

# Instruments for sustainable private sector forestry in Brazil

An analysis of needs, challenges and opportunities for natural forest management and small-scale plantation forestry

Virgílio M. Viana, Peter May, Lucineide Lago, Olivier Dubois, Maryanne Grieg-Gran



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High rates of deforestation in the Brazilian Amazon are the focus of both national and international concern. Brazil presents particular challenges for sustainable forest management since a large proportion of its forest is on private land and there are strong pressures to make land available for agriculture. The forest industry makes an important contribution to the economy and yet forests have traditionally been seen as obstacles to development. Most private sector forestry in the Amazon is being conducted on an unsustainable basis as large areas of forest are being cleared for other land uses, in spite of regulations which aim to ensure good forest management and to limit conversion.

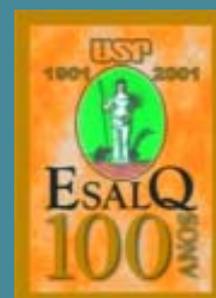
This report considers how new approaches to forest policy can induce the private sector to play a positive role in forest management. It examines how policy and market failures have limited private sector participation in sustainable forest management up to now and assesses the prospects for new types of instrument to overcome these failures. These new approaches, which include certification, payment for environmental services, private sector-community partnerships and incentives for reforestation, give more emphasis to markets than the traditional regulatory approach and have the common goal of increasing forest values to private owners or managers of land.

## Instruments for sustainable private sector forestry series

Forests provide society with many goods and services. The private sector has come to play an increasingly dominant role in the production and distribution of many forest goods. Often, this has come at a price – environments have been degraded and social inequalities increased. Forest services that benefit society as a whole, notably climate moderation, biodiversity and heritage, are overlooked or undermined because they offer no opportunity for private profit. Securing these forest goods and services has traditionally been a government function. However, faced with limited resources, many governments now have the challenge of finding new ways to ensure the private sector manages forests such that they optimise benefits to society. Some industry leaders have taken the initiative and are already working towards better forestry.

This series of publications comprises both thematic and country studies. The studies carried out in collaboration with research teams in key countries, aim to better understand private sector motivations and identify effective market and regulatory instruments to ensure the private sector produces social and environmental benefits from forest management. By considering new instruments within the wider context of policy reform, the series aims to provide practical guidance on how best to ensure the private sector manages forest resources sustainably.

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While this report is hugely indebted to those that contributed to the sub-studies, the opinions expressed in this paper are those of the authors alone, and not necessarily those of the sub-study authors, IIED, DFID or the EC.

# Acronyms

APA	Environmental Protection Areas
ATPF	Authorization for Transport of Forest Products
BASA	Amazonian Development Bank
CDM	Clean Development Mechanism
CESP	São Paulo State Energy Utility
FAO	Food and Agriculture Organization of the United Nations
FARESMAT	Mato Grosso Federation of Reforestation Associations
FEMA	State Environment Foundation
FIEMT	Mato Grosso Industry Federation
FSC	Forest Stewardship Council
IBAMA	Brazilian Institute for Environment and Renewable Natural Resources
IBDF	Brazilian Institute of Forest Development (now IBAMA)
IBGE	Brazilian Institute of Geography and Statistics
ICMS	Tax on the Sale of Goods and Services
IMAFLORA	Institute for Management and Certification of Forests
IMAZON	Institute of Man and Environment of Amazonia
INCRA	National Institute for Land Reform
INPE	National Institute for Spatial Research
IPEF	Institute of Forestry Research
IPN	Pro-Natura Institute
IPT	Institute of Technological Research
ISA	Institute of Environment and Society
MMA	Ministry of the Environment, Water Resources and the Amazon
MST	Landless Movement
NGOs	Non-governmental Organizations
NTFPs	Non-timber forest products
ONF	National Office of Forests (France)
PIFFR	Programme of Fiscal Incentives for Reforestation
PMFS	Sustainable Forest Management Plan



PNF	National Forest Programme
PRODEFLOA	Mato Grosso State Forest Development Programme
PROMADEIRA	Wood Processing Development Programme
PSCIB	Carbon Sequestration Project of the Ilha do Bananal and its Surroundings
REPEMIR	Reforestation Programme for Small and Medium Rural Producers
RPPNs	Private Nature Reserves
SFM	Sustainable Forest Management
SPVS	Society for the Protection of Wildlife
TNC	The Nature Conservatory
UFMT	Federal University of Mato Grosso
WWF	Worldwide Fund for Nature



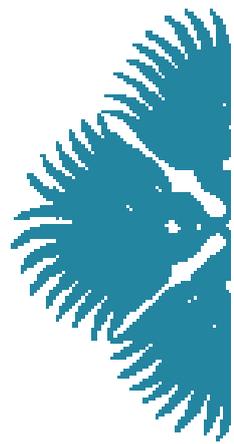
# Executive Summary

Brazil presents particular challenges for sustainable forest management given its vast forest resources and the significant pressures on land. Unlike in many other tropical countries, a large proportion of Brazilian forest is on private land. Little remains of the Atlantic Forest in the South, most of it having been converted to agriculture and pasture. In the North, the Amazon, though still retaining vast forest resources by international standards, has seen significant deforestation. Most private sector forestry in the Amazon is being conducted on an unsustainable basis as large areas of forests are being cleared for other land uses, in spite of regulations which aim to ensure good forest management and to limit conversion.

This report considers how the private sector in Brazil can be motivated to participate more in sustainable forest management and the role of innovative public policy instruments in achieving such a goal. It examines how policy and market failures have limited private sector participation in SFM up to now and assesses the prospects for new types of instrument to overcome these failures. These new approaches are primarily market-based in contrast to the traditional regulatory approach and all have the common goal of increasing forest values to private landowners or managers.

The focus is on the problems of forest management in the Amazon region in view of the attention it receives at both national and international level. However, experiences from other parts of Brazil with the use of innovative approaches are examined, and their implications and potential for application in the Amazon region are considered.

The Amazon region is itself very complex, with significant differences between the states that make up this region in terms of endowments of forest resources, rates of deforestation, pressures from other land uses and interest at the political level in sustainable forest management. It is therefore useful to consider the issues raised by SFM and the application of new policy approaches in the context of a particular state as well as more generally. The decision was made to focus on the state of Mato Grosso given that it has seen considerable deforestation and land use pressure from agribusiness developments yet still has significant endowments of forest resources. The state government has also shown considerable interest in environmental issues.



Five studies were carried out by different Brazilian institutions and researchers on the following policy instruments or approaches for sustainable forest management. In all cases, the lessons from previous experience in Brazil were examined.

- Impacts of forest certification
- Barriers to forest certification: the importance of cost
- Water tariffs and payment for environmental services of forests: lessons from the Piracicaba river.
- Incentive schemes for reforestation in Brazil
- Partnerships in the context of natural resource management

These studies were presented for debate at a workshop held with key stakeholders in Cuiabá, Mato Grosso. Presentations were also made at this workshop on existing initiatives in the Mato Grosso and on the experience in Brazil with the ICMS ecológico (ecological value added tax) and carbon sequestration projects. This was followed by in-depth interviews with representatives of industry, government and NGOs in Mato Grosso to assess their perspectives on the challenges for private sector participation in SFM and the potential role of the policy instruments presented at the workshop.

## **Key Challenges**

The biggest challenge for both the private sector and government is to change the paradigm that guides public policies and private investments. Forests have been seen as obstacles for development, not as opportunities. As a result, public policy has prioritized expansion of the agricultural frontier at the expense of forest cover. To change this paradigm will require not only the introduction of new instruments but also the modification of existing systems of regulation in order to simplify procedures and to ensure more effective enforcement. A prerequisite for the success of any new approach will be to address the problem of unclear and insecure land tenure through designation of public forests and other measures to reduce the risk associated with long-term investment in forest management.

## **New Policy Approaches**

### **Certification**

Certification has expanded rapidly in Brazil and has become a major catalyst of change in forest management. With the formation of a buyers group it appears that demand for certified timber is outstripping supply. Moreover, planted forests, outside of the Amazon region, still constitute the major part of certified forests in Brazil. There is an urgent need to expand the area of certified forest, particularly in natural forests in the Amazon.

The greatest barrier for producers to achieve certification is to demonstrate compliance with all relevant legislation on forest management, labour and

health and safety as this is a prerequisite for certification. The additional requirements of certification over and above the legislation are relatively minor. Thus measures to improve regulation as discussed above will have a positive effect on certification. Other actions that would encourage the expansion of certification include streamlining of requirements (evaluation of inventories, harvesting plans etc) for those already certified, creation of government credit schemes with good forest management or certification as one of the pre-conditions for access and research on utilization of new timber species.

### **Payment for Watershed Protection Services**

One of the key environmental services that forests provide is watershed protection yet this often goes unrewarded. An innovative approach has been adopted for the Piracicaba river basin to make the link between forest management and water supply explicit. Under this system 1% of all water revenues is allocated to reforestation and environmental education. This is only a beginning and more needs to be done, for example to pay farmers for the opportunity costs of the land used for reforestation. Yet it shows how innovative public policy instruments for the environmental services of forests can be developed.

This is relevant to the Amazon region as many river basins there have seen extensive deforestation. The major priority for implementing such an instrument in the Amazon region is in watersheds with high water consumption and high turbidity and consequently high costs of water treatment. The first step for implementation of this instrument should be preparation of a Master Plan identifying priority areas for restoring and conserving forest cover. This should be accompanied by creation of an appropriate legal framework and awareness-raising among decision-makers.



### **Partnerships between Communities and Private Companies**

Traditionally, the interactions between communities and the private sector in forest regions have been characterized by exploitative trading relationships and unsustainable patterns of resource exploitation. Land and resource tenure are key determinants of the situation as shown by various examples in the Atlantic Forest where communities have little bargaining power because of their lack of land rights. In turn, the ability to secure such rights depends on the extent to which communities are empowered through social organization and alliances with social movements.

However, there are some examples of arrangements that involve genuine partnerships where incentives are created for sustainable forest management and communities derive benefits. Through the efforts of the Forest Industries Centre in Xapuri, Acre, successful partnerships between rural communities and private companies have been established for the manufacturing of products based on Brazil nuts, rubber and timber. But, unlike the communities in the Atlantic forest, the communities in Acre are highly empowered, with clear land

tenure rights, and strong social institutions. This increases the likelihood of equitable and sustainable partnerships with the private sector.

In many cases partnerships with private companies may offer a route to community development provided that the necessary institutional and political conditions are in place. Technical assistance and advice to communities on negotiating long-term contracts will be crucial.

### **Fiscal Incentives for Reforestation by Small Producers**

The likely scarcity of wood in the future as well as the extensive area of degraded pastureland makes it essential to introduce policy instruments to promote reforestation in areas with high rates of forest loss. Brazil has a rich experience dating back to the 1960s in using fiscal incentives to promote reforestation. For many years the Federal Government offered generous tax incentives to private companies establishing plantations. While this was effective in increasing the area planted, it proved to be very costly and it was also difficult to monitor. For this reason, programmes to promote reforestation amongst small and medium farmers operated at state level could be a promising alternative.

The state programmes in Minas Gerais and Paraná have been effective in expanding the area reforested in small and medium landholdings for both productive and conservation purposes. They have also achieved better results in terms of area reforested than the reforestation association approach used in São Paulo. But to some extent, this reflects differences in financial resources, as in both Minas Gerais and Parana, the revenue from the reforestation tax has been supplemented by other state funds. The experience of the reforestation associations in São Paulo shows that it is possible to involve civil society organizations in the restoration of the productive forest base but this should not be the only approach used by a state government to promote reforestation.

Common to all the state schemes is the need to give more support to small producers after the planting stage, particularly in relation to marketing. This implies greater coordination with the companies that consume wood to understand their requirements. There is also a need to give more attention to reforestation with native species.

### **Carbon Sequestration**

Forests provide an important environmental service as they store and sequester carbon from the atmosphere and thus help to mitigate global climate change processes. Until recently, this service had no market value. One of the principal opportunities for financing private sector forest management activities that has emerged recently is the Clean Development Mechanism (CDM). This is associated with “additional” activities aimed at sequestering carbon from forests or through changes in land use. The ability to market carbon credits from forestry projects will help to improve their financial viability and so



address one of the principal obstacles to the development of the forest sector, that of low rates of return.

There are currently various pilot carbon sequestration projects in Brazil, based principally on land use change and reforestation. Three projects stand out:

1. The reforestation project for carbon sequestration operated by the National Office of Forests in France on behalf of Peugeot-Citroen in the Northeast of Mato Grosso.
2. The Action against Global Warming project developed by the Society for the Protection of Wildlife (SPVS) in Guaraqueçaba, PR with resources from Central and Southwest Corp.
3. The carbon sequestration project of the Ilha do Bananal in Tocantins state, coordinated by ONG Ecológica with funds from the British foundation AES-Barry.

These three carbon sequestration projects, which involve a total investment of over US\$18 million, include reforestation activities as well as emission avoidance activities through protection of natural forest. They also incorporate activities such as promotion of income-generating activities and participation in project planning processes aimed at ensuring that local communities derive benefits. These projects are showing how issues of demonstrating additionality and contributing to sustainable development at a local level can be tackled in practice.

A key challenge for the future is to consider carbon sequestration in the wider context of environmental services. In particular, attention should be given to restoration of river bank forests, combining both watershed protection and carbon sequestration services.



### **Ecological Value Added Tax**

The ecological value added tax (ICMS Ecológico) is a concrete case of a public policy instrument that is achieving success. It was first introduced in Paraná in 1991 and has since been extended to other states in Brazil. It involves the inclusion of an ecological criterion alongside the traditional criteria used to divide the ICMS tax revenue between municipalities.

In Paraná the ecological criterion accounts for 5% of the ICMS and is divided between municipalities with watershed protection areas and those with protected areas. In Minas Gerais and São Paulo, the percentage allocated to environment is much lower (in the former, 1% divided between sanitation and protected areas and in the latter 0.5% for protected areas). Even so, the amounts associated with these transfers are significant resulting in a substantial increase in municipal funds in various cases. As a result, the local authorities that have benefited have come to appreciate the importance of conservation to the local economy. This has led to the creation of new protected areas as well as the designation of Environmental Protection Areas (APAs). This has also prompted a new attitude on the part of the private sector, leading to a substantial increase in the area of private nature reserves (RPPNs).

There is considerable potential to introduce this instrument in other states. The key issue will be to ensure that the ecological criterion addresses both the area protected and the quality of management. In Parana, the allocation criteria have two dimensions: quantitative focusing on the area protected, and qualitative taking into account factors such as the efforts made in relation to planning, implementation, maintenance and management. Other states have so far not placed the same emphasis on the qualitative dimension and as a result there has been less impact on the management of protected areas.

## **Practical Application at State Level - Mato Grosso**

More than half of Mato Grosso lies within the Amazon, and the state has seen significant deforestation. The forest sector is a key industry in Mato Grosso, contributing over 6.4% of value added in the State, but its future is threatened by the unsustainable pattern of timber harvesting and lack of investment in reforestation activities. It is estimated that currently there is a deficit of approximately 6.5 million m<sup>3</sup> of wood per year.

The enforcement of forest management regulations in Mato Grosso exhibits many of the problems, such as excessive bureaucracy, delays, lack of standardized procedures, observed for the country as a whole or for the Amazon region. In particular, a review of forest management plans carried out in 1999 found that only 24% could be considered adequate. The State Government has introduced some innovative programmes and policy instruments to promote sustainable forest management. Pro-Madeira aims to improve efficiency and environmental management amongst wood processors. Prodeflora focuses on rural producers and financial incentives for the provision of forest environmental services. Nevertheless further action is needed to support these approaches and ensure that they are used to their full potential.



### **New Approaches**

#### *Certification*

Certification has proceeded slowly in Mato Grosso, with only one company, a teak plantations company, certified by April 2002. Most companies are aware of certification, but do not find its performance requirements very accessible. In order to support the expansion of certification in the state, the following actions should be considered:

- Simplification of the regulatory requirements and procedures for those companies that are certified
- Introduction of tax concessions or other incentives for certified companies. In particular, include “good forest management” and or certification in the eligibility criteria for tax concessions under Promadeira.
- Stimulate the development of courses to train technicians and forest operators in good forest management.

- Support partnerships between forest producer associations and wood technology centres such as the Institute of Technological Research (IPT) and others in order to increase knowledge of the applications for lesser known species.
- Increase awareness of the market implications of certification by promoting meetings between representatives of the Buyers Group and their principal suppliers in the state of Mato Grosso.

#### *Incentives for Reforestation*

While the state already has a number of instruments to promote reforestation, more attention needs to be given to the needs of small producers. Options to consider include:

- Strengthening of partnerships with communities that live close to forest operations, through identification of income-generating opportunities associated with timber harvesting
- Greater attention on the part of extension agencies to the technical assistance needs of small producers.

#### *Carbon Sequestration*

Mato Grosso has considerable potential to benefit from CDM projects, particularly from restoration of forests in the legal reserve areas. Important actions for the State Government to take include:

- Develop a list of the areas in the State most appropriate for CDM projects, particularly those related to the restoration of forest cover in legal reserve areas and permanent protection areas, notably river banks.
- Promote partnerships between rural producers who need to restore forest cover to their legal reserve areas, and foreign investors who can finance tree planting in exchange for carbon credits.
- Stimulate pilot sustainable development projects based on agroforestry and non-timber forest products or community forestry.
- Participate in the Brazil Climate Change Forum and lobby together with the Brazilian Government negotiators for the inclusion of forest projects in the CDM.

#### *ICMS Ecologico and Private Nature Reserves*

Both the ICMS ecologico and the Private Nature Reserves (RPPN) can play an important role in conserving biodiversity in the state of Mato Grosso. A proposal for the introduction of the ICMS ecologico was approved in November 2000, but unlike in other states, there is no provision for the incorporation of quality considerations. In addition, the conservation factor assigned to private nature reserves is relatively low. For this reason, the ICMS ecologico in its current form (at the time of writing at the end of 2000) is unlikely to have much impact on the creation of private nature reserves. Other types of incentive mechanism are needed to encourage private sector participation in the creation and management of conservation areas.

*Payment for Watershed Protection Services*

Watershed protection is recognized by both municipalities and state government to be a priority. There is a need to examine options such as a water tax to promote watershed protection. It is recommended that:

- A workshop be organized in Cuiaba to discuss experiences in watershed management from other parts of Brazil
- Preliminary studies should be conducted in the River Cuiaba watershed to examine the relationship between forests and water.



# 1. Introduction

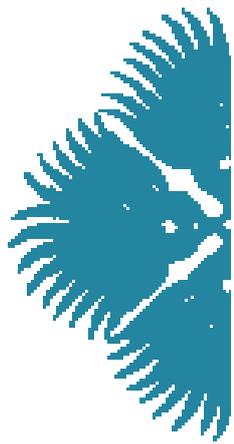
The private sector is an increasingly dominant player in the production of wood products and the market is the main way in which these products are distributed. Yet, for other forest goods and services such as non-timber forest products, biodiversity and carbon storage, markets are often not effective. Market and policy failures mean that the private sector often degrades the forest resource base and adopts unsustainable practices. Moreover, wood production can have an adverse impact on non-wood benefits (Bass and Hearne 1997).

The challenge is to identify policy and market instruments that would create incentives for the private sector to play an active role in improving forest management systems. Often these instruments are nation or region-specific due to social, cultural, economic, environmental and institutional factors. But some instruments, such as certification and payments for carbon sequestration can be applied in a variety of forest types, socioeconomic conditions and institutional contexts.

Brazil presents particular challenges in this regard given its vast forest resources and the significant pressures on land. Little remains of the Atlantic Forest on the eastern coastal zone, most of it having been converted to agriculture and pasture while in the North, the Amazon, though still retaining vast forest resources by international standards, has seen significant deforestation. Most private sector forestry in the Amazon is being conducted on an unsustainable basis as forests are cleared for other land uses, in spite of regulations which aim to ensure good forest management and to limit conversion.

## **Emerging instruments and approaches to private forestry in Brazil**

- forest certification
- water tariffs and forest restoration
- ecological tax
- carbon sequestration
- incentives to small scale plantation forestry
- partnerships between communities and private sector



The scope of this work is limited as Brazil is a very large country with a heterogeneous and complex forest sector. Given funding and time constraints it was necessary to focus on particular forest types and areas. This study addresses the problems of forest management in the Amazon region in view of the attention it receives at both national and international level. However, experiences from other parts of Brazil with the use of new instruments and approaches are examined, and their implications and potential for application in the Amazon region are considered. Our approach was to examine the old agricultural frontier (Southeastern Brazil) so as to extract lessons that may be applicable to the new frontier (Amazon).

The Amazon region is itself very complex, with significant differences between its constituent states in terms of endowments of forest resources, rates of deforestation, pressures from other land uses and interest at the political level in sustainable forest management. It is therefore useful to consider the issues raised by SFM and the application of new policy approaches in the context of a particular state as well as more generally. The decision was made to focus on the state of Mato Grosso for a number of reasons:

- Mato Grosso has seen considerable deforestation yet it still has significant endowments of forest resources,
- the emergence of agri-business developments and infrastructure projects which could intensify pressure from other land uses,
- the interest shown by the State Government in environmental issues.



Similarly, it is not possible to examine all types of forest and forest management in Brazil. We focus primarily on natural forest management which is becoming increasingly recognized as an important component of sustainable development strategies, especially in the Amazon. Another focus is on small-scale plantation forestry which is becoming more important in regions with high levels of deforestation and thus low supply from natural forests. We also examine the potential of forest restoration to generate a wide array of products and environmental services, especially carbon sequestration and watershed protection.

This report draws on four types of material:

- Five studies carried out by different Brazilian institutions and researchers under IIED's Instruments for Sustainable Private Sector Forestry Project. These studies were the following:
  - (i) Viana, V.M. and Nassif, A. 2000. *Water tariffs and payment for environmental services of forests: lessons from the Piracicaba Basin and its applicability to the Amazon*;
  - (ii) May, P. and Veiga Neto, F.C. 2000. *Barriers to certification in the Brazilian Amazon: the importance of cost*;

- (iii) Bacha, C. 2000. *Incentives for reforestation in Brazil: an analysis of public policies*;
- (iv) Caron, D. *et al* 2000. *Partnerships in the context of natural resource management: lessons from Southeastern Brazil and the Amazon*; and
- (v) Braga, E. 2000. *Impactos e perspectivas da certificação no Brasil*.

- Presentations of new policy instruments and existing initiatives at a workshop held in Cuiabá, Mato Grosso in August 2000
- Interviews with key individuals, representing different stakeholders of Mato Grosso, to assess their perspectives on the findings of this study in November and December 2000 (Lago, L. 2000. Characteristics of the Forest Sector in Mato Grosso).
- Literature review on the problems and policy context of forest management in the Amazon.

The findings of this study were discussed in a workshop organised by IIED at the end of 2000, in London, and compared with the findings of similar studies carried out in Costa Rica, South Africa, Papua New Guinea, India and China.



Fotografia: Instituto Pró-Natura

Environmental education should be targeted at children first.



Fotografia: Instituto Pró-Natura

Young girls planting trees in the Atlantic Forest as part of an environmental education campaign initiated by Pró-Natura

# 2. The Brazilian Forest Context

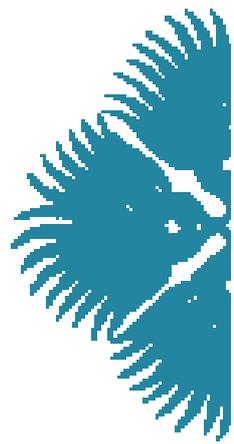
## 2.1 Recent Trends

Brazilian people are becoming increasingly aware of the problems associated with deforestation, predatory logging and watershed degradation and are being exposed to an unprecedented amount of information on these issues through the media. This is also affecting the National Congress which, over the past few years, has been debating major changes in forestry legislation. Never before has forestry received such a high level of attention.

More than three quarters of of the Brazilian population lives in urban areas and are facing the consequences of increasing levels of environmental degradation. Floods and landslides are recurrent phenomena with growing impacts on human livelihoods, especially in the case of the urban poor. Watershed degradation has resulted in increasing problems in water supply with a growing number of towns facing water shortages in the dry season. The city of São Paulo, for example, will have to reduce water consumption by 13% to avoid a collapse in its water supply system. Reduced streamflow led to a major hydroelectricity shortage in 2001, with a significant impact on the national economic growth rate. The government responded by rationing energy consumption by 20% to avoid breakdowns in energy supply.

Formal environmental education programs have become mandatory and are receiving increasing attention in schools. Together with these formal channels, informal campaigns, mostly launched by NGOs have brought deforestation, predatory logging and watershed degradation to the forefront of public debate. The results of these activities are clear. In 1997, a national public opinion survey revealed that more than two thirds of the population believed that environmental degradation should not be the price to pay for maintenance of employment. Moreover, deforestation and forest fires were considered the most important environmental problems by 45% of the population (Crespo and Leitão 1993).

Brazil's National Forest Programme (PNF), a comprehensive national forest programme launched in September 2001, is a notable landmark. Never before has Brazil adopted more than a sectoral policy for plantations, that operated in



the 1970-80s<sup>1</sup>. The PNF provides a framework to develop specific instruments to encourage sustainable forestry. The programme identifies areas which will need to be prioritized by existing and new policy instruments and international cooperation:

- expansion of forest plantations
- expansion and consolidation of forest management in national forests
- improvement and expansion of natural forest management in private areas
- increased efficiency of control and enforcement
- support to traditional and indigenous populations
- support to forest education, science and technology
- recognition and expansion of environmental services provided by forests
- support to institutional strengthening
- modernization of forest industries
- expansion of markets and trade of forest products

The process of developing the PNF has broadened dialogue between government and different stakeholders and has reinforced awareness of the need to develop sound sectoral and inter-sectoral policies. Although the programme has been successful in flagging the key themes deserving greatest attention by all stakeholders involved, there are many challenges ahead. How should these priorities be implemented given the institutional and financial limitations of the forest sector? How can government and private sector investment in sustainable forestry be increased? How can stakeholder capacity to devise and implement innovative initiatives be strengthened?



## 2.2 The Forest Sector in Brazil

Brazilian forests occupy a prominent position in a global context. Brazil is the world's fifth largest country and eighth largest economy, and has more tropical rain forests than any other country. Forests cover more than 65 percent (551 million ha) of the total land area, representing 59.8% of the forests of tropical South America and 26.6 of the world's tropical forests (FAO 1999).

### 2.2.1 Protected Areas

Brazil has one of the largest networks of protected areas in the world's tropical rainforests. These range from strict preservation areas to sustainable management areas; and include extractive reserves, a conservation system resulting from a globally recognised socio-environmental movement led by the late Chico Mendes. There are 229 conservation areas protected by the federal government covering 45 million ha, representing 5.25% of Brazil's territory. Of these conservation units, 101 are strict preservation areas ("indirect use"), covering 18.3 million ha, 47 of which are National Parks, 28 are Ecological Stations, 24 are Biological Reserves, 2 are Ecological Reserves. and 18 are

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1. During this period Brazil invested some US\$ 10 billion on tax incentives for forest plantations. See section 4.4

Areas of Relevant Ecological Interest. The remaining 128 areas are designated as “direct use” areas, in which sustainable uses are permitted. These cover 26.5 million ha – Forty-six of these are National Forests, 11 are Extractive Reserves and 24 are Environmental Protection Areas (IBAMA 2002). Most of these areas face common problems including land invasions, uncontrolled extraction of forest products and forest fires (WWF 1999). The Brazilian Government has pledged to extend the existing network of protected areas by an additional 25 million ha with the support of a WWF/World Bank alliance to protect 10% of the world’s remaining tropical forests (Lele *et al* 2000).

In addition to those areas designated as direct use conservation units, Brazil has set aside over 90 million ha of protected Indigenous Reserves that are home to more than 300 indigenous groups. Like conservation units, Indigenous Reserves also are the scene of conflict due to invasions, uncontrolled extraction of forest products and fire (ISA 1999).

### **2.2.2 Contribution to the Brazilian Economy**

The overall forest sector directly linked to wood products (forest production, services, equipment and industry) generated estimated yearly revenues of US\$ 53 billion for the 1993-95 period (in December 1998 constant dollars). The forest-based industry constituted 10.8% of Brazilian manufacturing industry in 1994, a slight decline from its level in 1970 (13%); and that of 1980 (13.4%) . The forest sector is a small but important component of Brazilian international trade, accounting for about 7% and 2% respectively, of total Brazilian exports and imports, for the 1995-98 period (Bacha 2000). The sector is also important in terms of employment. In the 1993-1995 period it employed 1.5 million people, many of whom were engaged in the harvesting of natural forest products (mostly timber). Forest-based industry accounted for about 11% of manufacturing industry employment in 1994, a slight decline from the 14% registered in 1980 (IBGE 1997).

The most important forest industry segments are pulp and paper, steel, furniture and other timber processing industries, plantation forestry, and timber extraction from natural forests. Brazil has a strong forest plantation industry that provides raw materials for the pulp and paper and iron and steel sectors. Brazil has reforested 5.5 million ha, mainly with eucalyptus and pines, and is a leading producer of short fibre pulp and paper, with an annual output of 6.2 million m<sup>3</sup> of pulp, representing 3.5% of global production and 6.9% of total world exports (FAO 1999).



## The Private Forest Sector in Brazil

Products	Type of Forest	Scale of Operation
Pulp and paper	Plantations	Large
Iron and steel (charcoal)	Plantations and natural <i>cerrado</i> (savanna) vegetation	Medium and large
Particle boards and plywood	Plantations and natural forest	Large
Furniture	Plantations and natural forest	Mostly small and medium
Sawn timber	Plantations and natural forest	Mostly small and medium
Logs	Mostly natural forest	Mostly small and medium
Non-timber forest products	Plantations and natural forest	Mostly small

Of the industries that use wood, timber sawmilling generates most employment, followed by iron and steel, furniture and pulp and paper (Table 2). (Bacha and Marquesini 1999, Bacha 2000).

Industry	% Sector Total 1985	% Sector Total 1994
Iron and steel	62.6	45
Pulp and paper	21.3	31.2
Sawn timber	9.5	11.6
Furniture	6.6	12.2

Source: Bacha and Marquesini 1999, Bacha 2000, based on IBGE 1997.

Within the forest-based industry, iron and steel production has the highest revenues, followed by pulp and paper, timber and furniture. In the period 1985-94, contribution of these activities to total forest-based industry revenues varied considerably. During this period, there was a decline in the importance of employment in the iron and steel industry relative to that in furniture and pulp and paper industries (Table 3). Up to the early 1980s, annual revenues from natural forest extraction were greater than those derived from plantations. This relationship was inverted thereafter (IBGE 1997).

Industry	% Sector Total 1985	% Sector Total 1994
Timber sawmilling	30.5	29.2
Iron and steel	29.3	24.2
Furniture	21.6	25.6
Pulp and paper	18.6	21.0

Source: Bacha and Marquesini 1999

## 2.3 The Amazon

The Brazilian Amazon is the world's largest rainforest, with unequalled biodiversity and surface freshwater. The Brazilian Amazon (*Amazônia Legal Brasileira*), hereafter referred to as simply the Amazon, denotes an even larger area including both forests and savanna. It occupies 5 million km<sup>2</sup>, of which 74% are forests, 13% are savannas and grasslands and 13% have been deforested (INPE 1998).

Brazil is the largest producer of tropical timber in the world, with over 90% of its output coming from the Amazon. Logging activities in the Amazon have grown significantly in the last two decades. Roundwood production rose from 4.5 million m<sup>3</sup> in 1976, to 28 million m<sup>3</sup> in 1997, originating mainly from the States of Pará, Mato Grosso and Rondônia. Most (80%) of the timber extraction and processing occurs in an arc in the southern portion of the Amazon that goes from Rondonia throughout northern Mato Grosso to the south and east of Pará (MAP?). Brazil is also the world's largest consumer of tropical timber. Thus the majority of timber produced in the Amazon (86%) goes to the domestic market, and especially to Southeastern Brazil, with estimated total revenues of about US\$ 2.2 billion/year (Smeraldi and Verissimo 1999, Lele et al 2000).

### 2.3.1 Deforestation Trends

Deforestation in the Amazon is proceeding at a rate of about 1.3 million ha per year, with a cumulative total of 53 million ha (1997) or 13% of the original forest area of 400 million ha (Lele et al 2000). This is an area roughly the size of France (Alves and Escada 1999 Pasquis, 1999). In 1996, deforestation combined with illegal logging resulted in carbon emissions in the order of  $0.3 \times 10^6$  Mg.y<sup>-1</sup>tons/year (Nepstad et al 1999a). Deforestation rates in the Brazilian Amazon have varied between 0.40 and 0.81 % per year since 1970 (average 0.5% or about 21,000 km<sup>2</sup> per year) (INPE/IBAMA, 1997, Pasquis, 1999). This is less than the global rate for the tropics (about 1%) and the rates for Africa (1.7%) and Asia (1.4%).

The intensity of deforestation varies across the nine states of the Amazon. About 75% occurs in Pará, Mato Grosso and Rondônia, which form the so-called 'deforestation arc' in the south-east of the region (INPE/IBAMA, 1997). This arc – roughly 200x600 km – corresponds broadly to the area of occurrence of mahogany and is also closest to the main markets for tropical timber, in the south-east of Brazil south-east. Recent research shows that, within this arc and, to a lesser extent elsewhere, deforestation occurs mainly in the vicinity of major highways (25-50 km each side) and near areas previously deforested (Alves, 1999). The existing level of deforestation is very heterogeneous. Many sub-regions have less than 5% deforested (most of the State of Amazonas, Acre, Amapá, Roraima and Northern Pará) while others have more than 50% cleared (parts of Maranhão, Southern Pará, Central Mato Grosso, and Rondônia).

While cattle ranchers were the main source of deforestation up to ten years ago, nowadays, they share the responsibility with small-scale farmers. These two groups account respectively for 30% and 34% of deforestation. The wood industry is responsible for some 20% of deforestation, the rest being attributable to perennial crops (12%), urban expansion, mining and energy projects (Pasquis 1999). Revenues from logging not only cover the costs of opening roadways but also help to finance agricultural expansion and thus further deforestation (Arima *et al* 1999).

### 2.3.2 Land Tenure

Publicly owned land accounts for 27.6% (1.37 million ha) of the Amazon (3.1% as strict protection reserves, 3.2% as sustainable use reserves, 20.8% as indigenous reserves and 0.5% as military lands, Verissimo *et al* 2000). A sizeable proportion of land is unclaimed but its exact area is not known. One estimate suggests that it could be around 25% of the total land area in the Amazon (Serôa da Motta 1997 cited in Landell-Mills, 1999). This means in theory that such land is still available for occupation by colonists who can claim ownership after 5 years. Private land ownership accounts for some 40% of the rural area of the Amazon (Table 4). However, both private and public property rights are often not clearly defined giving rise to a perception that forest land is “free” and available for those who want it. This perception, and the economic incentives associated with land speculation, fuel invasions and land grabbing.



### 2.3.3 Land Use Patterns

Private land use in the Amazon has the following characteristics:

- (i) Within private land, pastures are the predominant land use. Following the expansion of the agricultural frontier, they tend to occupy more land than forests. The same pattern of deforestation found in older agricultural frontiers in Southeastern Brazil is being repeated here in the Amazon;
- (ii) Fallow/secondary forests constitute a significant proportion of the total cropping area. These so-called “degraded areas” are often overlooked in discussions about land use planning and rural livelihoods. However, their importance in meeting farmers’ needs and in reducing pressure on primary forests from shifting cultivators has been recently highlighted (Smith *et al*, 1998).

Private land owners can be grouped into the following broad categories:

- Large *fazendeiros* (i.e. cattle ranchers) who often practise an extensive management of pastures (although intensively managed plantations of soybeans and other crops are also present), largely based on regular use of fire. This gradually results in degradation if not enriched with inputs such as improved pasture varieties and fertilisers. Such landowners usually involved in timber extraction in the early phases of the agricultural frontier;

- Wood-industries<sup>2</sup> which generally buy logging rights informally from other private land holders;. They are concentrated in “timber hubs”<sup>3</sup> which are responsible for 95% of the timber production of the region.
- Small farmers, who can be subdivided into:
  - *caboclos/extrativistas*: natives of mixed Indian and white blood – areas generally between 0.5 and 25 hectares – although seldom demarcated and lacking clear land tenure rights. They either live along rivers in *varzeas* (streambanks) and are then called *ribeirinhos*, or on the upland *terra firme*;
  - *settlers*, i.e. beneficiaries of government or private colonization programmes which generally allocate 50 to 100 has plots to each settler. They often combine crops and livestock on their farms;
  - *posseiros*, i.e. small farmers who often continue migrating along agricultural frontiers selling off their landholdings as land prices increase;
  - *sem-terra* (literally “without land”), i.e. migrants who regularly squat on public lands or on parts of large estates owned by wood-industries or cattle-ranchers, often organized through social organizations such as *Movimento Sem Terra*, a movement of landless farmers.

Type of use	Areas (ha)	% of each type	% of total area
<i>Cropping areas</i>			
Permanent crops	978,159	11.7	0.8
Temporary crops	4,767,469	57.1	3.9
Fallow	2,603,054	31.2	2.2
Sub-total cropping areas	8,348,682	100	6.9
<i>Pastures</i>			
Natural	18,217,080	35.6	15.1
Planted	32,932,155	64.4	27.3
Sub-total pastures	51,149,235	100	42.4
<i>Private Forests</i>			
Natural	49,826,092	99.3	41.3
Planted	349,911	0.7	0.2
Sub-total forests	50,176,003	100	41.5
<i>Others</i>	11,095,037	100	9.2
Total area	120,768,957	NA	100

Source: IBGE, 1996 Agricultural Census, cited in Young and Clancy, 1998

2. Other industries compose another significant fraction of private land in the Amazon including Agro-industries, i.e. mainly for soybean and cereals usually cultivated on non-forested land (savannahs or degraded land), and other industries - mainly hydroelectric and mining – often installed on (previously) forested areas.

3. Timber hubs are defined as cities with an annual production of roundwood equal or above 100,000 m<sup>3</sup>.

## 2.4 Plantation forestry

Plantation forestry in Brazil is an important segment of the forest sector as it provides raw material for pulp, paper and steel production. In the 1950-97 period, pulp and paper production increased from 95 thousand tons and 253 thousand tons to 6,331 and 6,518, respectively (Bacha *et al* 2000). This growth was only possible because of an aggressive reforestation policy, which is probably the single most important case in Brazilian history of a package of policy instruments being used to promote the forest sector.

Plantation forestry has had three distinct phases, associated with different approaches to policy incentives. Plantations of railroad and other state companies dominated the first phase, prior to 1965. The second phase (1965-1988) was characterized by three fiscal incentive programs established by the Federal Government, through which private sector involvement grew very rapidly (Table 5). Throughout this period, the Brazilian government operated the Program of Fiscal Incentives for Reforestation (PIFIR) which allowed companies or individuals that to allocate part of their income tax burden to the establishment of forest or tree crop plantations. In the second half of the 1970s, a reforestation policy targeting small and medium rural producers (REPEMIR) was introduced. This was implemented by State Governments. In 1985-88, there was a program to stimulate reforestation in the Northeast of Brazil as a response to the drought this region had suffered in the early 1980s (Projeto Algaroba) (Bacha 2000). The third phase from 1988 onwards has seen the elimination of fiscal incentives for reforestation at the federal level but programmes at the State level have been maintained, aimed primarily at small and medium producers. Reforestation by the private sector and most notably in the pulp and paper sector has continued at a relatively high level in spite of the phasing out of incentives (Table 5).

The result of these reforestation policies has been an increasing importance of reforestation both in number of rural establishments involved and total area planted. This trend suggests that, in the absence since 1988 of government policies aimed at increasing reforestation, the private sector has been responsible for most of this growth. The pulp and paper industry reforested between 74,000 and 112,000 ha/year in the 1991-97 period, while the steel industry reforested between 30,000 and 80,000 ha/year in the same period, although the annual rate has declined (Bacha and Marquesini 1999).

In addition, there were significant productivity gains, due in part to a partnership for technological development between the plantation forestry private sector and Brazilian universities. It is a success story that has resulted in continuous productivity gains in the plantation sector. This could be used as a model to fuel technological development for natural forest management in the Amazon. Brazil has had another successful experience with cocoa research, which was funded by part of the export taxes of that sector. Plantation forestry is viewed negatively by a significant part of the Brazilian NGO community. Some argue that its expansion has resulted in deforestation while others

Year	Pulp and paper industry	Steel industry based on charcoal	Small and medium size farms	Sub-total
1987	83,424.4	58,488	1,808.9	143,721
1988	99,135.2	54,352	10,155.2	163,642
1989	116,004.3	88,357	21,104.4	225,466
1990	131,925.0	125,000	24,283.2	281,208
1991	74,233.3	51,305	40,447.8	165,986
1992	82,653.1	80,067	43,430.9	206,151
1993	89,202.7	46,653	37,611.3	173,467
1994	83,702.9	37,026	30,039.4	150,768
1995	94,540	30,351	22,997.6	147,889
1996	112,541.6	32,752	18,708.1	164,002
1997	101,723.3	30,756	17,930.6	150,410
1998	110,702.2	19,808	28,972.1	159,482

Source: Yearbook of ANFPC (1987 a 1997), Yearbook of ABRACAVE 1998 both cited in Bacha *et al* 2000



highlight the concentration of land ownership involved and the forced migration of small farmers – and Amerindian populations - to urban slums. There are also concerns about the ecological impacts of the plantation systems adopted as these are mostly based on monocultures of exotic species, notably eucalypts and pines. It is true that many plantation forestry areas, notably those associated with large scale enterprises, have had negative environmental and social impacts. However, it is also true that the plantation industry itself is changing rapidly to improve its environmental and social performance, partly as a response to public and market pressures. In the Atlantic Forest, plantation forests provide an important safeguard against the spread of forest fires to native forest fragments.

## 2.5 North-South Differences and Interactions

The forestry sector in Brazil can be characterised by a sharp contrast between the South<sup>4</sup> and the North<sup>5</sup> in terms of:

- the type of forest concerned, i.e. plantations (predominantly in the Southern States, but emerging in the Amazon) and natural forests (i.e. mainly the Amazon and to a lesser extent the remnants of the Atlantic Forest in the South);

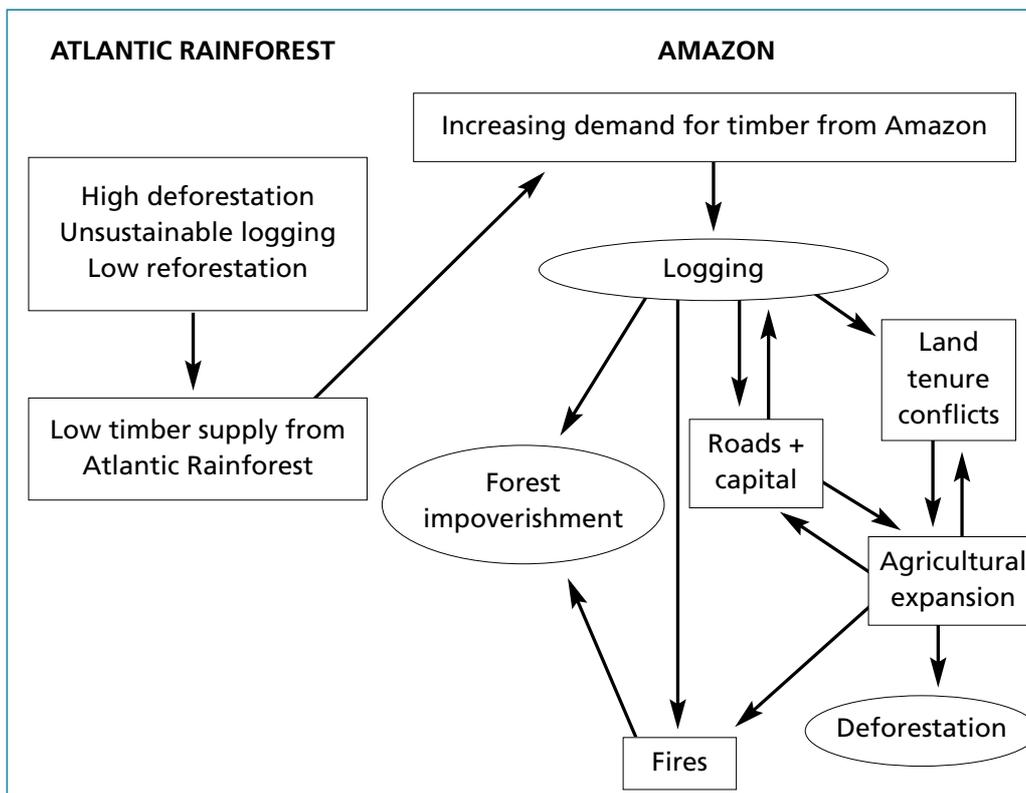
4. “South” is used here in reference to the South and Southeastern regions of Brazil, within the Atlantic Forest biome.

5. “North” is used here in reference to the Amazon region of Brazil.

- the significantly higher degree of professionalism and capital investment in the South – especially on the part of large pulp & paper companies - as opposed to the “pioneer/frontier mentality”, lower qualifications of staff and lower investment in forest production and industry in the North;
- the local demand for tropical timber from natural forests, which is significantly higher in the South than in the North (e.g. the domestic market consumes 86% of the timber produced in the Amazon, while the Amazon States account for only 10% of the domestic market; most consumption is concentrated in Southeastern Brazil – Smeraldi and Verissimo, 1999);
- the weaker government control of forest operations in the new agricultural frontier of Amazon states, compared to those in old frontiers of Southeastern Brazil (Viana *et al* 2000).

In spite of these differences there are some strong linkages between the Amazon and the Southern states of Brazil. These relate primarily to the influence of heavy demand for forest products from the most populated and wealthier areas in the South. There was a sharp decline in timber production in the 1970s and 1980s in the Atlantic Forest, in the South as a result of (i) high levels of deforestation, (ii) low levels of reforestation and (iii) unsustainable management of forests (Figure 1). As a consequence, there was an increase in demand for timber from the Amazon. Likewise, there are considerable interactions between governmental, non-governmental institutions and private sector organizations between Southern and Northern regions of Brazil, which affect research and training of forestry personnel.

**Figure 1 - Relationship between the Amazon and the Atlantic rainforests (drawn from Viana *et al* 2000).**





Fotografía: Instituto Pró-Natura

Forests are perceived as unproductive, representing an obstacle to other more productive land uses.

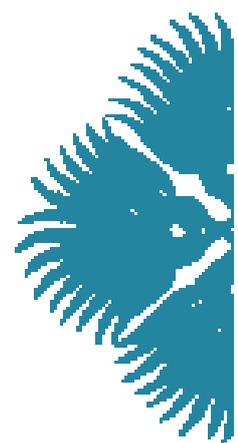
# 3. Sustainable Forest Management in the Amazon - Challenges and constraints

## 3.1 Public Policy and Forest Management in Brazil

Regulation to control forest management in Brazil goes back many years. The Forest Code which provides the framework for forest legislation in Brazil was first introduced in 1965. In the second half of the 1980s and 1990s, as the pressure on forest resources became more apparent, a series of regulatory measures were introduced with the aim of controlling conversion and forest mining (i.e. harvesting of timber without any attempt to manage the resource) (Barreto and Hirakuri 1999). Regulations currently in place that affect private companies include:

- Forest management plans – Enterprises consuming 12,000 m<sup>3</sup> or more of roundwood per year are required to develop forest management plans on their own land for approval by IBAMA, the Federal Environment Agency. This sets out requirements for 100% pre-harvest inventory, cutting cycle, annual harvesting plan etc. (Landell-Mills 1999 Barreto and Hirakuri 1999).
- Reforestation – Enterprises consuming between 4,000m<sup>3</sup> and 12,000 m<sup>3</sup> of roundwood per year must either pay a reforestation tax or form a cooperative with other companies to undertake reforestation. Enterprises consuming less than 4,000 m<sup>3</sup> must pay the reforestation tax (Landell-Mills 1999).
- Forest conversion – Forest land owners are allowed to clear no more than 20% of their holding in forested areas of the Amazon, 65% in cerrado (savanna) and 80% in the rest of Brazil. Use of the felled trees in the deforestation area must be justified. The remaining areas must retain a forest structure but can be used on a managed basis.
- Permanent protection areas – River banks and other environmentally sensitive areas must retain forest cover. In these areas and no clearing or harvesting of trees is permitted within an area of at least 30 metres from each side of the river (this is higher in the case of large rivers and lakes).
- Environmental Impact Assessment – Operations over 1000 ha must submit an environmental impact assessment for approval (Barreto and Hirakuri 1999).
- Transport of forest products requires authorisation to allow the Environmental Agency to ensure that it originates from operations registered as managed or that have paid their reforestation tax (Landell-Mills 1999).

In theory these regulations should result in sustainable forest management in the Amazon but the reality is different. In spite of these extensive regulations



controlling natural forest management and conversion, deforestation and timber mining still prevail in the Amazon. In part this reflects the difficulties involved in enforcing regulation in an area as vast as the Amazon but it also stems from more fundamental attitudes towards development and the way forests are perceived in Brazil. There are a number of factors and forces that drive this process, some of which are described in the following sections.

### **(i) Development paradigm**

Development policies have traditionally been formulated with an underlying agricultural paradigm such that forests are seen as transient land uses and as only temporary sources of income and employment. The “model” for rural development is provided by the highly deforested landscapes of the western part of São Paulo and Paraná. This same paradigm has been transferred to the Amazon in most sectoral and inter-sectoral development policies relating to this region, in particular in land tenure policies and fiscal incentive programmes. Practically all public policy instruments are based on the premise that rural socio-economic development will best be fostered by agricultural expansion. The challenge is to change the paradigms that drive policymakers’ decisions on development in the Amazon.

### **(ii) Forests are perceived as “unproductive”**

There is still a prevailing mentality that forests are “unproductive” and therefore constitute an impediment to other land uses. This is clearest among colonists who bring an “anti-forest”<sup>6</sup> sentiment from Southern and Northeastern Brazil, where “development” has traditionally meant deforestation. This bias against forests is reflected in land prices. Land without trees is worth several times more than land with trees – except in wood-industry hubs. The difference in price completely offsets the exemption from property tax in force since 1997 for areas where the private landowner complies with strict forestry standards. This is due not only to the low level of the property tax, but also to the low rate of enforcement of this and other taxes. The bias is also reflected in some financing mechanisms. Some Brazilian financing institutions do not accept forests as collateral for loans. This creates an incentive for deforestation and predatory logging. The challenge is to make forests a productive land use for all stakeholders.

### **(iii) Deforestation can be legal**

The law currently allows for deforestation on up to 20% of a land holding in the Amazon. This legislation is under hot debate and proposals have been made to Congress to increase the area that can be cleared to 50% as the law previously set.

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6. In Portuguese, the word “mato” ou “mata” (forest) has a negative connotation, it implies that an area is dirty and needs “cleaning”.

In the best case scenario for forest conservation (20% legal deforestation limit maintained and effectively enforced) some 22 million of hectares could be legally deforested (in addition to the existing 53 million ha already deforested (assuming forest ecosystems occupy 75% of the region). If no major policy changes are put in place, timber harvesting from these areas can serve as economic incentives for road construction, agricultural expansion and an unsustainable wood processing industry.

#### **(iv) Deforestation is an effective way to acquire and strengthen rights to land**

The land titling system prioritizes productive use and hence encourages deforestation. One can become the owner of land by simply occupying it and putting it into productive use (basically any non-forest land use) for five years, so long as no legitimate claim is made to it.

The purpose of the land reform programme is to reduce land concentration and therefore compensate poorer segments of the rural population. When squatters invade large estates, the government policy has been to react by expropriating such lands and distributing it among the invaders. It is increasingly realised that the expropriation policy has the unintended effect of leading both the landowner and the invader group to clear land as the best strategy to protect their interests. The squatter group will deforest and plant crops with the purpose of signalling that the land is being put into “productive” use. Once a formerly “unproductive” (forested) land fulfills this socio-economic role, the squatter is almost sure that INCRA – the land reform agency – will expropriate the land in his favour; or that he will receive compensation if evicted. The costs of cutting the forest are often paid by the sale of timber. On his part, the landowner will also convert forest into pasture, which is considered a “productive” use even where the land is not stocked with cattle. This will reduce the likelihood of invasions and increase the potential for securing the title of unclaimed lands.

#### **(v) Timber mining is the cheapest and most accessible means to finance agricultural expansion and intensification**

Shortage of cash is often the key constraint to agricultural expansion and intensification. Timber from forest constitutes a legal and cheap source of cash for farmers and cattle-ranchers. The sale of logs can be used to finance the intensification of farming practices, which has been shown to be the only way to make settled agriculture and cattle-ranching financially sustainable (de Almeida and Uhl, 1996). However, forest conversion is also used by some migrant farmers (i.e. posseiros and squatters) as a regular source of cash, not only through the sales of timber, but also through the sale of land.

Increasing the economic performance of agriculture and cattle ranching through intensification can reduce the pressure on forests because the income per hectare increases, thus allowing the farmer to obtain a stable flow of

income without clearing more land. However, it can also have the opposite effect of motivating more clearance if forested land is readily available. In the case of Parará, areas with highest agricultural productivity are also those with highest deforestation rates (Sonda, 1999).

Much emphasis has been given by policymakers to making agriculture in frontier areas more stable and sustainable as a strategy to promote conservation and sound development in the Amazon. Very little attention has been given to the forestry side.

### **(vii) Fiscal Incentives for agriculture, ranching and SFM**

Until the mid-eighties, conversion of forest to pasture benefited from tax incentives, and cattle ranching was responsible for 70% of deforestation (Pasquis, 1999). It would be expected that the removal of incentives since then would have led to a deceleration in the the expansion of pastures. This indeed occurred in the late eighties and early nineties, mainly because cattle-ranchers lacked capital to invest in more land and cattle. However, as discussed above, other factors besides fiscal incentives have favoured cattle ranching., Conversion of forest into pastures seems to have expanded again over the last years, especially near highways. This might have been partly favoured by the overall improvement of the macroeconomic context of Brazil since the 1994 Real Plan which led to higher demand from an expanding middle class.

There are very few policy incentives for SFM compared to cattle ranching and agriculture. This applies both to financial incentives and technical assistance programmes. Extension services are oriented towards agriculture and livestock and most of their staff know little about forest management. Where agencies do have forest engineers these have usually been trained in plantation operations and have little experience of or expertise in natural forest management. The same is true for technical staff working for financial institutions. Such institutions either have no technical guidelines for forest management at all or if they do they are too complicated or too vague to be applied. The end result is that no loans are given to SFM activities. The Amazonian Development Bank (BASA), for example, had no forestry project on its portfolio as of 1999 (Viana *et al* 2000).

## **3.2 Factors discouraging private sector involvement in sustainable forestry**

### **3.2.1 Competition from Timber Mining**

Deforestation often acts as a source of cheap timber, whether legal or illegal. In order to clear the land for pastures and agriculture or to open access roads, farmers sell timber rights at very low cost to loggers. This can be done legally, with governmental authorization, or illegally, without governmental control.

Small and large scale farmers see loggers as partners in bringing in income to meet subsistence and investment needs (i.e. agriculture expansion, roads). Since deforestation occurs mostly along roads (Alves and Escada, 2000), transportation costs for timber derived from deforestation can be lower than those of managed areas. Thus timber can be produced legally in theory (although in practice it is often illegal – see below) at a lower cost than that coming from sustainable forest management.

### **3.2.2 Bureaucracy and Poor Enforcement**

Forestry in Brazil may be characterised as a “forest of bureaucracy”, i.e. a vast array of “fines and fences”- type regulations which are introduced in new forms as the previous ones prove to be unenforceable. This is compounded by the juxtaposition of federal and state legislation on forest management. A common complaint is that it is procedurally simpler and cheaper to obtain authorisation for forest conversion to agriculture than to secure approval for a forest management plan.

At the same time the resources to enforce such regulations are very limited. For instance, in the State of Amazonas, IBAMA – the government agency in charge of the enforcement of environmental regulations - has one forest ranger for every 4 million hectares, an area the size of Switzerland (Adario and d’Avila, 1999)! This is the open door to informality, often associated with mismanagement and corruption.



Enforcement problems are reflected in the failure of many landowners to retain the legal forest reserve. In Southeastern Brazil this legal limit has not been respected and the same has happened to older Amazon frontiers such as those along the Belém-Brasilia highway. Surveys of forest management plans have revealed similar problems. A review of 34 forest management plans in Para found that these had not been drawn up with the intention of managing forests but solely to satisfy a legal requirement and that no management was in fact taking place (EMBRAPA/CPATU 1997). A common allegation is that forest management plans are often drawn up to provide a way of “laundering” logs obtained illegally from forest clearance. Loggers and sawmill managers have a small forested area from which they obtain a “paper” forest management plan in order to acquire the legal “transportation permit”, while a significant proportion, if not all, of their supply comes from areas occupied by small farmers or cattle ranchers.

The supply of large wood-industries requires vast amounts of land. By sourcing their supply from cattle ranchers and farmers, wood-industries save the costs of land acquisition, payment for preparation, legalization and implementation of forest management plans, and also avoid possible social conflicts associated with the concentration of land. This means that they can produce wood at lower cost than a company which complies with all the regulations. As long as

regulations are so poorly enforced, any company adopting sustainable forest management will find it difficult to compete.

### **3.2.3 Migration and invasions by settlers and land grabbers**

For many years, there has been a myth that the Amazon is only inhabited by forest people, or even that it is uninhabited entirely. The region has therefore been seen as a land of opportunity for the rural poor (“land without people for people without land”), and this has induced a strong inward migration. This has been fostered by the job cuts resulting from the modernisation of agriculture in the South combined with agricultural policies that stimulated land ownership concentration. In the period 1964/1985, the Federal Government’s desire to assert its sovereignty over the region by integrating it more with the rest of the country was also important. Several settlement programmes were launched in the 1970 and 1980s to attract colonists. As a result, the Amazon had the highest rate of population growth in the country over the 1980/91 period. (e.g. 3.5% compared to an average of 1.8% for Brazil during the 1980/91 decade – Young and Clancy, 1998). The Brazilian Amazon is today home to over 20 million people (MMA 1997).

Since the mid 1980s federal incentives for colonisation have declined but migration to the Amazon has continued. Driving factors include the creation of physical infrastructure and the depressed wages and high unemployment in the South of Brazil (Young and Clancy 1998). Migration to the Amazon is now predominantly a spontaneous process, with little government control.

Land invasions often disregard property rights, especially in forested areas, which are generally seen as “abandoned”. Invasions can be in the form of squatting by small farmers (posse) and “land grabbing” by large rural speculators (grilagem). This can take place in private areas, publicly owned forests of different types and unclaimed lands, often with high incidence of violence. Land invasions increase the risks associated with long term private sector investment in forest management. This is particularly true for large landholdings.

### **3.2.4 Land tenure of traditional populations**

Areas occupied by traditional extractivist (extrativistas and ribeirinhos) populations are mostly untitled, despite a significant increase in areas set aside as extractive reserves or equivalent land uses in the 1990s. Lack of secure land ownership acts as a disincentive to traditional populations to invest in SFM. First there is the risk of not receiving the land title. Second, there are the economic incentives for short term profit through illegal logging and agriculture. Third, public policy instruments such as credit and rural extension encourage agriculture expansion via deforestation. By the time land is titled, it is often too late to implement small scale private forestry. Most small holdings go through a rapid process of deforestation and timber mining.

Land tenure is often open for legal disputes due to overlapping claims. There are old land titles which often conflict with new land tenure rights of squatters and land grabbers. This creates a complex land tenure environment that increases risk and act as a disincentive to private sector investment in SFM.

### **3.2.5 Forest fires**

Research on the incidence of forest fires has significantly changed the perception about the role of predatory logging operations in deforestation (Nepstad et al, 1999a). Until recently, logging was thought to influence this process mostly indirectly, i.e. through the opening of roads for colonist farmers and cattle ranchers. However, the above-cited research has shown that conventional logging dries out forests by opening the canopy, thereby creating a great volume of flammable debris. This susceptibility to fires is further increased after a forest burns once, and forests recuperate much more slowly after successive fires. Fires have gained importance over the last decade, causing an average of 19,000 km<sup>2</sup> of forest losses per year. Whilst some fires are aimed at converting forest to other land uses, most of the damage seems to be caused by accidental fires and also fires aimed to rejuvenate pastures. In 1997-98, these factors were compounded by exceptionally dry years caused by the effects of El Niño. One consequence of this is that large parts of the Brazilian Amazon that appear to be deforested may have not been wilfully cleared by anyone. They may have simply 'accidentally' burned too many times.. This might be one of the major causes of the increase in deforestation rates in recent years.



Forest fires increase risk for private sector investment in SFM. Fires increase tree mortality, which lowers forest productivity and stand quality. If the current trend of increasing forest fire frequency persists, this can become a major barrier to SFM, especially in regions with a pronounced dry season.

# 4. Approaches and Instruments to support Sustainable Private Forestry

Several new approaches and instruments to support sustainable private forestry have emerged over the past decade. They are primarily market-based in contrast to the traditional regulatory approach, which, as discussed previously, has suffered from problems of poor enforcement and excessive bureaucracy. This is not to say that these instruments are alternatives to regulation, rather they can complement and reinforce it. These instruments all have the common goal of increasing forest values to private landowners or managers. They include:

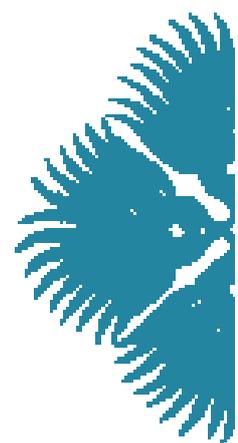
- (i) forest certification,
- (ii) payments for watershed protection and restoration,
- (iii) institutional partnerships,
- (iv) incentives to small producers for reforestation,
- (v) carbon sequestration
- (vi) fiscal incentives for conservation at the municipal government level .

This section examines how these instruments can serve as catalysts of changes away from timber mining and deforestation and towards forest conservation and sustainable forest production.

## 4.1 Certification

Forest certification has emerged as a new instrument to promote sound forest management practices in all forest types, ranging from boreal to tropical rainforests. The Forest Stewardship Council (FSC) certification system is the most widely accepted system worldwide. The FSC accredits certifiers that independently audit forest operations against a set of “Principles and Criteria” for good forest management. This system has acted as a catalyst of change in tropical forest management systems, whose area of adoption has surpassed the prediction set at the outset (Viana 1996). The area of forests certified under the FSC scheme has grown rapidly: there were over 24 million ha of certified forests worldwide and 870,511 ha for Brazil as of August 6th, 2001 ([fsc.org.br](http://fsc.org.br)).

This section surveys the current status of forest certification under the Forest Stewardship Council (FSC) scheme in Brazil and its relevance for natural forest management in the Amazon. It considers the factors that have driven the introduction of forest certification in Brazil, identifies barriers to companies interested in certification and identifies policy measures that will strengthen certification and hence the incentives for sustainable forest management. It draws on a review of chain of custody certified enterprises in Brazil (Braga



2000), workshop presentations of the recently formed Buyers Group and research on barriers to certification in the Amazon (May and Veiga Neto 2000).

#### **4.1.1 Current Status of Forest Certification in Brazil**

There are 15 companies in Brazil with certified forests. Their holdings vary in size from less than 2,000 ha to over 200,000 ha. Until the end of 2000, there was only one company, Precious Woods Amazon, harvesting timber from certified natural forests. In 2001 this firm was joined by three others: Cikel, Juruá and Gethal. The remaining companies are based on plantations and are mainly outside the Amazon (Table 6).

However, companies with an additional 1.5 million ha of forests are at some stage in the process of certification. In Amazonia, IBAMA has approved management plans for forests covering 3 million ha and of these, 800,000 are in the certification pipeline. Out of the 9 major logging companies that operate in the state of Amazonas, only one has not started discussions on forest certification.

As for companies that process wood, in 2000 there were 735 with chain of custody certification worldwide, of which 34 were located in Brazil. A further eight had been certified by August 2001 ([fsc.org.br](http://fsc.org.br)). Most of the certified processing companies are in the South and South-East of Brazil and, with the exception of three furniture and design companies, use eucalyptus and pines. These processing companies produced certified products valued at R\$30 million and employed 3,200 people in the year 2000 (Braga 2000).

#### **4.1.2 Driving Factors for Certification**

Forest certification in Brazil has been driven by a number of factors. Perhaps the most important are the perceived market benefits such as market share and prices. In addition, indirect benefits such as public image, staff morale, improved relationships with governmental agencies, NGOs and local communities also play an important role. The first companies to certify in Brazil were mainly driven by the demands of the export market and to some extent also by the demands of their international investors. Precious Woods Amazon sought certification initially to demonstrate to its investors that it was practising good forest management (Tim van Eldik, pers comm.). In the case of Gethal, certification was one of the conditions required by the U.S. investment fund manager GMO which acquired a majority holding in the company in early 2000 (Mayand Veiga Neto 2000).

The continuing importance of the export market as a driver for certification in the Amazon is confirmed by the case studies of companies there. The three enterprises contacted in Amazonas and Mato Grosso all pointed to their fear of losing their external market position, as well as the possibility of opening

<b>Table 6 – Companies with Certified Forests</b>			
<b>Company</b>	<b>Type of Forest</b>	<b>Location</b>	<b>Area (ha)</b>
<b>Amazon Region</b>			
Cikel Brasil Verde S.A.	Natural	Paragominas, Para	140,658
Floresteca Agroflorestal Ltda	Teak plantation	Jangada and Rosario do Oeste, Mato Grosso	8,519
Gethal Amazonas	Natural forest	Manicoré, Amazonas	40,682
Juruá Florestal Ltda	Natural forest	Moju, Para	12,000
Muaná Alimentos Ltda	Natural palm forest	Marajó, Para	4,012
Precious Woods Amazon	Natural forest	Itacoatiara, Amazonas	80,751
<b>Rest of Brazil</b>			
AW Faber-Castell SA	Pine plantation	Prata, Minas Gerais	8,987
Duratex	Eucalyptus plantation	Agudos, Botucatu and Lençóis Paulista São Paulo	47,904
Eucatex	Eucalyptus plantation	Salto, Botucatu and Buri, São Paulo	48,962
Flosul Ind e Com. De Madeiras Ltda	Eucalyptus plantation	Capivari do Sul, Palmares do Sul, Tramandai e Osorio, Rio Grande do Sul	6,764
IKPC – Indústrias Klabin de Papel e Celulose S.A.	Eucalyptus, pine and araucaria plantation	Telêmaco Borba, Paraná	221,000
Juliana Florestal	Pine plantation	Caçador, Santa Catarina	4,143
Plantar S.A.	Eucalyptus plantation	Curvelo, Minas Gerais	9,420
Rohden Artefatos de Madeira Ltda	Pine plantation	Salete, Santa Catarina	1,481
V&M Florestal Ltda	Eucalyptus plantation	Curvelo, Bocaiúva, João Pinheiro e Brasilândia, Minas Gerais	235,886

channels to new business opportunities, as the primary rationale for certification (May and Veiga Neto 2000).

Nevertheless, the export market for timber from the Amazon is relatively small. It is well documented that the principal market for native timbers from the Amazon lies in Brazil itself (more than 80% of total Amazon production). For certification to have a major impact on forest management in the Amazon, the Brazilian domestic market has to become more environmentally sensitive. The formation of a Buyers Group in Brazil in April 2000 is an important step in this regard. The group initially set targets to source 20% of its wood from certified sources by 2002 and 50% by 2005. It started with 42 members and had grown to 59 as of August 2001 ([www.fsc.org.br](http://www.fsc.org.br)), drawn from a range of sectors but principally furniture manufacturers and construction companies. The group also includes the State Governments of Acre and Amapá and the municipal government of Guarujá in São Paulo state as well as two associations of furniture producers. About 90% of the certified wood purchased by the Group is eucalyptus and over half is used in export products ([www.fsc.org.br](http://www.fsc.org.br) 7 Aug 2001).

From the furniture sector members alone, demand is estimated at 1 million m<sup>3</sup> per year. While this is small in relation to the total production of wood in the Amazon (some 24 million m<sup>3</sup>), there is little prospect that the supply of certified wood will be able to meet this demand over the next few years. For this reason it has been claimed that the Buyers' Group is a victim of its own success (Roberto Smeraldi, Pers. Comm.). While there is great interest amongst manufacturers in buying certified timber and non-timber forest products, supply is much below demand (Roberto Smeraldi, in May, Barbosa and Veiga Neto 2000). This has created a problem on one hand, since the members of the Buyers' Group are often frustrated in their attempts to purchase certified products. Tramontina, a major producer of small wooden objects (tools, kitchenware etc) and garden furniture, had some of its markets closed due to its difficulty in purchasing certified timber. This reduces the credibility of certification as a viable and concrete option for the majority of producers and buyers. On the other hand, this has increased prices being paid to the few certified forest producers. Small and medium furniture companies in São Paulo are paying as much as 50% over regular market prices (Viana, pers. observation).

#### **4.1.3 Impacts of Certification**

The most obvious and direct impacts of certification can be measured by the area of forests certified. These "direct impacts" involve different degrees of change in forest management systems, in social, economic and ecological terms. In addition, forest certification has also brought about indirect changes on forest management and sustainable development in general.

Also important have been the impacts on company behaviour and attitudes to forest management. The company Frame Madeiras in the South of Brazil

### Box 1 - The Challenges of Securing Supplies of Certified Timber- The case of Tramontina

Tramontina, a major manufacturer of wood-based products (tools, kitchenware) and garden furniture got involved in certification in 1999, initially seeking chain of custody certification for its factory in Garibaldi RS. After various unsuccessful attempts to find a supplier of certified wood for its factory in Belem, the company decided to encourage its existing suppliers to seek certification. As these suppliers showed little interest, Tramontina is planning to enter into forest management itself, purchasing forest land and applying for FSC certification.

Source: Braga 2000

provides an interesting example. In response to the initial certification evaluation it decided to divide itself into two companies, with one being responsible for forest management. In the space of two years it went from considering its forests merely as a raw material stock to adopting a long-term strategic planning approach, taking actions which will only bear fruit after twenty years (Braga 2000). Tramontina, a major exporter, has decided to purchase forest land in the Amazon in order to ensure that its supplies come from sustainably managed sources (Box 1). Also in the Amazon region, the company Gethal Amazonas provides a clear demonstration of how certification has been associated with far-reaching changes in the company approach. While Gethal used to obtain most of its wood from third parties, it has now entered into forest management itself and is actively encouraging its suppliers to improve their forest management practices and seek certification (Box 2).

In terms of financial and other benefits to certified companies from certification, price premiums in the export market have not yet been as high as anticipated, but companies appear to have benefited from improved market access. For example, one of the companies in Telemaco Borba, Paraná, that purchases timber from Klabin, (a major certified producer of eucalyptus and pine logs), doubled its number of employees in just 18 months after obtaining chain of custody certification (Braga 2000). Similarly, the furniture designer, Andre Marx, was able to access the German market after he obtained chain of custody certification and began to work with certified timber (Braga 2000). Gethal was receiving in 2000 a premium of 8% on its overseas sales but it is expected that this will go down in the future. The main benefit perceived in this case is the maintenance of existing markets that may not currently be demanding certification but are likely to do so in the future (May and Veiga Neto 2000).

#### 4.1.4 Barriers to Certification

As certification requires compliance with all relevant legislation it is difficult to disentangle barriers that relate to the challenges of achieving legality from those more specifically related to certification. However, it appears that the principal barriers, both financial and non-financial, are those associated with legal compliance. This includes compliance with forest-related legislation and more

## Box 2 - The Certification Process for Gethal Amazonas

Gethal Amazonas, S/A, is a plywood and veneer company, producing mainly for export and for the construction and trucking industries. It is based in the State of Amazonas where it is one of the main exporters. This company, originally a family business, had its majority control acquired by an American investment fund, whose shareholders conditioned the purchase on obtaining certification, a process which had already been initiated by the company.

The company started buying logs from the Amazon in the 1970s to process at its facilities in the South. In the 1980s it transferred its processing facilities to the Amazon region but remained largely dependent on third party suppliers for its wood. The company passed through a critical phase after 1994 when its owner died and economic difficulties for exporting companies in Brazil were particularly severe. Improved forest management and certification was seen as a way of differentiating the company in the market place. The company set up a forest management division, acquired more forest land and initiated discussions with certifying bodies. It also started a project on new Amazon species with the aim of examining the potential of lesser known species.

The company currently obtains 60% of its requirements from its own forests and the remaining 40% from five suppliers. It expects to increase the proportion from its own forests but at the same time ensure that its suppliers also seek certification. It received FSC certification in 2001. By the end of 2002 it aims to be using wood from certified forests only

Source May and Veiga Neto 2000



general legislation such as labour laws. The additional barriers associated specifically with certification are relatively minor. A more general barrier is the resistance to change that is prevalent among managers of many forest sector enterprises.

### **Barriers relating to costs and/or other financial aspects associated with the conversion to "good forest management"**

*Costs of adaptation to environmental legislation*, that is, to adopt Forest Management Plans, as required by IBAMA. These costs are associated with changes in forest operations, among which are included: a) 100% pre-exploitation inventory; b) definition of pre- and post-harvest treatments; c) harvest planning, including layout for directional felling and of skid trails, roadways and patios; d) establishment of operational norms and training of field personnel; e) evaluation of environmental impacts. Evidence from trials carried out by Imazon and the Tropical Forest Foundation (Barreto et al 1998; Holmes et al 1999) suggest that these costs can be recouped through increased productivity and reduced wood wastage. In addition, the three companies surveyed in the Amazon considered that pre-harvest planning based on a 100% inventory, was highly beneficial and responsible for improved net revenues, despite the investments required. Nevertheless, the upfront costs may prove too high for many companies.



Fotografia: Instituto Pro-Natura

### Reduced impact logging trial, Rohden Ligna, Mato Grosso

*Obligatory self-sufficiency*, requiring that the enterprise be proprietor of the total area needed for a full production cycle, which is also required by the environmental legislation of some states (Amazonas, for example), with the result that the companies incur a substantial capital investment for acquisition of lands. This was stressed by Gethal which has already invested heavily in land purchase but has to acquire another 120,000 ha in order to be self-sufficient.

*Continued illegal exploitation*: as long as illegal harvesting is still widely practised, there will always be unfair competition between wood from this source and that originating from managed enterprises. Wood obtained from deforestation authorised for agricultural conversion and legalised through payment of the reforestation tax (often irregular) adds to this low cost competition. In fact, the maintenance of the conventional system is a result of a combination of poor enforcement and the high returns obtained from this system.

*Substantial investment costs allied with difficulties in access to credit*: all management systems are based on a significant investment in machinery and infrastructure (for example, Gethal invested approximately US\$2.9 million in the year 2000 in acquisition of equipment and in infrastructure works), which makes credit vital for the conversion process. Yet, sustainable forest management has still not won the confidence of the financial sector. None of the parties interviewed suggested the need for differentiated credit offerings, suggesting that the principal demand is for credit access alone. This concern applies not only to sustainable management, but to the entire natural forest-based sector.

*Cost of training*: Lack of skilled personnel, such as foresters whose capabilities include both technical and managerial skills, as well as forest technicians able to command field teams both in the execution of harvesting tasks as well as in carrying out inventories. There is also a severe lack of chainsaw, skidder and other equipment operators trained with the perspective of sustainable

management. The costs for training such personnel can represent an important barrier for some enterprises. The high demand for professionals coming from the new forestry technicians programme of the Federal Agrotechnical School of Manaus is a good indicator of the need for trained mid-level professionals.

### **Cost barriers associated with compliance with general legislation**

*Labor law observance:* despite the fact that labor legislation is applicable to all economic activity in Brazil, its non-observance under conventional forest enterprise suggests that its compliance can represent an additional burden for achieving certification. Considering the high costs of training and the difficulties of securing personnel skilled in forest management, it is in the interests of the certified enterprise to guarantee labour rights to its employees as a means of avoiding worker turnover and ensuring loyalty and commitment. Health and safety legislation also implies additional costs for forest producers.

### **Barriers related with legal, marketing, research and other aspects of conversion to “good forest management”**

*Difficulties in land purchase,* due to the poor quality of real estate registries in the Amazon. Land titling is vulnerable to a variety of frauds, especially in small real estate registries. This increases the difficulty in obtaining land with “good” documentation and without land tenure conflicts.



*Obligatory forest inventories which means that companies are vulnerable to delays in approval* by IBAMA and consequent authorization to proceed with harvest. This undermines a forest operations calendar already limited by regional climatic conditions.

*Market and industrial restrictions toward lesser known timber species,* represent a further operational advantage for conventional management, which is based on selective harvest from a range of sources of those species with greatest market demand.

*Insufficient research:* there still remain a number of questions to be answered, such as the degree of impact on fauna, flora and the total ecosystem.. There are few initiatives being taken to solve these technological problems. Other important issues for research include evaluation of new timber species, wood drying and conservation techniques, and techniques for regeneration, enrichment and post-harvest monitoring of the effects of timber extraction practices on forest development.

### **Barriers associated with the direct costs of certification**

*Direct costs of certification:* although no unanimity exists on this issue, these costs may act as a barrier in some cases. Such costs include the amounts charged by the certifier for the initial process of achieving certification, as well as the costs of annual monitoring and chain of custody audits.

## Barriers regarding other aspects directly related to certification

*Chain of custody:* processing of certified and non-certified timber within the same industrial facility may provoke serious difficulties in some companies, due to logistical and training costs.

*Demands regarding relations with surrounding communities:* this is a new concern for those already legalized who believe they are conducting business correctly. Depending on the costs involved, these requirements can also act as a disincentive to certification. On the other hand, this represents an important opportunity to include these communities in the local development process.

*Restrictions on hunting and traditional shifting agriculture:* because of the frictions these restrictions create between companies and surrounding communities, they can be a disincentive to certification. But in some cases, such as that of Gethal, certifiers are seeking ways to make these prohibitions more flexible, in line with the social objectives of certification.

## 4.2 Watershed Protection and Forest Restoration

Forested land protects watersheds and this environmental service is a key element for sustainable development. The problem is that the forests that produce these benefits are usually found on private land while the beneficiaries are the population in general, urban and rural, dispersed along river courses. Private landowners have little incentive to provide this service to the general population, and are reluctant to incur the opportunity costs of changing agricultural land uses to forestry (Viana and Nassif 2000).

Maintaining forests on river banks is mandatory by Brazilian law. However, this is a case where regulations have not worked as most private farms have not maintained these protection forests and have cleared them for other land uses. The costs of restoring forests to these riverside areas run at about US\$ 2,000 per ha. The problem is that there is a need for mechanisms to cover these costs since the private farmer has usually no incentive or resources to finance forest restoration in these areas.

The same applies to the maintenance of legal reserve forests. Maintaining forests in certain soil types and topographic conditions is recommended by agronomic guidelines. Forests play a key role for watershed protection as they usually have lower soil erosion rates than agricultural land uses, increase streamflow in dry season and act as buffers against agrochemical pollution. Reduction in water turbidity results in an estimated 9% reduction in water treatment costs (Viana and Nassif 2000). However, despite these benefits and the fact that forest protection is mandated by law, most private farms in Southeastern Brazil have maintained less than 10% of their original forest cover, despite the legal requirement of a minimum 20% of forest cover.

Linkages between forest conservation and watershed protection offer new opportunities to fund environmental forestry, especially forest restoration. This section describes the case of the Piracicaba River watershed, where there are innovative mechanisms in place. This case is used to derive some recommendations for viable approaches to the Amazon region, in particular for the Cuiabá River watershed in Mato Grosso.

#### 4.2.1 The Piracicaba River Watershed Case

For the Piracicaba River Basin an innovative mechanism has been developed under which 1% of all water revenues is allocated to forest restoration and environmental education [The Piracicaba Watershed is administered by an institution called “Inter-municipal Consortium of the Piracicaba and Jundiaí Watersheds (“Consórcio Intermunicipal das Bacias do Piracicaba e Capivari”), which is responsible for coordinating water supply, pollution control, reforestation and environmental education. The President of the Piracicaba-Jundiaí Consortium is usually a mayor of one of the municipalities, elected by a board of directors drawn from different stakeholder groups

The private sector plays an important role in implementing forest restoration programmes in the Piracicaba-Jundiaí Consortium. Firstly, private industries are represented on the Board of Directors, which elects the President and approves investment programs. Secondly, most reforestation occurs on private lands, in river bank forests. Thirdly, private firms are usually responsible for carrying out tree planting operations.

There is a need to secure legislative approval for investment made by municipalities in programmes carried out by the Piracicaba-Jundiaí Consortium. The Municipality of Piracicaba was the first to pass legislation to allow the investment, in forest restoration, of 1% of all water revenues, on the basis of the water volume (m<sup>3</sup>) consumed. Several municipalities have passed similar legislation. This is generating annual budgets of about US\$ 500<sup>7</sup> thousand, and would reach US\$ 1 million/year if all municipalities of the watershed were to adhere to this policy. If all municipalities of the State of São Paulo were to adopt this policy, some US\$ 25 million/year could be invested in forest restoration and conservation, mostly for river bank forests. This is far greater than the incentives available for small scale reforestation.

As of the time of this writing, this programme was still being formulated. The Institute of Forestry Research (IPEF) has developed a Master Plan to Guide Forest Restoration in the Corumbataí River sub-basin. This plan, concluded in 2001, indicates (i) the various levels of priority for forest restoration, (ii) the appropriate technology for different ecological and socioeconomic settings and (iii) a scenario for investment needs for a 20-year time frame. There is a need to restore 9,200 hectares of protection forests, at a cost of US\$ 18.5 million (Viana et al 2002).

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7. Exchange rate: US\$ 1,00 = R\$2,10; figure for 2000 fiscal year.

The current system is demand-driven. Farmers get in touch with the Piracicaba-Jundiaí Consortium, which prepares a reforestation project. Seedlings are produced by municipal nurseries and private firms are contracted to carry out tree plantings. A new scheme is being developed to increase farmers' participation in tree planting and care.

The implementation of this instrument still has many challenges. Most funds are being used to pay part of the direct costs of forest restoration (e.g. tree planting). Private farmers are not being compensated for the opportunity costs of the land used for forest restoration. It is possible to conceive of a mechanism by which forest owners would receive an income from water production services. This is currently being researched and debated for the Piracicaba Watershed. Such a mechanism could have profound effects in promoting land use changes. If farmers can receive an income from their forests, their attitude may change rapidly. Forests and trees could become assets instead of being perceived as “weeds”..

There are other cases where the R\$0.01/m<sup>3</sup> instrument could be used, particularly in areas where maintenance of forest cover is important for biodiversity conservation or for maintaining cultural diversity of indigenous groups. In these cases, the revenue raised from the R\$0.01 instrument could be combined with funds assigned to other social and environmental services of forests. There is good opportunity to learn from the experience of innovative financial schemes used to pay for forest environmental services in other countries such as Costa Rica.



#### **4.2.2 Implications for the Amazon**

The need to reforest watershed protection forests is not limited to the highly deforested landscapes of Southeastern Brazil. Although most (75%) deforestation occurs along roads (Alves and Escada 1999), river banks are highly deforested in the Amazon. During the period when wood-powered boat engines were in use, river bank forests were subject to intensive logging. At the same time, these forests were cleared for agriculture as there were no roads and most settlements were restricted to areas accessible by river navigation.

Using the water revenue policy instrument in the Amazon could be an important element in securing not only good quality water supply, but also high productivity of freshwater fisheries and continued use of waterways for transport. . The challenge is to identify priority areas to invest resources and to devise a system that not only encourages restoration but also prevents further deforestation. The reforestation scheme, involving municipal nurseries, forestry firms and landowners based on water charges, used in the Piracicaba River Basin is an obvious starting point.

The suitability for the Amazon region of this type of economic instrument varies according to the characteristics of the different watersheds there. Three

<b>WATERSHED TYPE</b>	<b>PRIORITY</b>
High availability of low turbidity water	Low
Low availability of low turbidity water expected in the future	Medium
Current low availability of low turbidity water	High

different types of watershed can be distinguished, based on the availability of low turbidity water associated with erosion processes (Table 7).

The major priority for the implementation of the water tax instrument is in watersheds where there is currently little water of low turbidity. In these watersheds, the current cost of water treatment is already high because of the turbidity and the local population is more likely to be concerned about environmental degradation. The chances of obtaining political and institutional support are therefore higher than in the other two classes of watershed.

Situations where the availability of low turbidity water is currently high but expected to decline significantly in the very near future are an intermediate case. These are likely to occur in watersheds with high forest cover but with high rates of conversion to other land uses .



As a general rule, watersheds with high water consumption should be given priority. Where consumption is low, the revenue-raising potential of the water tax instrument will not be sufficient for the development of a forest restoration programme. Priority should also be given to prevention of forest conversion in critical areas. It is often much more costly to restore riverbank forests (about US\$2000/ha in the Piracicaba case) than to prevent deforestation. The critical variable may be the extent to which private landowners assume part of the costs of riverbank forest restoration, perceiving this as their responsibility (as required by law). In Mato Grosso, the state's licencing of private land use and associated fines for noncompliance with permanent protection requirements are now reinforcing this tendency.

The Cuiabá watershed, for example, falls into the category of high priority for analysis of the water tax instrument. There is a high level of water consumption, there is an intense process of deforestation and there are still areas with forest cover where preventive actions could be taken. Estimating water consumption in the city of Cuiabá at 5,800,000 m<sup>3</sup>/month (urban water supply only, excluding agriculture) (Lucineide Lago, pers. comm.), implementation of a water charge of R\$0.01/m<sup>3</sup> would generate revenue of around R\$58,000/month or R\$ 696,000/ year. The total for the whole watershed would be higher as other municipalities such as Várzea Grande

would be included. These resources could also catalyse other investments from government and the private sector.

### 4.2.3 Recommendations

Following the experience of Piracicaba, the first recommendation for the implementation of the water charge instrument is the preparation of a Master Plan for the Restoration and Conservation of Watershed Forest Cover. This Plan should identify priority areas for forest restoration and conservation as well as other environmental measures (e.g. soil conservation in pasture). These areas should be characterized according to land use and the socioeconomic profile of the landholders. This should form the basis for strategic action targeted at various producers' groups, taking into account the current state of their forests, the costs of forest activity etc. The Master Plan should identify needs for development of forest technologies adapted to the socioeconomic and environmental conditions of the watershed. Finally, the Plan should identify options for the financing of forest restoration and conservation activities.

The action strategy for implementing the R\$0.01/m<sup>3</sup> water charge instrument in Amazon watersheds should include:

- Awareness-raising amongst decision-makers on the role that forest play in water supply (especially in the area of sanitation),
- Creation of an appropriate legal framework, including the constitution of an intermunicipal consortium, committee or watershed agency,
- Legislation authorizing municipalities to make investments in areas outside their boundaries.

## 4.3 Communities and Private Companies: Partnerships or Deals?

Rural communities that are dependent on forest resources - whether timber or non-timber forest products (NTFPs) - for their livelihoods have an important role to play in sustainable forest management. Measures to conserve forest resources through establishment of protected areas, or through promotion of sustainable use are unlikely to be effective if the people that are dependent on these resources do not clearly benefit from them. The way in which communities interact with the private sector is key given that it is access to the market which affects the speed and process of transition from low level subsistence use of forest resources to commercial production. Harvesting may threaten sustainability of the production, depending on its intensity and the ecological dynamics of the resource base.

Forest communities are increasingly facing new relationships with private companies. Historically, communities have had socioeconomically unfair and ecologically unsustainable relationships. There are many such cases in the old frontier in the Atlantic Forest region. Lessons from these can be useful in designing public policies and in providing guidance to communities. At the same



Fotografia: Instituto Pró-Natura

**Rural communities depend on forests to meet basic needs, for example, using wood for house construction and firewood for cooking.**

time, a new type of private sector player is emerging: the social and environmentally sound enterprise. However, there are considerable challenges involved in making such enterprises viable. Here too, lessons from the old agricultural frontier may be useful.

Community-private sector interactions in relation to forest resources take a number of forms in Brazil, depending on the nature of the resource, timber or non-timber, the type of private sector entity involved and the land tenure situation. The various types can be categorized according to:

- **What the community sells to the private sector** - Communities currently sell timber rights, timber from natural forests, timber from planted trees, NTFPs, processed products (eg: sawn timber). In the future it is conceivable that they could sell environmental services such as carbon sequestration and watershed protection.
- **Who the community sells to** - The private sector entity that buys community products is, in many cases a middleman or trader but direct interactions can occur between community and companies of different types whether pulp and paper, solid wood processing company or NTFP processing.
- **The stage in the production cycle** - The interactions may take place only at the stage of marketing, or there may be interaction at an earlier stage. The latter is more likely where plantation timber is involved, for example a company may provide seedlings or technical assistance as part of an outgrower scheme.

- **The drivers of interaction**

- Community private sector interaction may take place simply because a community is living on or near company or private land and is making use of forest resources there. The approach of a company or landowner to such a situation can vary significantly from attempted expulsion to indifference to a proactive effort to establish good relations with the community.
- Communities may be competing with other groups eg cattle ranchers for access to land or struggling to defend land over which they have formal or informal use or tenure rights.

In many cases these interactions are characterised by unsustainable patterns of resource exploitation and by unequal relationships, with the community deriving little benefit in comparison with the private sector . But there are also some examples of arrangements that involve genuine partnerships where incentives are created for sustainable forest management and communities derive benefits.

This section draws on case studies examined by Caron et al (2000) which explore different types of community and private sector interaction. Cases from the old frontier (Atlantic Forest) are used here to extract lessons applicable to the new frontier (Amazon).

These interactions between community and private sector are heavily influenced by the legal and institutional context, as this determines the bargaining power of both sides and the incentives for sustainable forest management. The driving factors for such community- private sector interactions are also important. These relationships can arise because of a company's dependence on the community for access to forest resource, or for financial and public relations reasons (e.g. outgrower schemes cost less and can be politically more acceptable than company purchases of land). Local and central government may also have a key role in determining the outcome of private sector community relationships, although the 'mechanics' between companies and community groups or individual farmers is often determined by informal and market conditions.

Land and resource tenure are key determinants of the situation. This is demonstrated by the case of Ribeira Valley in São Paulo State where *quilombo*<sup>8</sup> communities dependent on harvesting of palm hearts have rights over land but not resource use rights, and that of São Sebastião, also in São Paulo State, where communities making crafts from balsawood<sup>9</sup> have neither land rights nor resource use rights. In both cases the resource is being depleted and the livelihoods of the communities involved are precarious.

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8 "Quilombo" refer to communities comprised mostly of descendants of slaves that escaped from slavery in the XIX century.

9 Balsa wood refers to the tree species *Tabebuia cassinoides*.

### Box 3 - Vale do Ribeira

Quilombo communities in Vale do Ribeira were given rights over land in 1988, with Brazil's new Constitution. However, Vale do Ribeira has been declared an Environmental Protection Area given that it contains some of the last remnants of the Atlantic Forest. This protected status implies severe restrictions on land use. Harvesting of palm hearts is the main source of cash income for community members but because of the land use restrictions this constitutes an illegal activity. If harvesters are caught by the environmental authorities they can be fined or imprisoned. The fact that they are harvesting illegally puts them in a weak position when selling their products to intermediaries. Not only do they get paid in arrears but also it is believed that the prices they receive are low. However, palm heart processing companies and traders are practically under no effective obligation to prove that they are dealing with legally harvested palm heart or that it originates from a sustainably managed source. The result of this situation is that the palm heart resource is being depleted and quilombo producers are receiving low prices for their products.

### Box 4 - São Sebastião

Tourism is an important activity in this region. Local *caiçara*<sup>10</sup> communities have adapted their traditional craft based on balsawood to attend the tourist market. This has become an important activity for this community. In some cases, it constitutes the main source of income. The balsawood resource has become more scarce in the region partly because of conversion of forest land to other land uses such as tourism development and due to lack of forest management practices. In an effort to protect the resource the Government prohibited the logging of balsawood in São Paulo state in 1989. This was followed three years later by legislation allowing harvesting of balsawood on a sustainable management basis. This did not benefit the *caiçara* community because in practice it is extremely difficult to secure approval for a balsawood management plan given the bureaucracy and costs involved, coupled with the lack of a forest extension service.

The land where the balsawood is located is privately owned, usually by people from urban areas planning to build a holiday residence near the coast or for tourism services initiatives. The craftsmen access balsawood forests either with permission from the landowners or in some cases without formal permission. The São Sebastião case shows what happens where forest dependent communities have neither land rights nor resource use rights. Landowners often give approval or choose to tolerate unauthorised harvesting because it is in their interests. Degradation of the forest will strengthen the case for them to secure approval of conversion to other land use. This is important because the coastal area has been declared an Environmental Protection Area involving restrictions on land use. The community has no incentive to manage the balsawood resource sustainably as it does not belong to them and neither do the private landowners as their primary interest is in other land uses.

10 "Caiçara" refers to traditional coastal populations resulting from Afro-brazilians, Indians and Portuguese inter-marriages.

Achieving alliances with institutions beyond the local level often constitutes a good means for local communities to increase their bargaining power. In the case of Pontal do Paranapanema local resettled farmers are backed up by the MST (*Movimento dos Sem Terra* – the Landless Movement) which is the most powerful social movement in Brazil and has the attention of the international community. In this particular case, involvement of research institutions and NGOs has furthered strengthened the local farmers.

#### **4.3.1 Prospects for the Amazon**

There are several cases where communities are attempting to establish partnerships with private companies in the Amazon. A noteworthy case is in the Center of Forest Industries of Xapuri, Acre. Through a partnership between the local municipality, the state legislature and State Government, this Center is becoming a role model for the Amazon. It has processing or manufacturing facilities for brazil nuts, natural rubber, condoms and furniture. Partnerships have been established between rural communities, producers of forest products and private companies. The natural rubber factory is engaged in a partnership with Pirelli, which has launched an ecological tyre, named “Xapuri”. The brazil nut factory is producing dry nuts for large processing industries in southern Brasil. The furniture industry – Aver Amazonia - has brought a highly advanced technology from São Paulo and has supported a forest management system in an extractivist community that meets the social and environmental standards required for forest certification. Contrary to the cases described previously, the local communities in Xapuri are highly empowered. They are all linked to the extractivist movement that was led by the late Chico Mendes and as of 2000 had elected a governor, senators, deputies, mayors and city council members. Moreover, the social organizations such as the rural labor unions are quite strong. As a result most of the communities have secured land tenure rights through extractive reserves or equivalent tenure arrangements. This increases the likelihood of balanced and sustainable partnerships with the private sector.

Partnerships between local communities and private companies are often essential to promote sustainable development on the basis of sound forest resource use. Local communities are often facing the challenge of implementing good forest management systems to replace unsustainable production systems. This is no simple task. Adding the further complexity and risk of establishing capital and technology intensive processing industries may not be the best strategy for most forest communities. In many cases establishing appropriate partnerships with private companies may provide the basis for community development. In implementing such a strategy it is fundamental to extract the lessons from the case studies discussed here. If power relations are not balanced it is quite unlikely that sound partnerships will be established and sustained. It is fundamental to create the necessary institutional and political conditions to avoid deals that are not conducive to sustainable development.

## 4.4 Fiscal Incentives for Reforestation by Small Producers

There are a growing number of social forestry programs worldwide. These programs are usually based on the fact that small producers often only have access to land resources that are marginal for agricultural uses (infertile soils), have high erosion risks (steep slopes), and have difficulty in generating savings to invest in improved livelihoods. Tree planting is seen as one of the options for small producers as it can be productive even on infertile soils, it can reduce erosion on slopes and can generate medium and long term savings.

Brazil has over 20 million hectares of degraded pastureland in the Atlantic rainforest region that need to be reforested. In the Amazon, a similar process of agricultural expansion is also generating vast areas of degraded land. It is likely that many of these areas will need to be reforested for social, economic and ecological reasons. At the same time there are concerns that in the near future there will be a shortage of plantation-based wood in Brazil in relation to industrial processing capacity. This is because there has been a reduction in tree planting rates in recent years, associated with the phasing out of the subsidy schemes that were available for reforestation. This shortfall in supply could put pressure on natural forests and make it more difficult to enforce regulations on forest management. In this context it is important to consider new mechanisms for stimulating reforestation and sustainable forest management in Brazil. In particular, incentives to small and medium agricultural producers (ie those with less than 500 ha) have a key role to play.



Brazil has been using fiscal incentives of different types since the 1960s to promote reforestation for both large and small producers. This section, drawing on the study carried out by Bacha et al (2000), presents some of the lessons from this experience.

### 4.4.1 Types of Reforestation Programme in Brazil

Three different types of reforestation scheme in Brazil can be distinguished:

- Federal schemes – These can be further divided into programmes such as the Programme of Fiscal Incentives for Reforestation (PIFFR) targeting large scale producers, and those aimed at small and medium producers such as the Reforestation Programme for Small and Medium Producers (REPEMIR) and the Algaroba Project which operated in the 70s and 80s. Since 1990 the Federal Government has not operated any schemes of this type.
- Schemes operated by the private sector.
- Programmes operating at state level. These can be further divided into those run by state government agencies, as in Minas Gerais and Parana, and those run by Reforestation Associations or state utility companies eg Sao Paulo.

Apart from PIFFR, all these programmes have been targeted at small and medium producers. They consist of provision of seedlings and in some case inputs and technical assistance to encourage farmers to plant trees. They can be linked to mandatory reforestation, for example restoration of native forests along river banks, or the reforestation of the legal reserve or used to expand the area under forest cover without any particular legal obligation.

#### 4.4.2 Federal Programmes

##### Large-Scale Producers

The main federal reforestation scheme was directed at large scale producers. The fiscal incentive programme (PIFFR) operated from 1966 to 1988. Under this scheme companies could offset income tax liability by investing in forest plantations. According to the Northeast Bank of Brazil (Banco do Nordeste do Brasil), a total of US\$ 10.86 billion was invested through PIFFR. This should have resulted in 6.2 million ha of plantation forests but as a result of fraud, unsuccessful plantings and poor monitoring, only part of these plantings actually became forests. Even so, PIFFR made a major contribution to the establishment of plantations in Brazil and the expansion of the forest products industry. The total plantation forestry area increased significantly during the operation of PIFFR from 1.66 million ha in 1970 to 5.97 million in 1985 as shown in Table 8. It is important to note that this expansion was also a result of private sector investment (Bacha *et al* 2000).

DATA	01/07/50	01/09/60	31/12/70	31/12/80	31/12/85	31/12/95
Number of rural establishments with forest plantations		138,984	155,609	242,186	328,851	398,475
Area (há) with forest plantations in rural establishments	1,128,994	2,069,806	1,658,225	5,015,713	5,966,626	5,395,935
Percentage of rural establishments with forest plantations in relation to the total number of establishments		4.16	3.16	4.69	5.67	8.20
Percentage of the total area of rural establishments with plantation forests	0.49	0.83	0.56	1.37	1.59	1.53

Source: Bacha and Marquesini (1999) and Bacha *et al* (2000).

Área	Period	PIFFR (US\$ current per hectare)*	REPEMIR (US\$ current per hectare)**
Brazil	1978 – 1982	659,06	67,56
Minas Gerais	1978 – 1982		75,06
Paraná	1980 – 1981	1.266,45	84,46

Source: (\*) Primary data from the former IBDF cited by Bacha (2000).  
 (\*\*) Values cited in the text.

The main drawback of PIFFR was its high cost estimated at current US\$659/ha on average between 1978 and 1982 (or about \$1,421/ha in 2002 dollars). For this reason, this type of approach cannot be considered a realistic option for the future

### **Small and Medium Producers**

The programme to stimulate reforestation by small and medium rural producers (REPEMIR) was based on donation of seedlings, fertilizers and technical assistance, and involved partnerships between the federal government and Brazilian states. Reforestation costs were, on average, US\$ 67/ha. This was about 10% of the costs of reforestation under PIFFR (table 9). These results show the potential for small-scale reforestation policies in Brazil.

This difference arose because the PIFFR involved more subsidy, covering all the costs of planting and maintenance ie seedlings, inputs, labour and equipment, until the fourth year when the plantation was securely established. In contrast, REPEMIR (except in São Paulo) did not cover labour and equipment costs and inputs were subsidized only in the year of planting and not thereafter.

While REPEMIR was relatively low cost for the government, it had only a small impact on the area of plantations. It was responsible for reforestation of 80,000-100,000 ha over its lifetime, equivalent to only 1.8% of the area that PIFFR was supposed to cover.

### **4.4.3 Private Sector Reforestation Schemes**

Some companies in the pulp and paper and iron and steel /charcoal sectors have established programmes to encourage small and medium producers to plant trees. This is principally through donation of seedlings. Table 10 shows the areas planted for each sector from 1990 to 1998 and it can be seen that they are small in relation to PIFFR but comparable in size to REPEMIR. While reforestation on company owned land is still predominant, outgrower schemes are becoming more important for the iron and steel sector. In 1998, the area planted under these outgrower schemes for the iron and steel sector was 31% of the total areas planted for this sector. In the pulp and paper sector in contrast, outgrower schemes are becoming less important and in 1998

Year	Pulp and Paper		Iron and Steel	
	Reforestation (Company)	Outgrowers	Reforestation (Company)	Outgrowers
1990	131,925.0		125,000	12,378
1991	74,233.3	18,347	51,305	7,976
1992	82,653.1	16,767	80,067	13,244
1993	89,202.7	13,615	46,653	7,564
1994	83,702.9	7,905	37,026	6,502
1995	94,540.0	7,049	30,351	6,323
1996	112,541.6	7,203	32,752	5,831
1997	101,723.3	6,242	30,756	6,536
1998	110,702.2	5,514	19,808	9,171

Source: BRACELPA and ABRACAVE cited in Bacha et al (2000)

accounted for less than 5% of the area planted for this sector. This reflects the need of these companies for regular and large scale supply.

In recent years, pulp and paper outgrower schemes have been expanding in Parana, Santa Catarina and Sao Paulo, whereas at the beginning of the 90s they were concentrated in Minas Gerais and Espirito Santo. Most of the iron and steel outgrower schemes are found in Minas Gerais where they form part of a state level Farm Forest Programme whereby producers are provided with seedlings, key inputs, and technical assistance. The funding for this programme comes from the companies themselves or from a 25% reduction in the reforestation tax levied on consumers of forest products (in the case of companies located in Minas Gerais).

#### **4.4.4 State-level Reforestation Programmes**

There are three different approaches at the state level. The state of São Paulo's reforestation programme gives priority to reforestation for productive purposes and is implemented by non-profit making rural associations. Reforestation for conservation purposes is carried out by the state energy utility (CESP). In Parana state the programme is carried out by government agencies. Minas Gerais is a hybrid case with the state government environmental agency providing incentives to the private sector to introduce outgrower schemes.

##### **São Paulo**

###### *Forest Restoration Associations*

A Forest Restoration Association is a not-for-profit entity composed of small and medium consumers of wood raw material up to 12,000 steres (a measure of piled fuelwood one cubic meter in size) per year eg brickmakers, bakeries, ceramic industries, sawmills, small industry), farmers, people interested in environmental conservation amongst others. The association receives the

revenue from the reforestation tax from small and medium consumers and uses this to develop and implement reforestation projects together with small rural landholders. In this way small and medium wood consumers discharge their responsibilities in relation to reforestation.

The first such association in São Paulo state was Flora Tietê, created in 1986. By 2000, there were 19 Reforestation Associations in the state. Between 1990 and 1996 these associations planted an average of 2,260 ha a year. The Association model has since been adopted in other states: Rio Grande do Sul, Paraná, Mato Grosso do Sul, Bahia and in the Amazon region in Mato Grosso, Tocantins and Rondônia (Migliari in May et al 2000).

Currently, the Reforestation Associations in São Paulo state provide seedlings to landholders and give technical assistance but do not necessarily provide free inputs. The associations are inspected by the state Natural Resources Protection Department. Most of the planting they promote is of exotic species (eucalyptus and pine) primarily for energy use and there is little emphasis on planting of native species for conservation purposes. This reflects a requirement of the law regulating the associations which stipulates that no more than 5% of the resources raised from the reforestation tax can be allocated to the restoration of river bank forests.

Concerns have been expressed about the operation of the associations and the lack of resources for monitoring them effectively. It is also pointed out they do not assist producers with the harvesting, transport and marketing stages and that they compete with each other for payments from wood consumers as their areas of operation have not been clearly demarcated.

#### *Companhia Energetica de São Paulo (CESP)*

Since the 1970s, the energy utility of São Paulo (CESP) has operated a reforestation programme based on native species in areas surrounding its reservoirs. The economic motivation of CESP in operating this programme is to minimize damage to energy generation equipment from abrasion caused by suspended solids and also to reduce the build up of solids in the reservoirs and consequent reduction in storage capacity. In addition, the environmental impact assessment carried out for each hydroelectric project commits CESP to maintenance of forest cover on the banks of the reservoir. CESP has two approaches to replacing forest cover: it does some reforestation itself and it also operates an outgrower scheme.

Due to technological innovations in planting techniques, and changes in the extent of assistance given to producers, the cost of this reforestation programme has been reduced considerably, from US\$5,000 per hectare in the 1970s to US\$800 in 1994 and there have been further reductions since then. However, by 1998 the company had carried out reforestation in only 9% of the area that needed it.

## Minas Gerais

Due to the large demand for charcoal in the state, Minas Gerais has been running reforestation programmes since the 1970s. These are directed at small and medium producers and involve the provision of seedlings and free technical assistance. Areas planted for productive purposes have increased over the years from 3,398 ha/year in the period 1976-1993 to 4,891 ha/year on average between 1993 and 1998, and 5,007/ha/year in 1998 and 1999. There is also a programme for stimulating tree planting for conservation purposes which achieved a planting rate of 2,221 ha/year from 1995-1998.

However, the highest planting rates (7,893 ha/yr between 1991 and 1998) have been seen in the Farm Forestry Programme which is operated by private companies under the supervision of the State Forest Department. Under this programme, unlike the others, the producers receive assistance from the companies involved in harvesting, transporting and marketing the wood as well as receiving seedlings and technical assistance.

In spite of the achievements of these programmes and the marked increase in the area reforested in small and medium landholdings in the state since 1980 (Table 11), this is still insufficient to meet the growing demand for forests for energy and conservation purposes.

Size of landholding	31/12/70	31/12/75	31/12/80	31/12/85	31/12/95
Small	13,797	12,723	17,407	25,114	41,910
Medium	58,815	71,417	85,158	104,189	159,071
Large	198,909	503,789	1,482,824	1,638,555	1,506,802
Total	271,521	587,929	1,585,391	1,787,859	1,707,783

Source: Bacha *et al* (2000)

## Reforestation Programmes in Parana

Paraná has operated several programmes to promote reforestation since the 1980s. At present there are two programmes: the State Forest Development programme (PRODEFLO) and the Municipal Forest Programme. The state government collects the revenue from the reforestation tax and combines these funds with other budgetary resources to promote reforestation amongst small and medium landholders. Between 1979 and 1999, on average 4,574 ha/year were planted for productive purposes and 3,200 ha for conservation purposes. Planting rates have been increasing in the state but not as fast as in Minas Gerais.

The programmes differ from those in Minas Gerais in a number of ways: firstly, there is greater participation of local governments, secondly, although seedlings were given free to producers in the past, they are now sold. The monitoring of the programmes is weak and no assistance is given to producers in relation to harvesting, transport and marketing of wood.

Size of Landholding	31/12/1970	31/12/1975	31/12/1980	31/12/1985	31/12/1995
Small	18,624	21,008	31,247	46,787	50,472
Medium	42,353	48,586	88,065	116,966	135,376
Large	144,186	338,267	506,347	655,798	527,278
Total	205,163	407,860	625,659	819,553	713,126

#### 4.4.5 Benefits of Reforestation Schemes to Producers

The extent to which small and medium producers benefit from reforestation affects the success and degree of interest in such programmes. Some idea of the potential financial benefits to producers can be obtained from analysis of the viability of reforestation projects in these three states. Table 13 shows the internal rate of return for eucalyptus projects estimated for the three states with and without the cost of the land. In the case of Minas Gerais, this assumes donation of seedlings whereas in the other two states purchase of seedlings is assumed. The results show that the cost of land has a significant effect on the rate of return. Whether or not seedlings are donated also affects the rate of return. Nevertheless, returns are high when compared with agriculture and livestock activities.

State	Internal Rate of Return (%)	
	Including cost of land	Excluding Cost of Land
Minas Gerais	21.74	30.89
São Paulo	9.35	25.09
Paraná	7.13	18.76

#### 4.4.6 Feasibility of Reforestation using Native Species

Most of the programmes discussed above have concentrated on monoculture planting of exotic species for production purposes and make use of native species only for conservation purposes. Little emphasis has been given to planting native species for productive purposes. The Forest Institute of São

Paulo, CESP and others have been conducting planting trials with native species in various locations and estimates have been made of their likely returns. The results indicate that the returns from these species are comparable with those of eucalyptus but the payback periods are longer, a factor which would discourage agricultural producers from choosing native species. Such a programme would have most chance of success if it were conducted in partnership with wood processing companies that use such species (Bacha *et al* 2000).

#### **4.4.7 Lessons Learned**

The likely scarcity of wood in the future makes it essential to introduce policy instruments to promote reforestation. The tax incentive model used in the past to promote reforestation on the part of private companies is no longer appropriate because of its high cost and the problems that occurred in implementation. Programmes to promote reforestation amongst small and medium farmers could be a viable alternative provided certain modifications are made to the existing schemes.

The programmes in Minas Gerais and Paraná have achieved better results in terms of area reforested than the reforestation association approach used in São Paulo. To some extent, this reflects differences in financial resources and in the priority given to reforestation in small and medium landholdings. In both Minas Gerais and Paraná, the revenue from the reforestation tax has been supplemented by funds from the state budget and loans from international financial institutions.

Nevertheless, the experience of the reforestation associations in São Paulo shows that it is possible to involve civil society organisations in the restoration of the productive forest base and at the same time charge a reforestation tax rate lower than those charged by state forest departments elsewhere. But the limitation in financial resources that this implies and the decline over the last three decades in the area reforested in small and medium landholdings in São Paulo shows that this should not be the only approach used by a state government to promote reforestation.

The state programmes in Minas Gerais and Paraná have been effective in expanding the area reforested in small and medium landholdings for both productive and conservation purposes. What is needed is more support to small producers after the planting stage, particularly in relation to marketing.

#### **4.4.8 Policy Implications**

While it is up to each state to decide on the approach to reforestation, whether centralized or involving the participation of civil society organizations like the reforestation associations, there are some policy lessons that apply regardless of the model adopted. The main lesson is that reforestation programmes should not only donate seedlings and give technical assistance but also create conditions in



Fotografía: Instituto Pró-Natura

**Tree-planting is considered a good option for small farmers as it can be productive even on infertile soils, it reduces erosion, and generates revenue in the medium to long-term.**

which producers can harvest and sell their wood. This implies the need for greater coordination with the companies that consume wood to understand their needs. There is also a need to give more attention to reforestation with native species, taking account of demand patterns and available technology. This again highlights the need for greater coordination of public reforestation programmes with the strategies and needs of private companies.

New approaches, such as mixed plantings, plantings for multiple purpose use, agroforestry-based reforestation and small scale forestry systems, are all receiving increasing attention. These are themes where dialogue is much needed.

## 4.5 Carbon Sequestration and Forests

Forests provide an important environmental service as they store and sequester carbon from the atmosphere and thus help to mitigate global climate change processes. Until recently, this service had no market value. However, in the past few years, there has been an increasing market for carbon sequestration forestry projects. This may be a key opportunity for some segments of the forest sector. Due to the initial establishment costs and the long gestation periods of forest plantations, the forest sector in Brazil faces serious financial problems to maintain the rate of reforestation. The high rates of the past were only achieved with the help of subsidies, as described by Bacha et al 2000, cited above. One of the principal opportunities for financing private sector forest management activities in developing countries that has emerged recently is the Clean Development Mechanism (CDM). This is associated with “additional” activities aimed at sequestering carbon in forests or through changes in land use.

This section analyses the regulatory and institutional contexts in which forestry carbon projects operate. In addition, the experience of 3 pioneer forestry carbon projects underway in Brazil, is reviewed.

### 4.5.1 Background

The application of the CDM mechanism to forest resources raises a number of issues: which forest activities should be included (reforestation, forest management, protection of natural forests, forest regeneration); whether the investments made are effectively additional and go beyond what would have been done without the CDM; how to measure the carbon sequestration in comparison with a baseline situation; and how to deal with leakages associated with the transfer of emission intensive activities to other areas as a result of the “freezing” of forest land use. The two basic requirements for each CDM project are proof of additionality, and coherence with national sustainable development objectives. Although the CDM, which is targeted at private sector projects and not public actions, cannot ensure the flow of sufficient resources to redirect national forest policy, it may be sufficient to improve the financial viability of a subset of forest investments, in cases where the rates of return are relatively low. As low rates of return are one of the principal obstacles to the development of the sector, and particularly to projects that involve native species and environmental recuperation objectives, this would contribute to the implementation of national forest policy. It is generally accepted in the scientific community that carbon sequestration in forests or resulting from land use change can enable postponement of the measures necessary to adapt the global energy base to emission reduction requirements. The main contentious issue associated with the CDM is that it implicitly allows developed countries to continue polluting so long as they invest in emission reduction in the developing countries. As well as dealing with this issue, it is essential that the parties to the Climate Change Convention agree on a definition of the baseline in order to establish at what point a project provides additional benefits (Feldmann, F. in May *et al* 2000).

An important issue in relation to forests is that of permanence, as the end use of planted trees, whether for long-life products such as ships, or short-life uses such as charcoal or firewood, has implications for the amount of carbon sequestered. This is different from the restoration of river bank forests, which constitutes a permanent action and therefore more easily satisfies this criterion. Nevertheless, the legal requirement to protect and restore riverbank forests already exists in Brazil as part of the Forest Code. Thus the additionality of this activity in relation to the CDM is debatable (Ibid.).

In spite of the uncertainties associated with the CDM, the interest of potential investors (principally from emission-intensive sectors in the North, for example, hydrocarbons, transport, electricity generation) has resulted in the creation of an incipient market for carbon credits. As a consequence, there is a flow of resources to projects, which can position investors and their partners in this market as well as help them project a good corporate image

#### **4.5.2 Carbon forestry projects in Brazil**

There are currently various pilot carbon sequestration projects in Brazil, based principally on avoided land use change and reforestation. Three projects stand out:

- (1) The environmental reforestation project for recuperation of degraded lands and carbon sequestration operated by the National Office of Forests (ONF) of France on behalf of Peugeot-Citröen in Northwest Mato Grosso.
- (2) The Action against Global Warming project implemented by the Society for the Protection of Wildlife (SPVS) in Guaraqueçaba, PR with resources from Central and Southwest Corp.
- (3) The carbon sequestration project of the Ilha do Bananal in Tocantins state, coordinated by ONG Ecológica with funds from the British foundation AES-Barry.

These carbon sequestration projects include reforestation activities as well as emission avoidance activities due to avoided deforestation (Table 14). The total investment involved is about US\$ 18.4 million.

**The Reforestation for Carbon Sequestration project in North West Mato Grosso**, has three main objectives:

- a) To maximize the absorption of carbon from planted forests
- b) To carry out reforestation, giving priority to the socioeconomic integration of the project in the region
- c) To promote greater knowledge at local level of the management of forest ecosystems.

A long-term objective is to add value to local forest resources (Graffin, A. in May *et al* 2000).

<b>Implementing Agency</b>	<b>ONF</b>	<b>SPVS</b>	<b>ECOLÓGICA</b>
Region	North West Mato Grosso	Paraná coastal area	Ilha do Bananal – Tocantins
Project area	5,000 ha	7,000 ha	1,700,000 ha
Activities	Reforestation in: - Pasture - Secondary forest	Forest restoration Protection of natural forests	Preservation Regeneration Agroforestry systems
Carbon sequestered	2 million tonnes	1 million tonnes	25 million tonnes
Investor	PSA Peugeot-Citroën	Central & Southwest Co.	AES Barry Foundation
Carbon Credits	No – demonstration only	Yes**	No – scientific/social
Value of Investment	US\$ 12 million	US\$ 5.4 million	£0.6 million / 4 years
Duration of Project	40 years	40 years	25 years

\* Refers only to the area to be reforested. The São Nicolau farm (1st phase of the project) is more than 10,000 ha in area of which 75% is in protected forests and permanent preservation areas and 25% is pasture or is in the process of reforestation.

\*\* Emission credits avoided through the protection of natural forests are included in the estimate of sequestration (500,000 tC or 50% of the total).



The contractual commitment of ONF with Peugeot is to reforest 5,000 hectares, implying on average 10 tonnes of sequestered carbon per hectare, per year. The ONF has a commitment to maintain this forest for 40 years. It should be emphasized that a number of national institutions are participating in the project, such as Pro-Natura (IPN) which provides scientific support and ensures synergy with its own activities to promote conservation and sustainable use of biodiversity in the region, as well as private consulting companies and institutions linked to the Brazilian scientific community such as the Federal University of Mato Grosso.

The ONF has already started its reforestation activity, focusing on areas of pasture and secondary forest in the São Nicolau farm in Cotriguaçu-MT (10,000 ha). The first stage of the project (2,500 ha) began in 1999, and 1,200 ha were planted in the first year with 33 species native to the region and in smaller proportion (15%) with the exotic species teak (*Tectona grandis*) which is widely used in private reforestation projects in Mato Grosso.

Although extension activities were not an explicit initial objective of the project, agroforestry systems have been established on the farms of 22 small landowners, with the support of local authorities and the NGO Pró-Natura, ONF's partner in the reforestation project, active in Northwest Mato Grosso

for over 10 years. As regards the development of knowledge and management of forest ecosystems for the sequestration of carbon, tests are being made of native species that have never been planted on a large scale before with the aim of restoring degraded areas. Studies are also being made of carbon fluxes in the atmosphere and the accumulation of biomass in planted forests to provide a comparison with the baseline of pastures and secondary forests.

SPVS, which is implementing the Action against Global Warming project, has been working in the Guaraqueçaba environmental protection area on the coast of Paraná for nearly 10 years in conservation and environmental education activities. The carbon sequestration project is supported by Central and South West Corporation – CSW, an American electricity company which has channelled its funding through the Nature Conservancy – TNC. The project has a time horizon of 40 years and involves an investment of US\$5.4 million.

The SPVS project aims at the restoration, protection and management of a property of approximately 7,000 ha. in an area known as the Serra do Itaquí Nature Reserve. It will also promote sustainable economic development opportunities for the neighbouring communities (Ferretti, A. in May *et al* 2000).

The project has five basic components:

- a) operational management;
- b) forest restoration, especially in lowland and coastal areas previously used for pasture;
- c) sustainable development in the rural areas identifying viable income-generating alternatives for the surrounding population;
- d) control of carbon leakage; with the aim of avoiding the shifting of environmentally damaging activities previously practised in the property acquired by SPVS to other areas;
- e) monitoring of the carbon balance over 40 years in different ecosystems.

The objectives of the project include:

- i) to obtain carbon credits through forest restoration (500,000 tonnes over 40 years)
- ii) to protect natural forests (an additional 500,000 tonnes of carbon over 40 years) in areas that are considered vulnerable to being cleared of forest.

To achieve this objective, a rigorous programme for monitoring and verifying the amount of carbon sequestered has been set up, under the responsibility of Winrock International. Another important goal of the project is biodiversity conservation, as the reserve is located in the largest remaining fragment of the Atlantic Forest in the country. The financial resources necessary for the management of the areas after the end of the project are being guaranteed by the creation of a permanent fund.



Fotografia: Instituto Pró-Natura

**The nursery – Reforestation project for carbon sequestration, implemented by the Office National des Forêts on behalf of Peugeot-Citröen in Northwest Mato Grosso.**

The additionality of the project can be justified by reference to the attempts to prevent the environmental damage associated with buffalo rearing, one of the principal economic activities of the region which has been highly damaging to the original forest cover. The project aims to rationalize buffalo rearing activities so that the animals are restricted to small areas and are not managed in an extensive way. SPVS is also encouraging the creation of private nature reserves (RPPN) in the properties surrounding the project area and looking for alternative sources of income for the population, linked to eco-tourism and sustainably produced crafts. SPVS has made no commitment that the avoided carbon emissions will be accepted in the carbon credits market. The monitoring of the carbon avoided will provide information to support discussion of this aspect.

The Carbon Sequestration Project of the Ilha do Bananal and its Surroundings (PSCIB) involves a technical and scientific collaboration between the NGO Ecológica, the Tocantins government and IBAMA. The project won an international competition sponsored by the AES-Barry Foundation of the United Kingdom. The objective of the project is to contribute to the reduction of local and global effects of climate change through the implementation of an innovative system of development and environmental conservation. The project has three components:

- i) environmental research covering studies on the baseline, leakage, additionality and carbon stocks;

- ii) forest management, including conservation, regeneration, reforestation, and agroforestry
- iii) a social component, including environmental education, income-generating alternatives and community participation in the project planning process (Rezende, D. in May *et al* 2000).

The first phase of the project involves five municipalities with an area of 1.7 million ha in the Northern region of the Bananal Island. A center has been created for research, environmental education and for eco-tourism where researchers and scientists are accommodated. The five principal lines of research are:

- development of methodologies for calculating carbon in different ecosystems in the region
- development of standards and processes for certification and trading of carbon credits
- survey of natural resources and studies of fauna and flora
- development and application of techniques and alternatives for using natural resources
- ethnobiological research

The project was initiated in 1998. The first step was to calculate the rate of deforestation in the region. This was found to be around 0.8% per year. In the “without project” situation, the amount of carbon emissions would be around 670,000 tonnes of carbon per year.<sup>11</sup> In addition, analysis of carbon fluxes in trees and soil is being carried out in some sample areas.

The estimate of sequestration and the guarantee of preservation of carbon stocks were calculated over a period of 25 years, including the following components (1) preservation of 200,000 ha of forests and floodplains; (2) regeneration of 60,000 ha of forest and savanna; (3) establishment of 3,000 ha of agroforestry systems with a total of 25,110,000 tonnes of carbon over the period. There is no aim to market the carbon credits as the financial resources originate from a social fund. The evaluation of the social benefits of the project were carried out using the five capitals sustainable livelihood framework.

### 4.5.3 Final considerations

Carbon sequestration can be an important source of funds for sustainable private forestry in Brazil. The ongoing experiences provide important practical and conceptual opportunities to substantiate the debate over national and international policies on the subject. Forestry carbon projects can complement other forestry objectives such as biodiversity conservation, watershed protection and forest production and thus be an important component of a broad strategy for sustainable development.

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11. Estimates were made of the tree biomass of four different plant typologies, as well as an analysis of the amount of carbon in different parts of the trees. The averages were found to be: 111 tonnes of C/ha in terra firme forest, 98 tC/ha in forests prone to floods, 31 tC/ha in savanna and 6tC/ha in floodplain forest.

## 4.6 Ecological Value Added Tax and Private Forest Reserves

Brazil has created an innovative tax incentive at state level for municipalities that have a high proportion of their territory protected as nature reserves. This has become a landmark for public policy since it generates a positive incentive to municipalities and in turn may encourage the private sector to invest in forest protection. This section reviews the cases where the ecological sales tax is most developed so as to draw lessons for other states in Amazonia that do not as yet have such an instrument in place.

### 4.6.1 Background

The ICMS (*Imposto sobre a Circulação de Mercadorias e Serviços*) is a value-added tax levied at state level. A proportion (25%) of the revenue from this tax is transferred by the state governments to the municipalities. The Constitution of 1988 (article 158) provides for a partial decentralization of decisions on the distribution of tax revenues between municipalities. It stipulates that 75% of the ICMS revenue should be allocated to municipalities on the basis of the value added they generate. The remaining 25% can be distributed according to criteria chosen by each state as set out in complementary legislation. In 1991, the state of Paraná introduced ecological criteria into the allocation rules. This was prompted by pressure for compensation from the mayors of municipalities that had land use restrictions because of the location of protected areas or watershed protection areas within their territory. The “ICMS Ecológico” was introduced as a way of giving compensation to these municipalities (Grieg-Gran 2000)

Similar schemes were introduced subsequently in São Paulo (1993), Minas Gerais (1995), Rondônia (1996) and Rio Grande do Sul (1998). The Ecological ICMS is also being implemented in Mato Grosso do Sul and is under discussion in Bahia, Pernambuco, Santa Catarina and Ceará. In Mato Grosso, legislation on the ICMS ecológico, proposed by State Deputy Gilney Viana, was approved in November 2000.

The criteria adopted for the allocation of the ICMS revenue vary from state to state. In Paraná, there are criteria relating to agricultural production, population, number of rural properties, area, equal distribution and environment. The environmental criterion accounts for 5% of the ICMS and is divided between municipalities with watershed protection areas and those with protected areas. In Minas Gerais and São Paulo, the percentage allocated to environment is much lower (in the former, 1% divided between sanitation and protected areas and in the latter 0.5% for protected areas). Although the revenue is transferred on the basis of environmental criteria, there is no obligation for these additional funds to be spent on conservation activities and they can be used for general expenditure.

Even so, the amounts associated with these transfers are significant (for example, R\$20 million for 172 municipalities in Minas Gerais in just three years) resulting in a substantial increase in municipal funds in various cases. As a result, the local authorities that have benefited have come to appreciate the importance of conservation to the local economy. This has led to the creation of new protected areas as well as the designation of Environmental Protection Areas (APAs) and private nature reserves (RPPNs) on private land. There has been an increase of 165% in the area protected in Paraná since the program began in 1992, with two specific cases being of particular interest: conservation of the floodplain ecosystems of Ilha Grande Complex and the RPPNs (see Table 15).

It is important to highlight the participation of the private sector in conservation through the RPPNs, of which at least 80% are located in regions to the north and east of the state where there is on average 2% forest cover. The increase in RPPNs has been catalysed by the ICMS Ecológico and is one of this instrument's most important impacts (Loureiro in May et al 2000). A similar result has been observed in Minas Gerais where the area protected rose by 62% after the implementation of the ICMS Ecológico in 1996, with a particular emphasis on the areas designated as APAs (areas of environmental protection).

Due to its low cost, its compatibility with existing legislation and the Constitution, the ICMS Ecológico represents a promising option for biodiversity conservation policy. It operates on the principle of “the protector benefits” as opposed to “the polluter pays” whereby the local authority that conserves more, benefits more, providing an incentive for preventive action.

In Paraná, the allocation criteria have two dimensions: quantitative and qualitative. The former takes into account the area protected in relation to the total area of the municipality, weighted by a factor which characterises the extent of land use restriction.<sup>12</sup> Apart from the conventional protected areas, other types of conservation area are included in the calculation, such as indigenous reserves, ecological corridors, areas of permanent protection and the legal forest reserve that each landholder must maintain. The last two categories are included in order to maintain connection between forest fragments surrounding a protected area of the indirect use type.

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12. The general formula for the allocation of the ICMS Ecológico is as follows:

$$FCMi = \sum FC \times FQ \times \frac{\text{Area protected in Municipality "i"}}{\text{Total area of Municipality "i"}}, \text{ where:}$$

FCMi – Conservation factor of municipality “i”

FC – Conservation factor given by the management category of each protected area

FQ – Quality factor determined for each protected area

The protected areas designated at federal, state or local level are: Biological Reserve, Ecological Station, Parks, Forests, Private Nature Reserves, Areas of Relevant Ecological Interest, Areas of Environmental Protection (APA), Special and Local Areas of Tourism Interest, Wildlife sanctuary and Natural Monuments. Typically, the complementary state level legislation establishes higher conservation factors for protected areas involving the most land use restrictions eg biological reserves while for areas of environmental protection that have been subject to land use zoning differentiates according to the extent of restrictions.

Table 15: Growth in conservative units in Paraná and Minas Gerais, prior to and during implementation of EMSE												
Management level	Paraná						Minas Gerais					
	Number		Area (hectares)		%		Number		Area (hectares)		%	
	To 1991	2000	To 1991	2000	To 1991	2000	To 1991	2000	To 1991	2000	% change	
<b>Federal</b>												
Parks and Reserves	3	5	218,502	267,603	22	6	6	208,453	208,453	208,453	0	0
Indigenous Lands	12	12	67,255	69,000	3	4	4	59,359	59,359	59,359	0	0
Forests	2	2	3,825	3,825	0	1	1	335	335	335	0	0
<b>State</b>												
Parks and Reserves	34	47	39,859	53,663	35	34	49	295,151	491,587	491,587	66.5	66.5
<b>Municipal</b>												
Parks and Reserves	20	90	1,429	4,169	192	25	46	3,851	12,927	12,927	236	236
<b>Private/Minced</b>												
APAs (Federal, State, Municipal)	5	17	306,693	1,212,324	295	12	61	1,023,556	1,809,480	1,809,480	77	77
RPPNs (Federal, State)	0	157	0	26,124		17	54	20,261	34,069	34,069	68	68
Other Forests <sup>a</sup>			0	38,153								
Farmlands			0	15,454								
<b>Total</b>	76	351	637,563	1,690,315	165	99	221	1,610,976	2,616,190	2,616,190	62.4	62.4

Note: <sup>a</sup>Streambank reforestation, legal reserves and other forests are not treated as CUs  
Source: May et al. 2002. The Ecological Value-Added Tax: Municipal Responses in Paraná and Minas Gerais, Brazil, in Stefano Pagola, Joshua Bishop, and Natália Landell-Mills (eds). *Saving Forest Environmental Services: Market-based Mechanisms for Conservation*

The qualitative dimension takes into account factors such as the physical and biological characteristics of the protected area, the efforts made in relation to planning, implementation, maintenance and management and the equipment and support staff provided by the council and the management agency. Of particular importance are the criteria concerning the attention given to the neighbouring community, as this makes it possible for the protected areas to contribute to local sustainable development.

A checklist of variables is used to assess the quality of conservation of the protected area.. The aim is to create an objective system with clear formulas and variables, in order to improve the dialogue with the mayors. As the revenue from the ICMS Ecológico is not earmarked, the quality factor is used as a means for strengthening local commitment to the objectives of the legislation: “Do you want to receive more money? Let’s take the equation and work on the variables that you need to improve”.

#### 4.6.2 Final considerations

The ecological value added tax (ICMS Ecológico) is a concrete case of a public policy instrument that is changing the paradigm of development. For many municipalities in states where the ICMS Ecológico has been introduced, forests are no longer seen as merely obstacles to agricultural development. In many cases protected forest areas have been responsible for substantial increases in municipal budgets which, in turn, have resulted in better services and quality of life. This has prompted a new attitude on the part of the private sector, leading to a substantial increase in the area of private reserves (RPPNs). The ICMS Ecológico is a notable example of a public policy that has created a positive – and effective instrument for private sector involvement in forest conservation.

One of the greatest challenges is to improve the instrument, in particular by introducing systems for evaluating the quality of protected areas, as in Paraná. Another challenge is to introduce this instrument in other states and countries.



Fotografía: Instituto Pró-Natura

Due to the *ICMS Ecológico*, protected forest areas have been responsible for substantial increases in municipal budgets.

# 5. Applications to Forestry in Mato Grosso

The preceding sections discussed a number of market and non-market instruments to encourage private sector engagement in sustainable forest management, conservation and reforestation. This section analyses the case of Mato Grosso State, which occupies the Southwestern margin of the Brazilian Amazon Region, drawing on the findings of a workshop held in Mato Grosso and interviews carried out by Lucineide Lago, a local forester and member of the IIED team.

## 5.1 The Context

The state of Mato Grosso covers an area of 906,806 Km<sup>2</sup>. More than half of its area lies above the 13th parallel and thus can be considered part of the Amazon forest, having either existing forest cover or potential for reforestation. Existing forest resources have been estimated at 400 million m<sup>3</sup> (Prodeflora, 2000).

Mato Grosso has a forest industry of around 1,200 companies, with installed processing capacity of approximately 4 million m<sup>3</sup> of wood per year. This implies the need for an area of 360,000 ha of natural forest each year to meet this demand for wood.

The forest sector currently employs 39,000 people directly, accounting for 26% of employment in the state's industrial sectors, and generates 8% of the sales tax revenue in the state or 36% of the total generated by industrial sectors.

About 350,000 people or 16% of the state's population depend on the forest sector directly and indirectly. The value added of the forest product chain in 1998 was R\$500 million, corresponding to 6.4% of the state total. It is the second most important contributor to exports in the state, surpassed only by soya (Carlos Vitor Bona, FIEMT, in May I *et al* 2000).

The combination of clearance for agricultural purposes and selective harvesting of wood is resulting in a rapid decline in forest stocks. In August 1998, it was estimated that the state had deforested an area of 131,808 km<sup>2</sup>, equivalent to 24% of the total deforested area in Brazil's Legal Amazon region. The speed of this deforestation process increased considerably between 1990 and 1995 but started to stabilize after 1995. In view of the more vigorous enforcement actions





Fotografia: Instituto Pró-Natura

**Juruena, Mato Grosso. The wood-processing industry is a key sector in Mato Grosso but its future is threatened.**

undertaken by the State Government from 2000 onwards as part of the Federal Pact, it is expected that deforestation rates will start to decline.



Mato Grosso has more than 23,000 hectares of forest plantations, almost half of them producing wood for energy purposes. In addition, around 1,500 ha is being planted each year with hardwood species, principally teak – *Tectona grandis*). The area reforested is too small to offset the depletion of natural forest stocks. Even though the state's forest ecosystems have excellent natural regeneration capacity, this will not be sufficient to replace the current market demand for wood raw materials and forest products. This is because the areas that are under forest management plans are being harvested in an unsustainable manner with a high degree of impact, thus precluding a second cutting cycle. Mato Grosso has great potential for forest management but currently forests are being exploited in an unplanned fashion, Insufficient attention is being given to replenishing and maintaining forest resources, and hence ensuring the sustainability of forest-based industrial activity.

As the wood processing industry has grown very rapidly in the last 10 years in Mato Grosso (and in Amazonia) its main raw material source by necessity originates from forest clearance, whether authorised or unauthorised. There is a close connection between the high rates of deforestation and the increase in timber production in Mato Grosso. These unsustainable sources of timber prompted the rapid growth of the wood processing industry in Mato Grosso (as in Amazonia) but paradoxically, also explain the industry's lack of long-term viability (Viana 2000<sup>13</sup>).

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13. Boletim Verde Vermelho, Publications State Deputy, Gilney Viana, 04/10/00.

## 5.2 Problems of Regulation and Enforcement in Mato Grosso forestry

The enforcement of forest management regulations in Mato Grosso exhibits many of the problems observed in the country as a whole or for Amazon region. People interviewed in the course of this study noted the excessive bureaucracy involved in securing approval of forest management plans, the confusion over the requirements of the various types of legislation relating to forests and environment and the general lack of technical knowledge of forest management both within companies and the regulatory agencies.

### Box 5 - Industry Concerns about Forest Regulation in Mato Grosso

- Lack of a defined environmental policy, creating constraints on the development of the Amazon region.
- Complex and bureaucratic legislation which is inadequate and isolated from the realities of the region ;
- Excessive delay in the granting of permits in particular for Authorizations for Transport of Forest Products (ATPFs);
- Lack of coordination between the actions of Federal Ministries and the State Government;
- Lack of standardised procedures as staff of the regulatory agencies make decisions based on personal criteria which often diverge from provisions in the relevant legislation.

Source: Carlos Vitor Bona, FIEMT in May *et al* 2000

More specifically, a review of forest management plans carried out in 1999 found that only 15% could be considered adequate (Box 6).

### Box 6 - Status of formally approved management plans in Mato Grosso State

There were formerly 1,500 approved forest management plans in the state. An inspection made by the federal environmental authorities (IBAMA) found that only 217 (14.7%) plans were acceptable. The remaining 1,283 (85.53) were considered unacceptable. The latter includes 984 suspensions, 175 cancellations, 20 under analysis and 104 inadequate).

The irregularities most frequently detected were:

- Unplanned harvesting
- Failure to follow the technical prescriptions/specifications of the sustainable forest management plans (PMFS)
- Lack of a forest inventory
- Failure to mark cutting areas
- Lack of compliance with the harvesting schedule
- Failure to update reports on activities
- Forest clearance

Source: Report on Inspection of Sustainable Forest Management Plans (PMFS) in Mato Grosso (IBAMA Brasilia 1999)

Similar problems of weak enforcement apply to the legal forest reserve as its demarcation in land title is generally not respected by landowners. However, FEMA, the State Environment Agency has recently established a new enforcement procedure which links a mapping system based on satellite images with the licensing system for forest clearing and more generally with environmental permits. (Leite in May, *et al* 2000).

A key problem is the lack of technical capacity within the environmental regulatory agencies. The foresters who appraise the forest management plans have insufficient training and are unable to explain the technical requirements of the regulatory agencies. Moreover the service to the public is slow and despite great efforts on the part of IBAMA to improve, the technical department is not able to keep up with demand.

A vicious circle therefore results: the licensing authorities do not give approvals quickly enough the logging company applies for a transport permit (ATPF) and it is not granted because the approval of the forest management plan is still pending. The logging company is thus forced to transport the wood without the full legal documentation required. The lorry is stopped and checked, the logging company is fined and demotivated.

The consequence of this is that the logging companies, believing that there is little interest on the part of IBAMA to give the necessary authorizations, decide not to invest in forest management plans. Instead they resort to bribery or work clandestinely so as to avoid inspection. This gives rise to unfair competition. It is easier to inspect a company which is officially registered and this creates a disincentive for companies to register.<sup>14</sup>

Another problem is that in many cases the inspection is of the paperwork and not of operations in the field. In spite of recent efforts by IBAMA to carry out random field inspections, the technical evaluation of the forest management plans remains of lower priority than the paperwork. Knowing that irregularities in the paperwork can always be found the officials exert pressure on the forest enterprise to obtain approval, stimulating corruption. This situation is worrying because the regulatory agencies are losing credibility amongst the business community.

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14. This problem is illustrated by the case of the company Rohden Ligna, which was fined by IBAMA for not having registered the extraction of wood from a demonstration project for sustainable forest management. This project was paradoxically being conducted in partnership with the state regulatory agency so as to improve timber extraction technology in the field.

### Box 7 - Industry Attitudes to Forest Management Plans

“There is a total lack of information amongst the business community about forest management, the techniques and its viability. To date very few business people know why a 100% survey is needed or what is meant by low impact logging. ....In general, forest management is regarded by business people as a piece of paper that it is necessary to obtain in order to certify the origin of the wood . In this way they buy a “paper management plan” in order to have all their documentation in order for IBAMA. Current thinking among the business community is that managed forests will not have further economically viable harvesting after the first cycle”.

Ricardo Mastrangelli

Forest engineer and owner of REFLORA REFLORESTADORA LTDA and of TECANORTE EMPREENDIMENTOS FLORESTAIS LTDA

## 5.3 Potential for Applying Market-Based Instruments in Mato Grosso

Due to the shortcomings in the forest management plans and the lack of investment in reforestation activities, it is estimated that currently there is a deficit of approximately 6.5 million m<sup>3</sup> of wood per year. In order to avoid excessive pressure on forest resources and to ensure the sustainability of the industry, the state government has introduced some innovative programmes. Pro-Madeira (Box 8) aims to improve efficiency and environmental management amongst wood processors. The objective of Prodeflora (Box 9) is to provide incentives for implementation and monitoring of sustainable forest management and reforestation. It focuses on compensatory financial incentives for the provision of forest environmental services as a way of attracting the interest of rural producers.



### Box 8 - Pró-Madeira Wood Processing Programme

Pró-Madeira was introduced under State Law 7.200/99, which established a tax concession of up to 85% of the ICMS tax due on the sale of forest products, as an incentive to adoption of improved industrial technologies and environmental management procedures. The goal is that this fiscal adjustment will be in effect over a 6-year period. By way of preparation, several consultations were held in the main wood industry centres of the state (Sinop, Alta Floresta, Juína and Juara) in order to understand the concerns of the sector regarding its sustainability.

The objectives of Pró-Madeira are to establish: :

- 1- A policy on sustainability of forest resources;
- 2- A policy on taxation, inspection and environmental control.
- 3- A policy on competitiveness
- 4- Incentives for vertical integration and value added productive activity in the wood processing sector
- 5- Quality and management programmes in order to promote modernization.

There are different rates of tax concession under the programme according to

the stage of production and type of activity.

A) Preliminary stage: 34% concession. This includes drying, or treatment and chemical conservation of sawnwood -;

B) Intermediate stage: 76.5% concession. This includes primary processing (, eg: veneer and plywood), operating with modern technology and with implementation of quality and management programmes;

C) Advanced stage: 80% concession. This comprises the final wood processing stage (furniture, panels, laminates for floors, fibreboard, MDF) operating with quality and management programmes.

D) Wood residues processing: 85% concession. This applies to enterprises which can show that they using exclusively wood-based industrial residues.

In order to qualify for these concessions the company must supply proof of the following:

- Origin of the wood, approved by the environmental authorities;
- Legal tax status;
- Implementation of quality and management programmes

Source: Dr Jorge dos Santos, Mato Grosso State Secretariat of Industry, Commerce and Tourism, in May *et al* 2000

### Box 9 – PRODEFLORA Forestry Programme

PRODEFLORA, consists of the creation of a Forest development fund - FUNDEFLORA, and a forest extension and promotion project to support reforestation and forest management. Finance for the fund will come from a proportion of the forest tax levied for licensing of forest activities. The fund will support producers who carry out reforestation in degraded areas for industrial and energy purposes as well as landowners who wish to manage their forest areas sustainably.

Another aim is to promote certification of the forest-based raw material with a Mato Grosso ecolabel to indicate whether it is derived from ecologically correct reforestation or forest management. It is also planned to prepare a legal framework for the marketing of carbon credits.

Through this important initiative the State Department for Agriculture and Land Tenure Issues together with the Mato Grosso Association of Foresters aims to maintain the stock of forest raw material in the state of Mato Grosso and in this way secure the future of the forest industry in the state.

Source: Mato Grosso State Department of Agriculture and Land Tenure Issues in May *et al*, Barbosa and Veiga Neto 2000.

### 5.3.1 Incentives for reforestation

*...it is also necessary to promote reforestation as we believe that this is the most practical way of contributing to future raw material supply as well as enabling the sale of credits generated by carbon sequestration”.*

Nereu Luiz Pazini, Vice President Elect of the Federation of Mato Grosso Industry (FIEMT) and President of the Association of Wood Processing Industries of Northern Mato Grosso

In the State of Mato Grosso there are a number of mechanisms to promote reforestation including:

- the reforestation tax which is levied by the Federal Environmental Agency (IBAMA). The reforestation association model of São Paulo has also been adopted in Mato Grosso and after some initial teething problems, steps are being taken to establish an effective accountable system.
- a new program (Prodeflora – Box 9) introduced by the State Government which aims to provide financial support and technical assistance to small producers as well as introducing a certification scheme and a system for marketing carbon sequestration services;
- a tax concession applied to the value added tax (ICMS) aimed at stimulating value added processing in the wood sector (Promadeira – Box 8).

#### Box 10 - Reforestation Associations in Mato Grosso

The first reforestation association in Mato Grosso was created in 1995, followed by two more associations and the formation of some reforestation companies. The development of the reforestation associations in the state, has gone through several phases, culminating in intervention by IBAMA, in part due to accusations of embezzlement of the funds originating from the reforestation tax. In response, the task was initiated of uniting the various reforestation associations and companies in the state in a federation (FARESMAT). The aim is to give some representation to the reforestation associations and companies, allowing them to discuss reforestation issues in a coordinated manner and to guarantee that the the funds raised for reforestation will be used in the areas where the timber originates.

Another question that needs to be addressed by the federation is the level of the tax, which currently is not in line with the cost of reforestation.

Companies that use wood need some guarantee that their raw materials are being replaced through reforestation in the areas of timber harvesting. FARESMAT therefore proposes to establish partnerships with local authorities with a contractual arrangement to guarantee the replacement of trees harvested for timber by planted trees. This will bring some benefit to the area where the environmental damage was caused.

Given the not-for-profit nature of the associations, FARESMAT intends to discuss with the public and private sector ways of allocating a percentage of the revenue raised for reforestation to the restoration of forests along riverbanks, using native species. This can be achieved by means of partnerships with local authorities and associations of rural producers.

Source: Afranio Migliari in May *et al* 2000

Nevertheless, these instruments are not being used to their full potential. Moreover, their effectiveness is hampered by the fact that they are under different forms of control: federal government, state government and private sector.

The integration of all these mechanisms under one representative structure such as a management council with executive powers could help to harmonise them and make them work together effectively.

All these mechanisms need to be implemented in the areas where timber extraction, processing and reforestation are being carried out. The private timber enterprise sector, through its representative bodies should strengthen its position in relation to government agencies, emphasising its status as the leading sector in the state for industrial employment creation and the second largest exporter.

Small producers have a key role to play in reforestation. Financial incentives therefore need to be accompanied by other measures which address the needs of small producers:

- Development of studies and projects aimed at strengthening partnerships with communities that live close to forest operations. This would aim to identify income generating opportunities associated with timber extraction and address some of the difficulties that small and medium enterprise face when trying to achieve forest certification.
- Greater involvement of foresters together with extension agencies like EMPAER in attending to the needs of small producers as these are currently not receiving any technical assistance for forestry activities and consequently have little understanding of what forest management actually means.

### **5.3.2 Certification and Sustainable Forest Management**

As of 2001, there was only one certified forest company in Mato Grosso - Floresteca - which specializes in teak plantations. Its prime motive for certification was to attract private investors in Europe as it will be some years before it is ready to market teak products. Other companies engaged in natural forest management are examining the option of certification for example, Rohden Lignea (Box 11), and most companies in the forest sector in Mato Grosso are aware of the concept.

Nevertheless, the performance requirements of certification are not accessible making it difficult for companies to take the initiative. Only a small number of companies are interested in and prepared for certification. This is usually where the owner is a forest professional, or is in partnership with one, or has engaged a forest consultant.

The people interviewed were broadly supportive of certification although concern was expressed about its complexity in relation to local realities, its cost and the lack of trained people to assist companies in making the transition to certification. The need to find markets for lesser-known species was also highlighted.

### Box 11 - Rohden Lignea and its attitude towards certification

Rohden is located in Juruena in the Northwest of Mato Grosso and has been operating there since 1980 as a sawmill and since 1984 as a door and panel manufacturer. In 1990, it purchased 25,000 ha of land for forest management. Until then it had been entirely dependent on other local suppliers for its wood raw materials. It is currently about 95% self-sufficient. Its annual turnover is R\$6 million, divided equally between the export and domestic market. The owner of the company began to see the need for certification during the late 1990s as he observed that European buyers were increasingly making this a condition of purchase.

The principal barriers to certification for Rohden are the practicalities of chain of custody certification given that for some species the company relies in part on outside suppliers. This would require segregation of the supplies from the company's own forests from that of third parties. The owner of the company regards this as impractical. He believes that the company's forest management practices are already close to the standards required by certification and so does not see this as a problem.

Source: May and Veiga Neto 2000

Recommendations to support the introduction of certification in Mato Grosso include:

- a) Simplification of the regulatory requirements and procedures for those companies that are certified. Given the many criticisms made about the bureaucratic requirements for approval of forest management plans and inventories, this could be a stimulus to the take-up of certification.
- b) Introduction of tax concessions or other incentives for certified companies. In particular, include "good forest management" and or certification in the eligibility criteria for tax concessions under the Promadeira scheme and not solely compliance with minimum standards. The tax concession should apply also to forest producers that do not have industrial processing facilities.
- c) Stimulate the development of courses to train technicians and forest operators in good forest management. These courses could draw on existing expertise in centres such as the Tropical Forest Foundation and IMAZON () in partnership with companies that are already certified such as Gethal and Precious Woods Amazon. Indeed participation in such training activity could be incorporated in the criteria for certification. In the State of Mato Grosso courses could be conducted in "frontier" areas with the involvement of the UFMT (Federal University of Mato Grosso) and using land of companies like Rohden and others that are looking favourably at certification.
- d) Support partnerships between forest producer associations and wood technology centres such as the Institute of Technological Research (IPT) and others in order to increase knowledge of the applications for lesser known species.

- e) Promote meetings between representatives of the Buyers Group and their principal suppliers in the state of Mato Grosso to emphasise the existing demand for certified timber and the potential risk of losing markets for those companies that are not certified.
- f) Disseminate a study underway by Friends of the Earth and its partners at IMAZON and Imaflora to trace the origin of wood purchased by companies in the South and South East of Brazil.

### 5.3.3 Carbon Sequestration

Even though the market for carbon will depend considerably on the resolutions adopted by the Federal Government and by the international agreements, it is important for the State of Mato Grosso to follow developments closely. The possibility of incorporating a forest dimension in the projects of the Clean Development Mechanism could bring substantial benefits to the State. This is because a considerable part of Mato Grosso's forest cover has been cleared while the rest is under permanent threat along the "deforestation arc" of the Amazon part of the State. The requirement for restoring forest cover in legal reserve and permanent protection areas which FEMA has made its priority enforcement objective, opens up substantial prospects of carbon credits which could finance reforestation in private land and/or catalyse funds for regional development funds based on agroforestry.

Some suggestions for policy and recommendations for the State Government aimed at promoting CDM projects include:

- a) Develop a list of the potential criteria and areas in the State most appropriate for CDM projects, particularly those related to the restoration of forest cover in legal reserve and permanent protection areas, notably river banks. The aim would be to ensure complementarity with the policy adopted by FEMA<sup>15</sup> and to contribute to conservation and sustainable use of biodiversity.
- b) Promote partnerships between rural producers who need to restore forest cover to their legal reserve areas, and foreign investors who can finance tree planting in exchange for carbon credits.
- c) Stimulate pilot sustainable development projects based on agroforestry and non-timber forest products.
- d) Develop actions related to reforestation and carbon in the rural settlement areas as a way of supporting economically viable forest activities. The settlements can formulate carbon sequestration projects to help finance subsequent community forestry activities.

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15. These activities should be conducted not with the aim of generating carbon credits but as complementary components of a reforestation project, following the example of the procedure adopted by the Peugeot/ONF project on Reforestation for Degraded Land Recuperation and Carbon Sequestration. Licensing of the project was made conditional on the restoration of 450 ha of Permanent Preservation Area (APA) which had been cleared for pasture by the previous owner.

- e) Participate in the Brazilian Climate Change Forum and lobby together with the Brazilian Government negotiators for the inclusion of forest projects in the CDM.

### 5.3.4 ICMS Ecologico and Private Nature Reserves

Both the ICMS ecologico and the Private Nature Reserves (RPPN) can play an important role in conserving biodiversity in the state of Mato Grosso, as they do in other states of Brazil.

One interesting option, involving the private sector, is for the municipalities to use part of the ICMS revenue to provide incentives for rural producers who need to comply with legal reserve requirements to reforest degraded lands. To do so, municipalities could apply part of the revenue accruing to them as a result of the existence of RPPNs. This could be both in areas of Amazon forest where 80% of a land holding is required to be kept as forest, and in areas in the South of the state that were originally savannah but that have been heavily deforested and converted to agricultural use.

However, it is important to take into account two key characteristics of the proposal in Mato Grosso for introduction of the ICMS Ecologico. Firstly, unlike the system in Paraná, the legal instrument in Mato Grosso does not make any provision for incorporating quality considerations in the calculation of the ICMS ecological index. This will restrict the power of the environmental agency in stimulating the creation of RPPNs.<sup>17</sup>

Secondly, the conservation factor assigned to RPPNs in the Mato Grosso proposal for the ICMS ecologico is only 0.2 whereas in Minas Gerais it is 0.9. This, combined with the large size of municipalities in Mato Grosso means that the amount of ICMS revenue generated per hectare of RPPN will be relatively small. As a result the ICMS Ecológico as currently operating in Mato Grosso is unlikely to stimulate efforts by municipal governments to convince private landowners they should create RPPNs.

It is also important to consider the creation of incentive mechanisms in addition to those in the federal legislation on RPPNs (ie land tax exemption). This type of protected area requires permanent protection and implies restrictions on sustainable use of natural resources. One option (contemplated in the original design of PRODEFLOA) is for an environmental label to be awarded by FEMA to producers who designate a larger area for permanent protection than that required by law. This would provide a way of differentiating and adding value to agricultural and forest products derived from this type of property.

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17. A recently completed ongoing study by researchers of the CPDA/UFRRJ in collaboration with the World Bank (Chomitz K 2000 Fiscal incentives for conservation in Brazil: a political economic analysis Chomitz K 2000. Fiscal incentives for conservation in Brazil: a political economic analysis May *et al.* 2002), comparing the local experience after the implementation of the ICMS Ecologico in Minas Gerais and ParanaParaná, suggests that the quality factor is one of the principal motivations for municipalities to assign a part of the funds derived from the ICMS ecologico Ecológico (which are not officially earmarked) to conservation and local sustainable development activities.

### 5.3.5 Watershed Management

*“From 2001, responsibility for water supply services in Juína will be transferred from the state authority SANEMAT, to the municipal government. In view of this change, we are worried about the future of the water sources of the city as no work has ever been done to raise awareness about the appropriate use of these resources.” Ságuas Moraes Sousa, Mayor of Juína*

As of 2001, the water supply and sanitation services in Mato Grosso will be decentralised to municipal level. According to Francisco Daltro, Secretary of Agriculture and Land Tenure Issues, there is a great need amongst municipalities in the State for watershed protection and rehabilitation. This applies particularly to Cuiabá and Várzea Grande and the municipalities in the South and Southeast of the State. It is therefore important to examine options such as a water tax to promote watershed protection. Interviews with the mayors of Juína (see above) and Campo Verde confirmed this interest in policy options for promoting watershed protection.

#### Recommendations

The State of Mato Grosso, represented by FEMA, the State Environment Agency, and in partnership with the water supply and sanitation services as well as the hydroelectric power companies need to start discussions with users. This would be with a view to forming a consortium to manage water resources and discuss policies for water use. It should be noted that The Nature Conservancy (TNC) is currently promoting international dialogue toward creation of a Cuiabá River Basin committee.<sup>18</sup>

It is therefore proposed that a workshop be organised in Cuiaba at which experiences in watershed management from other parts of Brazil could be presented and discussed. These could include Piracicaba (São Paulo), Jucú and Santa Maria (Espírito Santo) Paraiba do Sul (Rio de Janeiro and São Paulo) amongst others. This workshop would be the catalyst for similar initiatives in municipalities of Mato Grosso State.

In addition, preliminary studies could be promoted in sub-basins of the River Cuiaba which was mentioned by workshop participants as being by far the most critical and visible river of the state. These studies could examine the relationship between forests and water and identify investments and measures necessary to address adverse effects of certain land uses on water quality and availability. These studies could take advantage of the findings on these themes

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18. The Nature Conservancy and the state of Mato Grosso, Brazil, have agreed to exchange information about the Illinois and Cuiabá rivers. These large-floodplain rivers — tributaries of the Mississippi and Pantanal, respectively — share ecological and economic similarities. Both are affected by intensive agricultural development. “Learning will flow in two directions,” said Michael Reuter, associate director of the Conservancy’s Illinois Chapter. The Cuiabá teaches us how a large-floodplain river system functions in its natural state, while the Illinois and Mississippi offer lessons about restoration and the costs of overdevelopment. September 2001 ([www.nature.org](http://www.nature.org))

(vegetation cover and hydrological flows) in the context of the Paraguai River basin for the Pantanal project which is currently in its implementation phase.

### 5.3.6 General Priorities for Mato Grosso

*“The key is to reduce the bureaucracy involved in sustainable forest management. SFM is still so bureaucratic that it is quicker to obtain approval for forest clearance. In my opinion, the authorities are stimulating deforestation in this way. For example, what is the point of drawing up a forest management plan for 100% of an area, if IBAMA allows harvesting in half or less than half of the area?”*

Gilberto Siebert, Mayor of Cotriguaçu in North West Mato Grosso, owner of AMAZON WOODS - Import and Export Ltd.

Operation of the market-based instruments discussed above will not be effective unless some broader issues are addressed. Government enforcement approaches have to become simpler but also more effective, while the industry has to become more professional and upgrade its technical capacity. Specific recommendations include:

- More effective inspection of timber companies that operate illegally. With the transfer of responsibility for inspection from the Federal agency (IBAMA) to the State agency (FEMA) these activities will perhaps be more effectively carried out. This will reduce the competition from illegal logging which currently constitutes the principal disincentive for companies to operate on a legal basis. This applies particularly for those companies that supply the domestic market.
- Creation of public production forests in areas of unclaimed land in the state of Mato Grosso, with the supervision of FEMA. In addition, consideration should be given to the option of partnership between agricultural producers and forest producers in the legal reserve areas of their farms.

The timber industry with the help of the public sector should examine the following options:

- Establish a regional Wood Technology Centre
- Assign resources and establish partnerships for applied forest research
- Strengthen capacity building programmes together with government departments, industry training and technical assistance services such as SEBRAE and SENAI, Universities and NGOs.
- Increase its knowledge of markets (internal and external) which are interested in native wood species from the Amazon region.
- Set up credit mechanisms appropriate to the needs of the sector, for machinery and equipment for harvesting and processing as well as for forest management projects.



# 6. Conclusion

The time is ripe for policy changes to encourage sound forestry practices. However, there is a need for in depth analysis of key forestry issues to inform policy debate, dialogue and reform. A key issue is the need to deal with the private sector. Contrary to many other tropical countries, most Brazilian forest production is private and is conducted on private lands. The challenge for public policy is to encourage private sector engagement in sound forestry practices.

Historically, public policy has not promoted private sector involvement in SFM but rather has encouraged the expansion of the agricultural frontier at the expense of forest cover. This is reflected in the lack of financial and non-financial incentives for forestry and the simpler procedures for authorizing forest clearance. Only rarely has public policy succeeded in increasing the value of forests to rural producers and industry. The high levels of deforestation of the Atlantic Forest are evidence of this. The same policy approaches have been transferred to the Amazon and are yielding similar results.

The biggest challenge for both the private sector and government is to change the paradigm underlying public policy and private investment in forest regions. Instead of being regarded as obstacles for development, forests should be seen as opportunities. At the same time public concern about deforestation, predatory logging and watershed degradation needs to be diverted from diagnosis towards problem solving actions. The private sector is a key element in providing such practical solutions.

However, there is wide variation in the intensity of land use and the socioeconomic and environmental characteristics of different states of the Amazon. The heterogeneous character of the Amazon calls for a high degree of sub-regional specificity in designing forest policies for the region. For this reason separate consideration is given to implementation of these instruments in Mato Grosso state.

Some key priorities for the region as a whole can be identified:

- **Facing the land tenure problem.** National (FLONAS), state and municipal production forests and extractive reserves (or equivalents) need to be expanded. In the case of production forests, there is a recent study identifying the most appropriate areas for new protected forests. Public control of large



areas creates new challenges for government as Brazil does not have much experience of forest concession policies and as governmental structures to control the forest sector are weak. In the case of extractive reserves, the need to merge timber production with existing extractivist and subsistence activities poses technical and governance challenges.

- **Increasing security and reducing risks.** Land reform as a way to reduce the risk of invasions needs to be expanded. Special policies need to be put in place to discourage invasions of managed forests. Forest fires need to be prevented and effectively controlled. There is a need to broaden positive experiences of environmental education and fire prevention such as the “Fire Protocol” partnerships (Smeraldi *et al* 2000). There is also a need to strengthen the operational capacity of forest fire control.

There are some new market and policy instruments that have yielded positive incentives to private sector forestry but which can still be improved in relation to their effectiveness and scope.

## Certification

Certification has expanded rapidly in Brazil and has become a major catalyst of change in forest management. With the formation of a buyers group it appears that demand for certified timber is outstripping supply. Moreover, the major part of certified forests in Brazil are concentrated on plantations. There is an urgent need to expand the area of certified forest, particularly in natural forests in the Amazon. The greatest barrier for producers to achieve certification is to demonstrate compliance with all relevant legislation on forest management, labour and health and safety as this is a prerequisite for certification. The additional requirements of certification over and above the legislation are relatively minor.

Measures to support certification and encourage its expansion include:

- Efforts to enforce legislation with respect to clandestine timber harvesting need to be improved so as to increase the costs of illegal harvesting. This could draw on the experience of field auditing systems developed for forest certification. Another means to improve the quality of enforcement would be for IBAMA to offer accreditation to independent technical organizations, such as professional forest engineering associations.
- Streamlining of requirements (evaluation of inventories, harvesting plans, etc.) for those already certified would represent a considerable stimulus to the entry of new enterprises in the certification process. This would reduce the costs of legality.
- Creating government credit schemes for forest management enterprises, incorporating approved forest management or certification as prerequisites for access to credit. Such efforts should also encourage the creation of credit lines by the private banking sector.



Fotografía: Instituto Pró-Natura

**Forests provide important environmental services, contributing, for example, to landscape beauty.**

- Create public production forests in unclaimed lands to reduce the need for purchase of new areas. Another option could involve the establishment of partnerships between rural landowners and forest enterprises to utilize legal reserve areas for managed timber harvesting.
- Motivate research on utilization of new timber species and sustainable management techniques, through partnerships between associations of forest enterprises and centers of wood products technology and forest research.
- Creation of a network involving all actors in the tropical timber chain to enhance technical development and policy action.

## **Watershed Protection**

The innovative approach adopted for the Piracicaba watershed shows how market mechanisms for the environmental services of forests can be developed. This is only a beginning and more needs to be done eg to pay farmers for the opportunity costs of the land used for forest restoration. This is relevant to the Amazon region as many river courses there have been highly deforested. The major priority for implementing such an instrument is in watersheds in the Amazon with high water consumption and high turbidity and consequently high costs of water treatment.

The first step for the implementation of the water tax instrument should be the preparation of a Master Plan for the Restoration and Conservation of Watershed Forest Cover. This Plan should identify priority areas for forest

restoration and conservation as well as other environmental measures (e.g. soil conservation in pasture). These areas should be characterized according to land use and the socioeconomic profile of the landholders. This should form the basis for strategic action targeted at various producers' groups, taking into account the current state of their forests, the costs of forest activity etc.

This should be accompanied by:

- Awareness-raising amongst decision-makers on the role that forest play in water supply (especially in the area of sanitation),
- Creation of an appropriate legal framework, including the constitution of an intermunicipal consortium, committee or watershed agency,
- Legislation authorizing municipalities to make investments in areas outside their boundaries.

### **Partnerships between Communities and Private Companies**

Traditionally, the interactions between communities and the private sector in forest regions have been characterized by exploitative trading relationships and unsustainable patterns of resource exploitation. But there are some examples of arrangement that involve genuine partnerships where incentives are created for sustainable forest management and communities derive benefits. Land and resource tenure are key determinants of the situation as shown by various examples in the Atlantic Forest where communities have little bargaining power. In turn the ability to secure such rights depend on the extent to which communities are empowered through social organization and alliances with social movements.



Local communities are often facing the challenge of implementing good forest management systems to replace unsustainable production systems. Adding the further complexity and risk of establishing capital and technology intensive processing industries may not be the best strategy for most forest communities. In many cases establishing appropriate partnerships with private companies may provide the basis for community development. But if power relations are not balanced it is quite unlikely that sound partnerships will be established and sustained. It is fundamental to create the necessary institutional and political conditions to avoid deals that are not conducive to sustainable development. Technical assistance and advice to communities on negotiating long-term contracts will be crucial.

### **Fiscal Incentives for Reforestation by Small Producers**

The likely scarcity of wood in the future makes it essential to introduce policy instruments to promote reforestation. The tax incentive model used in the past to promote reforestation on the part of private companies is no longer appropriate because of its high cost and the problems that occurred in implementation. Programmes to promote reforestation amongst small and medium farmers operated at state level could be a viable alternative provided certain modifications are made to the existing schemes.

The programmes in Minas Gerais and Paraná have achieved better results in terms of area reforested than the reforestation association approach used in São Paulo. But to some extent, this reflects differences in financial resources as in both Minas Gerais and Paraná, the revenue from the reforestation tax has been supplemented by other state funds. The experience of the reforestation associations in São Paulo shows that it is possible to involve civil society organizations in the restoration of the productive forest base but this should not be the only approach used by a state government to promote reforestation.

The state programmes in Minas Gerais and Paraná have been effective in expanding the area reforested in small and medium landholdings for both productive and conservation purposes. What is needed is more support to small producers after the planting stage, particularly in relation to marketing. This implies the need for greater coordination with the companies that consume wood to understand their needs. There is also a need to give more attention to reforestation with native species.

### **Carbon Sequestration**

One of the principal opportunities for financing private sector forest management activities that has emerged recently is the Clean Development Mechanism (CDM). The ability to market carbon credits from forestry projects will help to improve their financial viability and so address one of the principal obstacles to the development of the forest sector, that of low rates of return. Pilot carbon sequestration projects that are already underway in Brazil are demonstrating how issues of demonstrating additionality and contributing to sustainable development at a local level can be tackled in practice.



The ongoing experiences provide important practical and conceptual opportunities to substantiate the debate over national and international policies on the subject. It is also necessary to consider carbon sequestration in the wider context of environmental services. In particular, attention should be given to restoration of river bank forests, combining both watershed protection and carbon sequestration services.

### **Fiscal Incentives for Conservation at the Local Level**

The ecological value added tax (ICMS Ecológico) is a concrete case of a public policy instrument that is changing the paradigm of development. Municipalities in states where the ICMS Ecológico has been introduced, now see forests as an opportunity to increase their budget and no longer as an obstacle to agricultural development. This has also prompted a new attitude on the part of the private sector, leading to a substantial increase in the area of private nature reserves (RPPNs).

Provided that care is taken to address not only the size of the area that is protected but also the quality of management, there is considerable potential to introduce this instrument in other states.

## 6.1 Practical Application at the State Level – Mato Grosso

The forest sector is a key industry in Mato Grosso but its future is threatened by the unsustainable pattern of timber harvesting and lack of investment in reforestation activities. The State Government has introduced some innovative programmes and policy instruments (eg: Promadeira and Prodeflora) to promote sustainable forest management. Nevertheless further action is needed to support these approaches and ensure that they are used to their full potential.

Certification has proceeded slowly in Mato Grosso, with only one company, a teak plantation company, certified so far. While most companies are aware of certification, its performance requirements are not accessible to the majority. In order to support the expansion of certification in the state, the following actions should be considered:

- Simplification of the regulatory requirements and procedures for those companies that are certified.
- Introduction of tax concessions or other incentives for certified companies. In particular, include “good forest management” and or certification in the eligibility criteria for tax concessions under Promadeira and extend the scheme to include forest producers that do not have industrial processing facilities.
- Stimulate the development of courses to train technicians and forest operators in good forest management. These courses could draw on existing expertise in centres such as IMAZON (Institute of Man and Environment of Amazonia) in partnership with companies that are already certified such as Gethal and Precious Wood Amazon.
- Support partnerships between forest producer associations and wood technology centres such as the Institute of Technological Research (IPT) and others in order to increase knowledge of the applications for lesser known species.
- Promote meetings between representatives of the Buyers Group and their principal suppliers in the state of Mato Grosso to emphasise the existing demand for certified timber and the potential risk of losing markets for those companies that are not certified.

### **Incentives for Reforestation**

While the state already has a number of instruments to promote reforestation, more attention needs to be given to the needs of small producers. Options to consider include:

- Strengthening of partnerships with communities that live close to forest operations, through identification of income-generating opportunities associated with timber harvesting
- Greater attention on the part of extension agencies to the technical assistance needs of small producers.

### **Carbon Sequestration**

Mato Grosso has considerable potential to benefit from CDM projects, particularly from restoration of forests in the legal reserve areas. Important actions for the State Government to take include:

- Develop a list of the areas in the State most appropriate for CDM projects, particularly those related to the restoration of forest cover in legal reserve areas and permanent protection areas, notably river banks.
- Promote partnerships between rural producers who need to restore forest cover to their legal reserve areas, and foreign investors who can finance tree planting in exchange for carbon credits.
- Stimulate pilot sustainable development projects based on agroforestry and non-timber forest products or community forestry.
- Participate in the Brazil Climate Change Forum and lobby together with the Brazilian Government negotiators for the inclusion of forest projects in the CDM.



### **ICMS Ecológico and Private Nature Reserves**

Both the ICMS Ecológico and the Private Nature Reserves (RPPN) can play an important role in conserving biodiversity in the state of Mato Grosso. The ICMS Ecológico began to be implemented in 2001 in Mato Grosso but unlike in other states, there is no provision for the incorporation of quality considerations. In addition, the conservation factor assigned to private nature reserves is relatively low. For this reason, the ICMS Ecológico in its current form is unlikely to have much impact on the creation of private nature reserves. Other types of incentive mechanism are needed to encourage private sector participation in the designation of protection forests.

### **Watershed Management**

Watershed protection is recognized by both municipalities and state government to be a priority. There is a need to examine options such as a water tax to promote watershed protection. It is recommended that:

- A workshop be organized in Cuiaba to discuss experiences in watershed management from other parts of Brazil
- Preliminary studies should be conducted in the River Cuiaba watershed to examine the relationship between forests and water, taking advantage of a

program of international cooperation sponsored by The Nature Conservatory (TNC) between Cuiabá River communities and those in the Illinois River basin, USA.