remain steady over time. After harvesting, the same area can be planted using new investments generated from the perennial carbon stocks. Thus, in addition to recycling the CO₂ already present in the air and freeing oxygen, forest plantations also generate sustainable carbon stocks on the Earth's surface¹.



Value should be given to discussions on forest plantations at Rio+20.

Credit: Fibria/Ricardo Teles

¹ However, there are two types of climate benefits associated with the production of forest plantations: carbon stocks in the plantation areas and (ii) potential emissions avoided on account of the use of renewable lumber instead of non-renewable resources or fossil fuels.

Estimates based on consolidated methodologies indicate that Brazilian forests stock approximately 1.3 billion tons of CO₂ equivalent (tCO₂e), just considering carbon inventory in forest plantations areas². In order to grasp this figure, 1.3 billion tons is equivalent to more than half of all of Brazil's emissions in 2005³. The pulp and paper sector alone contributes with an average stock of approximately 440 million tons of tCO₂e. These estimates do not include, conservatively, stock in conservation areas maintained by the sector, which represents approximately 2.9 million hectares. When it is considered the potential use of planted lumber instead of gas or fossil fuels in many chains of production, the potential for further climate benefits is even greater.

However, although Brazil has favorable soil and climate (edaphoclimatic) conditions and despite having the most advanced technology, the country still faces a substantial forest plantations deficit and underused potential on account of a number of barriers. In order to overcome this challenge, it is crucial to promote and place economic value on climate, social and environmental benefits through the numerous public and private instruments available, including carbon markets.

Given such, the Brazilian pulp and paper sector, in conjunction with a number of non-governmental organizations, is developing the Iniciativa Brasil Florestas Sustentáveis (Brasil Sustainable Forests Initiative). It is based on structuring and implementing a strategic program to expand and sustainably manage industrial forests in a way that integrates the protection and conservation of native forests, as an alternative to mitigating climate change and to promote sustainable land development. The project is inspired by the most rigorous methodologies, including the Clean Development Mechanism (CDM) addressed in the Kyoto Protocol, which will serve as a basis for large-scale pilot programs as well as for more widespread sector policies and programs.

Thus, the sector expects to coordinate efforts to value climate, social and environmental benefits through carbon credits, with the need to and challenge of expanding Brazilian forests within the context of the green economy. This is an opportunity to catalyze positive changes in the economy and the communities involved in the forestry business. In order to make this a reality, it is necessary to improve interaction and involvement with multilateral principles and norms.

However, this is not only about Brazilian potential or needs. According to the UN FAO forecasts, more than two million people worldwide depend on forest biomass to survive, which makes the need to step up efforts and pursue international cooperation in this area even more clear. Brazil is poised to act as a leader, including cooperation from South-South, since it has vast experience that can be shared with other developing countries in an attempt to encourage green economies based on synergies between mitigating climate change and promoting sustainable development.

Starting with the Climate Convention (UNFCCC) signed in Rio in 1992, the international community has made important advances in combating global warming and, more in-

² Brazil has 7 million hectares of forest plantations. Of this, 2.2 million hectares are used for producing pulp and paper. Estimates of carbon stocks do not include, conservatively, stocks in conservation areas maintained by the sector (legal reserves, permanent conservation and other areas).

³ According to Brazil's Second Communiqué to the UNFCCC, national emissions in 2005 totaled approximately 2.18 billion tons of CO₂.

directly, in promoting sustainable development. The Convention and its Kyoto Protocol were also successful in initiating one of the main mitigation instruments, in other words, valuing carbon through market mechanisms, capable of helping bring the factor of a variable climate into the production and consumption systems. Forests were taken into consideration for these mechanisms, though less extensively, in a more limited manner and subject to the restrictions of developed countries. It is needed to advance their involvement more ambitiously.

It is important to include mechanisms that value forest carbon since they can contribute to the development of other topics that are important for sustainable development. Of all externalities referenced in the green-economy agenda, “climate externality” is certainly the one with the greatest potential for internalizing in the production and consumption systems since it can be consistently measured, can be directly attributed to consumers, companies and chains of production, and its costs can be estimated and compared on a global level.

Therefore, in the context of the forestry based economy, it is also important that monetary valuing of carbon serves not only as an instrument for mitigation but also a lever for sustainable development. Other green-economy topics (such as water resources, land use, renewable energy, social inclusion in rural areas, biodiversity and the fight against deforestation) can be associated with the value of carbon based on improving and expanding current mechanisms, always using high environmental integration standards.

Due to the interdisciplinary nature and because it involves synergies between the international climate-change regime and the other topics of the green economy, it is fundamental that these points be addressed in the discussions and in the adoption of principles and criteria at Rio+20. This is a two-way street that needs to be further explored. Valuing forest carbon, including by means of carbon markets, can lead to developments in other areas as well as synergies with other topics that can make mitigation efforts in production and consumption systems more effective, promoting the green economy in an integrated way. This approach seems essential to guarantee the counterparties and create the means to value and make the necessary expansion of the green economy feasible in Brazil and in other developing countries in a sustainable and integrated manner.

5.2 Biotechnology – The pulp and paper sector’s proposal for Rio+20

The challenge of supplying the planet, which will be part of the discussions at the United Nations Conference on Sustainable Development, Rio+20, will also create opportunities in many countries, translated into the pursuit of solutions to produce more without depleting raw-material resources. In order to adapt to this new world context, the sector will have to improve land, water and energy use as well as the use of other resources, reconciling the sustainable food, biofuels, fibers and forests production (the so-called 4 Fs – *food, fuel, fiber and forests*).

PHOTO 18. BIOTECHNOLOGY



Biotechnology is an alternative to finding solutions to supply the planet.

Credit: Arquivo International Paper

Biotechnology has stood out as an alternative to meet these demands and simultaneously to reduce environmental externalities in addition to producing social and economic benefits. According to the International Service for the Acquisition of Agro-Biotech Application (Isaaa), biotechnology is the agricultural technology that has been most widely adopted in the last 10 years, now affecting a planted area 94 times greater than in 1996 and currently being used in 29 countries. The world boasts more than 160 million hectares with genetically modified plants. Brazil has taken a leading role in this world model, ranking second in terms of genetically modified organisms (GMOs) worldwide, equivalent to more than 30 million hectares.

According to the consulting firm Ceteris, the quantifiable and cumulative benefits of biotechnology from 1996 to 2010 include: an increase in the volume and value of production, which has reached US\$ 78 billion; improvements to the environment by avoiding the use of 443 million kg of the active ingredient in pesticides; the conservation of biodiversity by avoiding an additional 91 million hectares of land being turned over to agriculture; the reduction of poverty through programs for 15 million small farmers; a 19 million tons reduction in carbon dioxide emissions in 2010 alone.

Arboreal biotechnology is still in its testing phase and is being developed by internationally renowned scholars, scientists and research institutes. Despite its potential benefits to all three pillars of sustainability (social, economic and environmental), the technology has not yet been approved or used on a commercial scale.

The forestry based, pulp and paper sector stresses the contributions of biotechnology in forest plantations under the following topics:

Economic benefits

- encourages new investments;
- reduces production costs and risk of losses;
- increases competition.

Environmental benefits

- pest and disease control;
- potential increase of wood productivity;
- lower consumption of natural resources;
- incentive to implement agroforestry systems.

Social benefits

- meets the demands generated by the growth of the global population;
- education and professional training;
- job creation and income generation.

Multiple forest use must be highlighted for the industries that use forestry base products. Based on the UN estimate that global population will reach eight billion people in 2025, there will be an increase of the use of natural resources, which may create difficulties for sustainable development. Therefore, the use of biotechnology may facilitate the understanding of the demand for forestry products in the following industries:

- pulp & paper;
- food;
- energy;
- medical drugs;
- electronics;
- packaging;
- footwear;
- personal hygiene;
- automotive;
- cosmetics;
- toys.

Given this outlook, Brazil's forest plantations, pulp and paper sector defends the inclusion of the topic biotechnology in the Rio+20 agenda. Brazil has much to contribute to this debate given its recognized excellence in forest management and the fact that it is a large agricultural producer with available lands to meet a significant portion of world demand for food, fuels and forest products.

The objective of this proposal is that the conference participants are familiar with the scientific advances resulting from studies and researches into the application of biotechnology as an essential tool to meet these future demands. Furthermore, it is crucial that the risks and opportunities of biotechnology use be widely and jointly evaluated within the context of the proposals for sustainable development.

The concept of sustainable development is dynamic, constantly evolving and will never stand still. Therefore, Rio+20 is the ideal stage to discuss this topic, which is currently approached as a stand-alone topic, thus helping facilitate discussion and promote multilateral actions with common objectives. As such, it is hoped that governments and organizations that take part at Rio+20 Conference will include a debate on biotechnology in their agendas as one of the paths to sustainable development.

It is very important that biotechnology is also seen as an ally to implement global solutions for the upcoming years, that resonate with the Brazilian government's proposals for the Conference, such as eradicating extreme poverty, valuating forests in a country's economy, strengthening multilateralism and disseminating technologies to reduce greenhouse gas emissions (GGEs), protecting natural resources (and payment for environmental services).

More information: www.bracelpa.org.br.

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