

Country Case Study 5

Giants Don't Leap: Verification in Brazil's Process towards Sustainable Forestry

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Summary

This case study illustrates the importance of political commitment and coordination at the highest level of government in tackling the causes of illegality in the forest sector in a country as large and complex as Brazil. The paper touches on some of the issues which restrict sustainable timber production, such as land use change and forest land tenure, but also discusses the impact that changes in the legal framework, in particular the introduction of the Law on Management of Public Forests, may have on the forest sector. The paper describes the currently ongoing creation of a decentralised forest administration and verification system under the coordination of a national forest authority.

LESSONS LEARNED

- A trans-sectoral approach to forest policy issues, political leverage at the highest level of decision making and strong individual leadership are critical elements for successful formulation and implementation of programmes to combat illegality in the forest sector.
- Broad participatory processes that include 'non forest actors' often result in pragmatic approaches to forest and conservation issues, that focus on 'the possible' rather than 'the ideal' from the perspective of environmentalists and foresters.
- Perhaps obvious, but nevertheless frequently overlooked, is the fact that possibilities for the forest sector to operate legally are often limited by confusing land tenure conditions. A first step to allow the forest sector to operate legally is to provide a transparent legal framework for land ownership.
- A decentralised (state or province) forest administration and verification system needs to be linked to a comprehensive information system that allows verification and audit by national and federal forest authorities.
- Public access to information about illegal logging reduces opportunities for corruption.
- An efficient forest management and verification system clearly defines the responsibilities of the forest professionals involved and addresses needs for specific capacity-building and training.

1. Introduction

1.1 Forests and forest production

Brazil is a country the size of a continent (8.5 million km²). It does not have a national forest inventory, which probably explains why estimates of total forest cover vary widely. While FAO estimated, in 2000, that Brazil had 5.4 million km² of forest, other estimates are more conservative. For example, Delepinasse and Bonse,

2002, put the area of Brazil's Forests at 3.5 million km². The recently published Forest Resources Assessment (FAO, 2005) estimated that the total area of planted and native forest is 4.7 million km².

Although the Amazon Rain Forest is the focus of most international attention, the country has six different biomes, four of which contain important forest resources. Apart from the Amazon Rain Forest, there is the Cerrado, the second largest biome in Brazil, which



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spreads over 2 million km² of the Central Brazilian Plateau. It consists mainly of woodland, savanna and dry forest. The Caatinga is a semi-arid scrub forest which stretches over almost 1 million km² (Conselho Nacional da Reserva da Biosfera da Caatinga, 2004) in the Northeast of Brazil. The Atlantic Rain Forest originally covered around 15% of Brazil. Estimates are that only 7 to 8% of the original forest is left, scattered over isolated spots (Fundação SOS Mata Atlântica et al., 1998). Finally, the Amazon, in the North, covers almost 5 million km², or almost 60% of the whole country.

Only 1% (Santos and Câmara, 2002) to 1.5% (Delepinasse and Bonse, 2002) of the total forest cover consists of planted forest (mainly pine and eucalyptus), concentrated mostly in the South of the country. Compared with the area of native forests, planted forests may seem insignificant. However, with an area of almost 480,000 km² (Delepinasse and Bonse, 2002), they are the main source of raw material for the cellulose and paper industry.

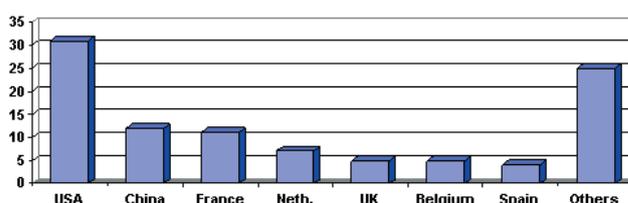
In 2000, the forest industry produced around 2% (US\$12 billion) of the total Gross National Product (US\$596 billion), of which US\$ 5.5 billion was produced by the timber industry and 6.5 by the paper and cellulose industry (ABIMCI, 2001). In terms of volumes, Brazil extracted 47 million m³ of fuel wood and 20 million m³ of timber from native forests, in 2003. From planted forests the volumes were 40 million m³ of fuel wood and 100 million m³ of timber, half of which was destined for the paper and cellulose industry and half for other purposes (IBGE, 2003).

While in 1975 over half of the log production took place in the south of the country (World Bank, 1992), today more than 85% of the total production from native forests comes from the Amazon, in particular from the States of Pará, Mato Grosso and Rondônia (Smeraldi and Veríssimo, 1999). The forestry sector produces around 8% of the GNP of the region. During 2004, the sector employed 380,000 people in the Amazon: 214,000 directly and 255,000 indirectly. This represents almost 3% of the total active population in the region (Lentini, et al., 2005). In the same year, over 3,000 logging companies were counted in the Amazon (up from 2,500 in 1998 (Lentini et al., 2005)), the

majority of which were saw mills (92%), while the remainder consisted of laminated wood companies and plywood factories.

Owing to government export promotion measures and increased competitiveness, the exported volume of processed timber increased by 450% between 1990 and 2002, from around 330,000 m³ to 1.5 million m³ (Smeraldi, 2004). Between 2002 and 2004 export showed another leap to 3.7 million m³. According to Lentini et al., this growth is due to a combination of increased demand from the European, American and Asian market and a favourable exchange rate (Lentini, 2005, p.66). The value of exported timber from the Amazon increased between 1998 and 2004 from US\$ 381 million to US\$ 943 million. As Graph 1 shows, the main markets are the USA, China and France (Lentini, 2005). On the domestic market, the State of São Paulo is by far the main consumer, absorbing 15% of the total production (down from 20% in 1998). Most of this (80%) is used in construction (Sobral et al., 2002).

Graph 1: Destination of exports (in % of total value)



Source: MDIC in Lentini 2005

In the Amazon, timber is legally produced either on the basis of authorisation from IBAMA (the federal environment agency, *Instituto Brasileiro do Meio Ambiente e dos Recursos Renováveis*) or one of the state environment agencies to deforest up to 20% of any given property, or through sustainable forest management plans (PMFS), assessed and approved by IBAMA. Table 1 gives an indication of the volumes (in cubic metres) authorised in the years 2000, 2001, 2003 and 2004, as well as the number of management plans approved, the aggregate area covered by management plans and the

Table 1: Authorised timber production from natural forests, 2000 – 2004

	2000	2001	2003	2004
Volume from authorisations to clear (in million m ³)	5.3	5.6	2.8	4.7
Number of Management Plans approved	389	549		
Total area covered by Management Plans (ha) ¹	185.000	340.000	316.000	342.000
Volume (in million m ³) from Management Plans	4.1	9.4	8.2	9.4
Total volume (in million m ³)	9.4	15	11	14.1

Source, Lentini, et al. 2005
¹ Size of annual harvest plans

Table 2: Areas certified by FSC by type of business

Type of Business	Certified area (in 1000 ha)	% of Total certified forests in Brazil	Number of businesses
Amazon			
Private Companies	1216.7	40	12
Community management	31.5	1	7
Planted Forests	440.1	14	3
Subtotal Amazon	1688.3	55	22
Outside the Amazon			
Planted Forest	1355.3	45	30
Total Certified Forest	3043.6	100%	52

Source: FSC in Lentini, 2005

volume authorised to extract. The figures in this table do not include the authorisations from all state environment agencies. But even if they did it is unlikely that they would add up to the estimated 24 million m³ (Lentini, 2005) consumed by the industry in the Amazon alone. In other words, much more is being consumed than is produced in a legal manner. Estimates of illegal logging differ, but it seems safe to put it at around 80% of the total timber production in the Amazon (SAE, in Barretto, et al., 2001). The Inter-ministerial Working Group for the Reduction of Deforestation in the Amazon (GPTIRID) put this figure even higher, at around 90% (GPTIRID, 2004).

Recent data available from a high resolution remote-sensing analysis of selective logging in the five main logging States in the Brazilian Amazon shows that the selectively logged area in the year 2001 was 1.2 million square kilometers (Asner et al., 2005), while the area covered by management plans shown in Table 1 for that year was only around 28 % of that figure.

Certified production is still relatively small. Today there are some 20 certified logging operations, including seven community forestry initiatives and two certified planted forests (see Table 2). Together, these certified forests occupy 1.7 million hectares in the Amazon (up from 540,000 ha., in 2003 [FSC in Lentini, 2005]).

Community forestry was formally approved in 1998. In 2005, there existed some 80 community initiatives in the States of Acre, Amazonas, Pará and Rondônia. On average these initiatives harvest one cubic metre per hectare per year. The total area covered by the management plans of these 80 initiatives was 340,000 hectares (Lentini, 2005).

Apart from its macroeconomic role, the forest also provides the basis for the livelihoods of over 170 different indigenous peoples (with a total population of around 300,000), descendants of migrants from earlier economic cycles, in particular the rubber boom at the end of the 19th century and beginning of the 20th century, and other communities who have adapted their livelihood strategies to the forest. Several of these peoples live in protected areas.

A little over 8% of Brazil consists of protected areas (2.6% indirect use¹, IUCN category I-IV and 5.5% direct use, IUCN category VI). Adding to

that the indigenous lands (11.6%), almost 20% of Brazilian territory is protected area. In the Amazon, 33% are public protected areas, 10% are 'special areas' (military lands, rural settlements), a third of the lands are unsettled² and a fourth are privately owned (Lentini et al., 2005, p.33). Most protected areas are managed by the Federal Government, more specifically by IBAMA. Recently, however, States and municipalities have also created protected areas, managed respectively by state environment agencies and, where they exist, municipal agencies. In addition, there exist over 400 private protected areas (RPPN) with a total area of 400,000 ha (IBAMA, 2005a), managed by their private owners often with support from the Federal Government. Indigenous lands are managed by the agency for Indian affairs, FUNAI.

1.2 Forests without forestry

Recent government policies to develop Amazonia have had a profound impact on the logging industry in the region. These policies are usually seen as divided into three phases. The first phase started with the implementation, in 1966, of Operation Amazon, which aimed at promoting occupation, attracting investment and stimulating development of the region. During this period the Superintendency for the Development of the Amazon (SUDAM) was created and subsidies and tax exemption measures for investors in agriculture, livestock, industry, tourism and other activities were introduced. This policy also supported the creation of development poles, such as the free trade zone in Manaus (Hall, 1991).

In the second phase, which started with the adoption of the National Integration Program in 1970, the focus shifted to integrating the Amazon region with the rest of Brazil. This programme continued to subsidise cattle-ranching, but was further characterised by the planning and implementation of major infrastructure development programmes (Transamazônica highway, the Perimeter North, the Cuiabá-Santarém road, the Manaus-Boa Vista road and the Cuiabá-Porto Velho road) and directed colonisation of small farmers. As part of an attempt to promote the integration of the Amazon and lessen social problems elsewhere,

settlement of small farmers from the South and North-east was actively promoted by the National Institute for Colonisation and Agrarian Reform (INCRA) under the slogan of 'land without men for men without land' (Ribeiro, 1992).

The idea was to create a system of agrovillas (consisting of 45 to 60 families and basic services); agropolis (consisting of 22 agrovillas in a radius of 50 km); and ruropolis (an urban centre with industrial and commercial activity) along the Transamazônia highway. Owing to low soil fertility, the lack of extension services and technical support and logistical difficulties with respect to storing and transporting agricultural produce, these colonisation projects were a failure (Ribeiro, 1992).

Partly because of the failure of colonisation, this policy was replaced in 1974 with the *Polamazonia Program*. This Program 'based the future developments of Amazonia on extending transport and communications, on expanding export oriented activities such as beef, timber and minerals and on the geographical concentration of investments in specific areas of the region' (Hall, 1991, p.20). One of the initiatives supported under this policy was the development of the Carajás iron ore mining programme, which also included large infrastructure works such as construction of the Tucuruí dam, the Carajas-São Luís railway, and the Barcarena port near São Luis. During this phase, the role of private enterprise, in particular cattle ranching and agribusiness, was re-emphasised. This policy continued during most of the eighties.

Policies during the nineties show a much more diffuse picture. On the one hand, policies to integrate the region in the national economy continued. The 1999-2003 *Avança Brasil* planning programme, for example, included a number of infrastructure developments, such as paving of the road BR 163 from Cuiabá to Santarém, construction of hydro-electric power plants, continued support for agro-industry, timber and mining. On the other hand, with support from social movements and donors, concern for preservation and sustainable development has become a counterbalance to the economic development policies.

The main impact of the policies described above was that they considerably improved access to forest resources

in the Amazon. Infrastructure development, such as the Trans Amazônia Highway, the Highway Brasília-Belém and the Highway Cuiabá-Porto Velho opened up large regions of the forest. The Inter-ministerial Working Group for the Reduction of Deforestation in the Amazon (GPTIRID) estimated that three-quarters of all deforestation between 1978 and 1994 occurred in an area of 50 km on either side of major roads (GPTIRID, 2004). Once a road opened up a region, selective logging continued and intensified that process. A study by Imazon (a not-for-profit research institute that aims to promote the sustainable development of the Amazon) of a little over a quarter of the Legal Amazon found 95,000 kilometers of clandestine roads (Lentini, 2005), which were largely built by logging companies in order to gain access to the forest. Table 3 shows the deforestation rates during 1978 - 2003.

A second impact of these policies is that they created a strong relationship between cattle ranchers, agro-industry, small farmers and the forest industry. As a result of the incentives for cattle ranching, the Amazon now houses almost a third of all cattle in Brazil (Alencar et al., 2004). Although in more recent years subsidies and other incentives have dwindled, cattle ranching in the Amazon continues to grow because investments in cattle carry low risks and have become profitable even without subsidies – thanks to technological improvements and increased domestic and international demand. The rate of return per hectare of cattle ranching in the Amazon is even higher than in São Paulo State (Magulis, 2004).

Large and intermediate cattle farmers are responsible for 70 to 80% (Alencar, 2004; GPTIRID, 2004) of total deforestation in the Amazon and have provided the forest sector with a steady supply of timber. The same is true for the 750,000 small farmers – usually with a area of up to 100 hectares³ – in the region. Although they are responsible for only some 18% of the total deforestation (Alencar et al., p31) and clear on average only about one to three hectares annually for small scale agriculture, they have been important for the forest sector through fuelling the agricultural frontier and the opening up of new areas.

In recent years, the expansion of soy bean cultivation has become another important factor in the

Table 3. Mean rate gross deforestation (km²/year) from 1978 to 2003

Amazon states	77/88 *	88/89	89/90	90/91	91/92	92/94 **	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03
Acrez	620	540	550	380	400	482	1208	433	358	536	441	547	419	727	549
Amapa	60	130	250	410	36		9		18	30			7		4
Amazonas	1510	1180	520	980	799	370	2114	1023	589	670	720	612	634	1016	797
Maranhao	2450	1420	1100	670	1135	372	1745	1061	409	1012	1230	1065	958	1330	766
Mato Grosso	5140	5960	4020	2840	4674	6220	10391	6543	5271	6466	6963	6369	7703	7578	10416
Para	6990	5750	4890	3780	3787	4284	7845	6135	4139	5829	5111	6671	5237	8697	7293
Rondonia	2340	1430	1670	1110	2265	2595	4730	2432	1986	2041	2358	2465	2673	3605	3463
Roraima	290	630	150	420	281	240	220	214	184	223	220	253	345	54	326
Tocantins	1650	730	580	440	409	333	797	320	273	576	216	244	189	259	136
Amazon	21050	17770	13730	11030	13786	14896	29059	18161	13227	17383	17259	18226	18165	23266	23750

Source: INPE, 2004 (http://www.obt.inpe.br/prodes/prodes_1988_2003.htm)

deforestation of the Amazon. Some studies (e.g. Alencar et al., 2004; Brandão et al., 2005) have argued that soy bean cultivation has predominantly made use of already cleared forest and has, therefore, had limited impact. Even if these conclusions are correct, there is little doubt that the indirect impacts are huge, pushing the frontier further ahead and opening up the forest through the construction of necessary transport infrastructure.

At first sight, the relationship between farmers and loggers may seem a paradox. After all, they compete for the same resources. However, two closely interrelated conditions help to explain the collusion. The first is that legal logging requires a legal title over the land. Registration of rural property in Brazil is, however, very precarious. This is in part a legacy from the past, and in part because there is no central register, or a system that effectively links data from municipal, state and federal land agencies. Control over notary offices (privately run, independent legal offices to which the registration of land titles is delegated by the state) is usually weak and several titles frequently exist for the same area. In this situation land title fraud has been rampant (see also Box 2). In 1999 the federal government began an investigation into fraudulent land titles and discovered that 100 million hectares had questionable documentation. INCRA cancelled land titles of over 70 million hectares, a third of which were located in Pará, involving 422 farms. In this situation it has been far easier for the logging sector to use the abundant resources from clear-cutting of the forest by farmers than to manage the forest.

The other condition is the conflict over land created by the contradictory nature of the development policies for the Amazon. 'Although land-hungry migrants from the North-East and South have been encouraged to colonise the tropical rainforest with, amongst other objectives, the aim of easing social conflicts in their regions of origin, the official support necessary to guarantee a stable existence in Amazonia has been denied them by the State which has, for a variety of reasons, concentrated its efforts on assisting commercial and speculative capital investments' (Hall, 1991, p.78). On the one hand, this created conflicts and escalating rural violence. According to Hall, some 1500 people died between 1964 and 1986 (Hall, 1991, p.81). The *Comissão Pastoral da Terra*, a church-based organisation, counted 350 conflicts over land property in the Amazon in 2003, involving over 70,000 families and almost 3 million ha of land. (CPT, 2003a) In the same year, they also registered 56 murders related to conflicts over land in the Amazon. (CPT, 2003b). On the other hand, this has fuelled the expansion of the frontier. Although INCRA does not actively resettle landless people in forest areas any more, they still regularise and legalise 'spontaneous' settlements which sometimes develop with the active support of local governments or land agencies. It is easy to find anecdotal evidence about landless people who are invited to settle at a new frontier, open up a part of the forest and apply for regularisation by INCRA which will entitle them to subsidies and credit. Fearnside even speaks of an 'industry of invasion' under which migrants receive land from INCRA, sell it and get land again in

other INCRA settlements, registering under the name of a spouse or child (Fearnside, 2001). Under threat from invasions by landless people and expropriation of their lands by INCRA, landowners sometimes feel obliged to clear the forest in order to prove that their farm is productive. The opposite also happens, as heavily indebted ranch owners invite squatter organisations to invade their lands in order to obtain generous expropriation fees from INCRA. In any case, these processes usually ensure that logging companies have access – often legal – to timber.

Although the conflict is over land, at the heart of it lies a highly unequal distribution of land and an agricultural policy that favours modern, capital-intensive agro-business and cattle ranching over small-scale family-based agriculture. During most of the almost five decades of policies for the development and integration of the Amazon, forest management and logging was largely ignored. One isolated instrument designed to regulate forest management was the Forest Code, which has been in force since 1965. Although it was an important milestone, it took almost 30 years to work out its ruling and complementary regulations on management and reforestation. The Forest Code has, therefore, been more an instrument for environmental management and control than one which has helped shape the sector into a sustainable and respected partner in the development of the region.

2. The reform process

2.1 Main concerns and driving forces: from pilot to mainstream

Different concerns and sectoral interests seem to have come together in a coalition of driving forces that may be able to influence the current situation in the Amazon. One of these forces has been the Pilot Program to Conserve Brazilian Rain Forests (PPG7). This is a US\$400 million programme financed by the G7 member countries, the European Community and the Netherlands. It is partly funded through a Trust Fund managed by the World Bank, partly through bilateral financial and technical support. Its main objectives are to support protection and promote sustainable development of the Amazon. It is divided into four main components – Natural Resource Policies, Conservation and Protection, Science and Technology and Demonstration Projects – and some 20 different projects. One of the projects most relevant in the current context is the Forest Resources Management Program (FRMP-PROMANEJO). Its main objective is to support the development and adoption of sustainable forest management in the Amazon and it includes an evaluation of the current forest control/verification system and the development of a new system. Although the Pilot Program provided financial and technical support to this project, it should be stressed that it was to a large extent driven by the Brazilian Government, in particular by IBAMA's current head of the forest department, in collaboration with civil society and the private sector.

Lessons from the PPG7, in particular those regarding the relations between conservation, development and governance, were important building blocks in the preparation of a sustainable development framework (*Plano Amazônia Sustentável*). This was published in 2004 under the co-ordination of an inter-Ministerial Commission and with ample inputs from civil society. This framework divides the Amazon into three regions: the already largely deforested eastern and southern belt, the central Amazon, and the western, largely untouched sub-region, and identifies different policies for each of these regions. The same lessons also served as a basis for the preparation of a development plan for the region affected by the surfacing of the Cuiabá – Santarém road (BR 163), which was co-ordinated by another inter-ministerial working group, created in 2004.

The alarming deforestation rates in 2002/2003 led to the creation, in 2003, of the aforementioned Permanent Inter-ministerial Working Group to Reduce Deforestation in Amazonia. The group consists of representatives of several line ministries⁴ with an interest in the Amazon and whose policies with respect to the region may have – and have had – a profound impact on its development. In 2004, the Working Group published its Plan of Action, giving support to monitoring and control, land-use planning, sustainable economic development and adequate infrastructure.

Concerns about deforestation, as well as about the position of Brazil as one of the main producers of timber and wood products, particularly in the context of the gradual depletion of stocks in other parts of the world, led to the creation of the National Forest Program (NFP). This Programme was launched officially in 1998 (Decree 2.473) and reinforced with Decree No. 3.420 on April 20th, 2000. The programme was the result of a broad participatory process in which more than 600 organisations from different segments of society were involved, aiming to promote the sustainable development and conservation of the forests in line with other public policies (Aragón, 2004). The NFP is a comprehensive programme to foster the sustainable development of Brazil's forest sector which aims to reach 9 objectives, of which the most relevant for this analysis are the following:

- a) encourage sustainable use of native and planted forests on private and public lands;
- b) support economic and social activities of the populations who live in forests;
- c) suppress illegal deforestation and predatory exploitation of forest products and sub-products;
- d) expand internal and external markets of forest products and byproducts;
- e) add more value to environmental, social and economic goods and services produced by public and private forests.

In this context, the Inter-institutional Commission to Coordinate the National Forest Program (CONAFLO, Decree No. 4.864) was created in 2003, with the purpose to propose and assess measures needed to implement the policies of the NFP. CONAFLO is composed of 37 institutions belonging to different sectors⁵.

With this institutional backing and with strong political support at the highest level of government,

a group of 10 ministries under the leadership of the Ministry of Environment is implementing a results-driven working plan of the NFP for the years 2004-2007. The programme aims to double reforested areas in order to ensure timber supply for the industry and lessen the pressure on natural forests, to promote SFM through capacity building and to reduce deforestation. One pivotal element of the programme is regularisation of public forest land. The first product of this is the recently approved Law on Public Forest Management. This law may have far-reaching implications, and is discussed below.

Although these initiatives were fuelled by different sectoral concerns and interests, they all seem to contribute to changing the disorganised development of the Amazon into a more effective, sustainable and just process. In this web of different interests, concerns and approaches, the National Forest Program seems to occupy a central role, partly because of the dynamic leadership of its director, but also because it has established strong links with the private sector and segments of the Government that seldom take an interest in the discussion on conservation and the sustainable use of natural resources. It is fairly common nowadays, for environment programmes and initiatives in the Amazon to actively involve civil society. It is, however, a novelty that a programme also establishes strong links with the private sector, the Ministries of Mining, Defence, Transport and the like. Forestry and deforestation are no longer just environmental concerns. Increasing export earnings and a potential deficit in planted forest resources for the strategically important pulp and paper industry have brought forestry on to the radar screen of the economic sector. This sector is increasingly aware of the need for more sustainable forestry if Brazil is to guarantee its supply and its position in the international market, as consumers are becoming more concerned about the origin of the timber they buy.

Although it would be a mistake to attribute the recent decline in deforestation rates only to the changes discussed here, estimates are nevertheless promising. Estimates for 2003/2004 are that 27,000 km² was deforested. This figure fell after intensification of enforcement activities, particularly in Mato Grosso, along the Cuiabá-Santarém road and in Pará, to 19,000 km² between August 2004 and July 2005. From January to December 2005 this figure fell further to around 16,000 km² (Amigos da Terra, 2006).

2.2 Sectoral legal framework

The main legislation with respect to forests and forestry was, until recently, the 1965 Forest Code (Law 4.771 of 15 September 1965). This code established that 'it is prohibited to exploit empirically the native forests in the Amazon Basin as they can only be utilised in accordance with technical codes of conduct and management' (article 15), for which regulations and standards were to be established within one year of the Code's publication. It took, however, until 1986, when Law (7.511 of 7 July 1986) and Public Act (486/86-P of 28 October 1986) included a form requesting technical and economic justifications, the species to be harvested, and others.

During the nineties, several decrees and internal directives about how to assess management plans, the quality of management and the length of the cutting cycle were included. Decree 1.282 of 19 October 1994 details penal and administrative sanctions, and instructs IBAMA in case of illegalities to notify the Public Prosecutor's Office and the professional council of forest engineers in order to have the responsible forest engineer disbarred. This Decree was complemented by a Public Act (no 48 of 10 July 1995), which was the result of thorough involvement of all stakeholders, including politicians, the private sector and civil society. It provides operational guidelines for, among others, the content of a Management Plan. The Decree, together with the Public Act in effect provided the operational instructions, thirty years after they had been promised in the Forest Code in 1965 (Amigos da Terra, 2003).

Another important law approved in the late nineties was the Law of Environmental Crimes (No. 9.605, 1998). This Law makes it a criminal offence to destroy or damage forest considered of permanent preservation (on hill sides, along rivers and lakes, etc) or within conservation units. It is also considered a criminal offence to sell, transport or have in stock forest products or even chainsaws without a proper licence or authorisation.

Another important milestone was Provisional Act No. 1.511, of 25 July 1996, which increased the 'legal reserve' (the percentage of a property that has to remain under forest cover) in the Amazon from 50 to 80%.

In 1998, Decree 1.282 was replaced with Decree 2.788 eliminating the need to produce an Environmental Impact Assessment in addition to a Management Plan and formally recognising small-scale and community forest management. Operational procedures for these types of management were published in 1998 in internal directives (No. 4 for community forestry, No. 5 regarding small producers and No. 6 with respect to logging by larger companies). This participatory process

of legal adaptation and improvement, which is still underway, led to the forestry instructions currently in force, issued by the Ministry of Environment in 2002. Normative Instruction No. 4 regulates different regimes for timber harvesting in the Amazon based on different types of actors involved⁶:

- Management Plans for Logging Companies (more than 500 hectares)
- Management Plans for Small Scale Loggers (up to 500 hectares)
- Management Plans for Timber Harvesting Communities (up to 500 hectares/year).

In all three regimes the Management Plan must be elaborated by a registered forest engineer or agronomist, based on the following minimum mandatory guidelines: (Sabogal et al., 2005):

- a. 100% forest inventory of harvestable trees
- b. Delimitation of Forest Management Units (FMU) and Annual Production Units (UPA)
- c. Planning of roads and skidding trails
- d. Planned felling and harvesting
- e. Controlled log hauling
- f. Monitoring of forest growth (or general cutting cycle 25 years)
- g. Maintenance of infrastructure.

In the case of small scale traditional non-mechanised extraction practices with a harvesting intensity of less than 10 m³/ha, a simple tree list can be used to obtain a harvesting permit instead of these technical guidelines.

Normative Instruction No. 3 (2002) regulates the authorisations to clear forest land. It sets a limit of 3 and 5 hectares per year for subsistence farmers and collective extractivist activities respectively. Up to 20 m³/ha of timber can be legally harvested without any inventory. For higher volumes a sample plot forest survey must be done. Deforestation permits of more than 3 hectares require more legal and technical information as well as an inspection prior to clearing.

Box 1: The Law on Management of Public Forests

- The Law creates the Brazilian Forest Service (SBF), responsible for giving out forest concessions and promoting sustainable forest management in public forest lands.
- Concessions do not involve grants of land or forest, but the right to harvest timber in a sustainable way.
- The income generated from concessions will be used to finance the Forest Service and IBAMA (20%). The remaining 80% of the resources will be divided among the National Fund of Forest Development (40%), the State (30%) and the municipality (30%) in which the concessions are located.
- The National Fund for the Development of Forests (FNDF) is created with the income from the concessions to finance research, extension, monitoring and control of forest activities, capacity-building, protection and conservation, among others.
- The Law mandates a national inventory of all public lands to be carried out.
- Concessions will be based on an Annual Forest Licensing Plan (PAOF). This Plan will identify public forests already occupied by local communities, and their access to forest resources will be guaranteed through the creation of extractive or sustainable development reserves or agro-forestry projects.
- The management and control of forest plantations on private lands will be the responsibility of the Ministry of Agriculture.
- Concessions will require environmental assessment studies, including regional public hearings. The maximum duration of a concession will be 40 years and they will only be open to national enterprises or organisations.
- IBAMA will be responsible for the approval, control and enforcement of forest activities on federal lands. Municipal and State agencies will be responsible for approval and control of forestry activities on lands under their jurisdiction.
- An ombudsman will be created inside the SBF to receive and handle complaints of users and clients.

Box 2: Land-grabbing or *Grilagem*

The federal government estimates that 24% of the land in the Amazon is private, although it is uncertain whether these titles are legitimate, 31% is public and protected and 45% are so-called *terras devolutas*, or public, but without public use (IPAM, 2006). According to Diniz (2004) today there exist three different categories of land: private land, public land and/or *terras devolutas*, and land that is occupied but without legitimate land titles.

The land tenure situation in the Brazilian Amazon is rooted in the time of colonisation when the Portuguese Monarchy donated lands (*sesmarias*) to settlers (*capitães donatários*) who were allowed to subdivide it among interested farmers. If these lands were not used they were returned to the Crown, and became known as *terras devolutas*. In other words, 'ownership' was defined not only on the basis of a judicial recognition of a title, but also on the basis of the ability or interest to use the land in a productive way.

Appropriation of public lands in the Amazon is not a new phenomenon. During the early rubber boom at the beginning of the last century, what counted in the absence of a proper land and financial market was not legal title but access to financial resources to develop land. According to a study by IPAM, this relationship between land and access to financial resources continues today. An example in the context of forestry is the provision of informal credit in exchange for timber and, in effect, control over access to forest resources (IPAM, 2006).

A report of the International Advisory Group to the PPG7 explains how land-grabbing works: 'Land grabbers submit requests to INCRA for the regularization of huge areas over which they do not hold any legal rights (often using requests from local front men or *laranjas*). They use the request docket to legitimise their land offers in the local marketplace. Such docket-numbers are widely available and are considered sales documents. In addition, frauds have become more common through the use of means such as contiguous allotments for relatives, the aforementioned *laranjas* and cooperative associations. Thus land grabbers have been able to gain access to areas larger than the 2500 ha established as the maximum limit for the transfer of individual plots of public land. Among the methods used for taking over land, those that are noteworthy are deforestation (in order to demonstrate agricultural activity and 'productive' use of land), the purchase of untitled plots from smallholder farmers, the installation of billboards and signs indicating private property and prohibited access, and even the violent expulsion of owners, small-scale traditional land owners and long-time settlers. Such activities are taking place openly and are widely distributed throughout the areas visited. Perpetrators go totally unpunished, which seems to contribute to their legitimization... Although this type of situation is nothing new in the Amazon region, its accelerated pace is... Practical efforts undertaken in order to solve the problem seem limited in comparison to the pace and magnitude of the problem' (IAG, 2004).

Although these new rules reduce the former excess of bureaucracy and transfer more responsibilities to the registered forest engineer, a study carried out in 2005 shows that the complexity of the legal framework and the average time the approval of the management plans takes, together with the land tenure problem, are still the main obstacles to the adoption of forest management practices in Amazonia (Sabogal et al., 2005).

The forest management instruments mentioned above apply to private or communal forest land. Until early March 2006, public lands, the largest part of the territory of the Amazon, could only be legally used in two ways: by traditional and local communities, through the creation of extractive reserves or sustainable development projects; or by direct administration of the government in national and state forests, which never occurred. Thousands of private logging entrepreneurs, big or small, had no legal alternative to harvest timber in the Public Forest, and were thus forced to act illegally. The new Law on the Management of Public Forests (4776), approved in early March 2006, adds a third form: management by the private sector through concessions given out after tender processes.

Although it will require the implementation of the law to show how it works in practice, it has a number of elements that are likely to have considerable impact. First, the inventory of public lands foreseen in this law is likely to make land-grabbing and squatting

(*grilagem*) more difficult especially as INCRA has also changed some of the procedures that were used in the past as the basis for land-grabbing practices (see Box 2). Second, the law may in practice become an important land-use planning tool as it implicitly establishes that public forests are to remain forests. When properly implemented it may be a powerful tool to stop the expansion of the frontier and the conversion of forest into pastures. This is also likely to have an impact on land prices, and hence on the profitability of extensive cattle ranching in comparison with forest management. Third, the law implicitly breaks the relationship of the forest sector with cattle ranching, and its dependence on the conversion of forest into pasture or arable land in order to ensure access to forest resources. It emancipates forestry from its marginal position into a legitimate economic sector. An indication of this is that private and public banks have started to show more interest in forest management.

2.3 Institutional setting: decentralisation and delegation in progress

The current framework of environmental organisations was established by Law 6938 of 1981. This Law created what became known as the National Environment System (SISNAMA). This system is headed by a Government Council which advises the Presidency about the formulation of policies and guidelines with respect

to the environment and natural resources. The Law also created an advisory body, the National Environment Council (CONAMA). This body, which consists of representatives from all sections of society, advises the Government Council, promotes studies and proposes guidelines. It also discusses and determines regulations and procedures. The central body of the system is the Ministry of Environment, which is responsible for planning, coordinating and supervising environmental policies. The executive agency is IBAMA, which is responsible for monitoring and control of public lands of the federal state.

The next level includes sector bodies and state environmental agencies, which are responsible for the execution of programmes and projects and monitoring and control of activities that may potentially have adverse impacts on the environment, as well as monitoring and control of properties that fall under their jurisdiction. They may establish their own laws and procedures as long as these are not in conflict with federal legislation. When state agencies lack the necessary capacity to perform these roles, IBAMA is expected to step in.

In the Amazon, decentralisation of environmental management competences from IBAMA to the States has been a slow process. It has often taken the form of a negotiated division of responsibilities between the state environment agency and IBAMA. According to IBAMA, States have shown interest in licensing but little appetite for control and enforcement responsibilities, while the States usually allege that IBAMA has been trying to hold on to power. One of the sub-programmes of the earlier mentioned PPG7 supported the decentralisation of environmental management, with a particular emphasis on institutional strengthening of state environment agencies and municipal governments. Some of the lessons of this sub-programme are that decentralisation needs to be based on a set of clear criteria, and should be seen as a concurrent responsibility among federal, state and municipal agencies, rather than a transfer of responsibilities from one level to the next (MMA, 2002). The States in the Amazon that have acquired the greatest capacity to be competent partners in such a system of shared responsibilities are Mato Grosso, Acre, and probably also Tocantins. The new law on public forest management, discussed above, may accelerate the decentralisation process as it transfers the responsibility for forest administration and enforcement to state environment agencies. Some caution is needed, however. A study of environmental management by municipalities concluded that success in the consolidation of municipal systems for environmental management depends to a large degree on the priority that the mayor and his councilors give to environmental policies, and their efforts in creating management mechanisms and establishing partnerships to raise the funds necessary for their implementation (Toni and Pacheco, 2005). But it is not only with respect to environmental management that the role of local government is important. Local governance, and the local socio-political context in general, are likely to have an impact on efforts to reduce illegal deforestation. (In this respect it is interesting that local politicians in frontier towns are frequently recruited

from the class of large land-owners and speculators [see IPAM, 2006]).

Another interesting process of delegation from the forest administration to a third actor lies in the way that all management plans for timber harvesting must be executed under the responsibility of a forest engineer or agronomist, registered by the Regional Association of Engineers (CREA). These professionals are responsible for the execution and supervision of forest harvesting operations, and provision of technical guidance. In the case of management plans for communities and logging companies, the administration can issue documents of origin for harvested timber based on reports from specifically mandated forest engineers. Although professional foresters have more responsibilities under this regime introduced in 2002, Sabogal et al. (2005) recommend that their role should be better clarified and prosecution of incorrect actions by IBAMA and the CREA should be improved. There is anecdotal evidence of forest engineers having taken responsibility for more than 10 management plans 'on paper' and never having performed a field inspection of any of them.

2.4 New technologies and instruments: Bar-codes and satellites against chainsaws?

The first step in the development of the new verification system was the creation and implementation of a shared database of timber harvesting licences and authorisations (SISCOM). This system aims to integrate geo-referenced information of diverse origins such as cartographic and cadastral data, forest management plans and deforestation permits, and other information available to IBAMA and the State Environmental Agencies into one comprehensive system available to all parties and open to civil society access. This has become all the more important now that the Law on the Management of Public Forests has effectively decentralised responsibility for approving and licensing forest management plans to the States and municipalities. In view of that, IBAMA commissioned, under the aforementioned PROMANEJO, an analysis of the existing control/verification system which was conducted by Imazon. According to the study by Imazon (Barreto and Souza, 2002) the main problems of the current control system are:

- i) fragmented and overlapping responsibilities;
- ii) slowness of and weaknesses in the licensing process;
- iii) weaknesses in field monitoring procedures;
- iv) a lack of control of the origin of forest resources;
- v) lack of a strategy to promote forest management.

With respect to the first problem, the study concludes that the current division of responsibilities between IBAMA and state environment agencies is inefficient. To make this division more rational and effective, it was proposed that state environment agencies (SEA) become responsible for all licensing (of deforestation, forest management and burning) and the monitoring of these licences. IBAMA would take responsibility for the supervision and control of the state environment agencies, and for enforcement. Recent decentralisation

agreements between States and the Ministry of Environment have been signed following this recommendation (*Termo de Cooperacao Técnica para Gestap Florestal Compartilhada* with the State of Mato Grosso in September 2005).

Problems with respect to the slowness of, and weaknesses in, the licensing process have already been resolved to a large extent with the adoption, in some States, of systems like the one that was implemented in 2000 in the State of Mato Grosso (SLARP) with the support of the Pilot Program. This licensing system for deforestations in rural properties is based on information from satellite images, which reduces the need for field inspections prior to the implementation of management plans (see also Box 3).

Concerning field inspections it is evident that it will be impossible to do all the field inspections required under the current procedures and instructions. In the case of management plans, IBAMA (or the SFA) analyses the judicial and technical aspects of the management plan. IBAMA (or the SEA) either pays a pre-appraisal field visit or may cross-check the management plan with recent satellite images of the area. Once the overall plan is approved, IBAMA (or the SEA) must also approve annual deforestation plans. Although IBAMA (or the SEA) is required to pay annual monitoring and verification visits, in practice it lacks the physical and financial resources to do so. Often the financial resources for monitoring management plans are transferred only towards the end of the fiscal year, which coincides with the rainy season when access is difficult and extraction is interrupted. Hence, it is proposed that field visits be chosen at random and based on sample areas. The study also found that the quality of field inspections differs, in part because of different interpretations of management regulations. It is therefore proposed that more effort be put into the development of consistent

and transparent procedures for these field inspections.

As monitoring and control of forest management improves, producers need to be given the opportunity to adapt to more stringent and sustainable management practices. At the moment, the capacity of most producers to manage the forest is weak. A number of measures, including training, will be required. It is suggested that a transition period be adopted to allow producers to adapt to this new situation and to adopt proper management practices.

Finally, the study found that the current system of control of the origin of forest resources is not effective and allows for fraud and laundering of illegally harvested timber and products.

Based on this analysis, Imazon and IBAMA developed two new instruments: the Declaration of Origin (DOF) and a Log Tracking System, SIRMAT. In order to be able to appreciate the new system, it is useful to understand the main elements of the pre-existing system based on transport permits (ATPF). This is described below.

Legal logging can take place either on the basis of a Sustainable Forest Management Plan (PMFS) prepared by a registered forest engineer and in general approved by IBAMA and an Annual Authorisation to Exploit (AUTEX) based on an annual logging plan, or an authorisation to clear. Once a logger has an authorisation to clear or an authorisation to exploit, he needs a transport permit (ATPF) for the harvested logs. This is a legal form issued by IBAMA. An ATPF is needed for all transport from forest to first processing, and from first processing to commercialisation. The production and distribution of the forms is one of the weak links in the chain as forms can be lost or deviated, and IBAMA offices can run out of copies. Besides, under this system the focus of the control effort is more on the transport of logs and timber than on the origin of the logs and processed timber. The objective of the new, experimental system is therefore to make information

Figure 1: SIRMAT System

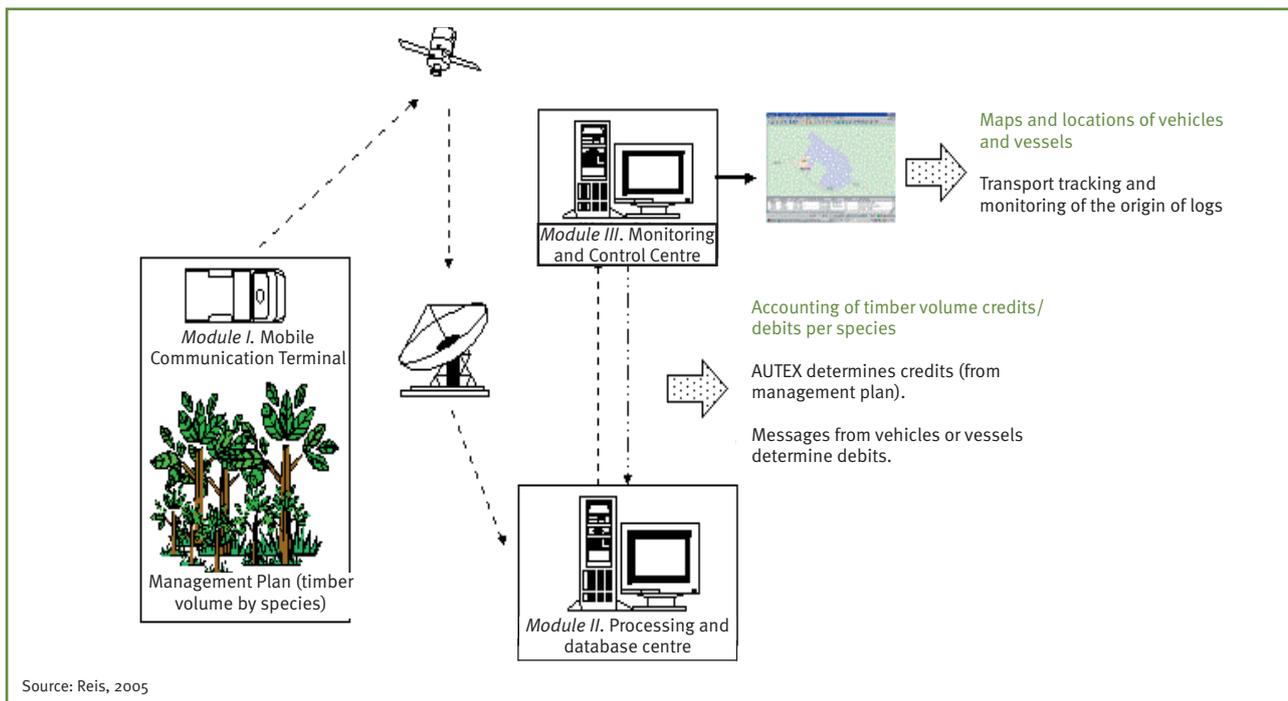
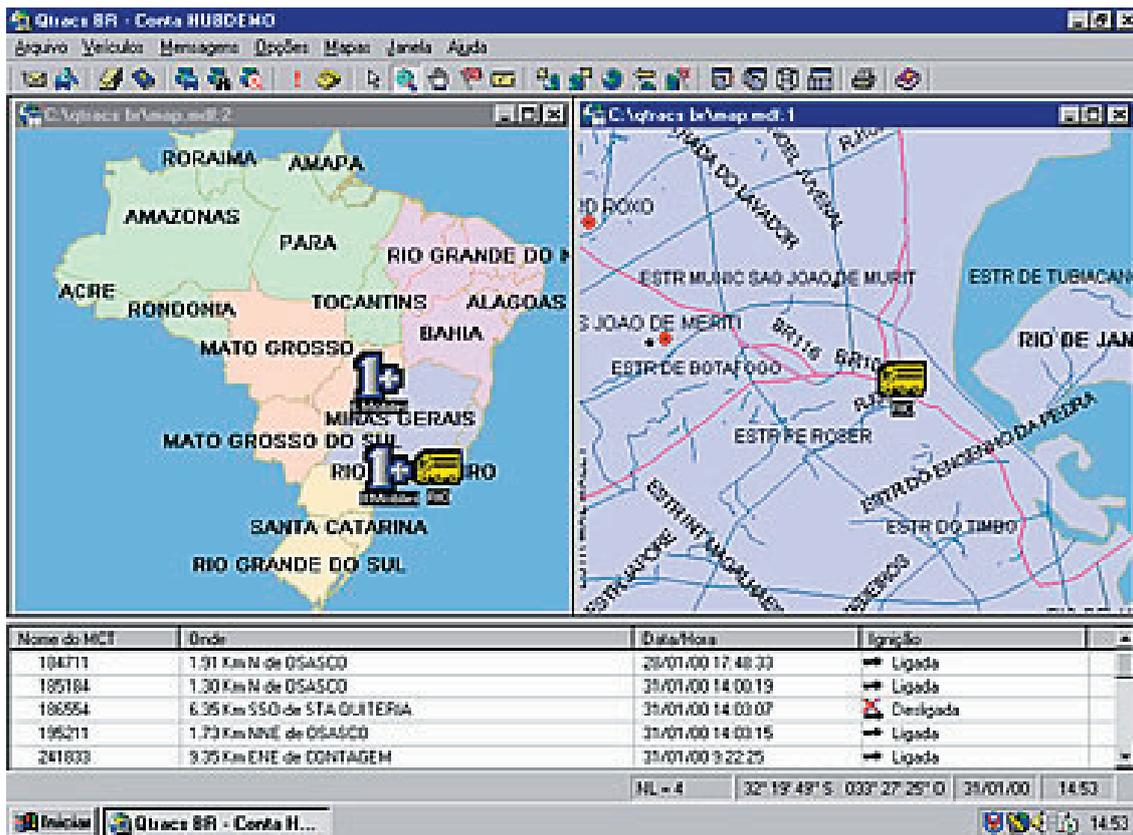


Figure 2: Screen of the tracking system



Source: Reis, 2005

about the origin of the logs accessible and verifiable, to reduce the bureaucratic burden for the producers and the administration, improve transparency and reduce the opportunities for fraud.

(i) Administration of harvesting licences and timber transport permits: DOF

The Declaration of Origin (DOF) is meant for small and medium loggers. It consists of an on-line database that allows the producer, after receiving an authorisation to harvest or deforest, to access the forest administration system on-line and debit harvested volumes against the original volumes per species authorised in the AUTEX. The system provides a bar-coded document which replaces the ATPF. The document will inform road checks about the origin and volume of the logs. Upon arrival at the sawmill, the bar-coded document is used to read the information in the system.

Compared with the existing system, the responsibility for the emission of the DOF and the reporting back to IBAMA lies with the producer, thus reducing costs and bureaucracy. The bar-code individualises the timber transport permit (ATPF-DOF), protects the system against fraud and misuse of forms, and the fact that the system is on-line protects it against corruption and the arbitrariness of local bureaucrats. In addition, it will be easier to link products in the system to the original logging site.

Problems include access to computers or the internet in remote areas, and/or computer illiteracy. Confronted with these difficulties, IBAMA points

to the fact that the responsibility for authorisations and the related bureaucracy usually lies with the industry. IBAMA also referred to the public pension system in which even people without a bank account access the system, even in remote areas, to receive their pension. It is therefore expected that if IBAMA provides access to a terminal and support for new users of the system, these potential problems might be overcome. Producers mentioned in interviews that there is usually no on-line access to the database at the logging site. Information about volumes and species therefore needs to be determined beforehand, thus reducing the flexibility to take these decisions at the logging site.

(ii) High-tech for the big players: SIRMAT

The SIRMAT system was developed with the more capital-intensive logging companies in mind. It had to be simple and transparent, easy to operate, efficient and cheap to maintain. The system was tested with four big timber companies in the States of Amazonas and Pará over two years, starting in August 2003. It introduced four innovations;

- (i) electronic accounting of the 'logging credit';
- (ii) on-line tracking of transport;
- (iii) on-line discovery of possible fraud;
- (iv) targeted control and surveillance.

An important element in the development of the system was the preparation and adoption of a unified list of codes for the different species.

The system consists of three different elements:

- (i) mobile communication terminals;
- (ii) a processing and database centre;
- (iii) a monitoring and control centre.

The mobile communication terminals are installed in trucks or ships used to transport logs, and are used by logging personnel to fill out the electronic timber transport permits (e-ATPF) with the volumes and species that are going to be transported. This information is sent to the processing and database centre, where it is checked against the approved species, volumes and location contained in the AUTEX. If the information entered fits with the information on the database, the entered volumes are electronically debited and the electronic authorisation to transport (e-ATPF) is issued. This, in turn, is sent to the monitoring and control centre which is responsible for monitoring and tracking the transport via a satellite system, being able to track the transports by satellite during all their journeys.

The tracking system uses 'Windows' and is able to monitor one or more trucks or vessels. It can also provide reports of routes taken and logs transported, and warn when a car or vessel departs from the most logical, or previously agreed route. Control teams on the road have on-line access to the database to carry out routine controls, and if any irregularity is detected by the monitoring team, local enforcement units are sent to the field to initiate controls, on the spot.

The system allows users access to their accounts online, and its information is fed into the forest information system, SISCOM.

The experiment with SIRMAT was evaluated by the main stakeholders in September 2004 and again in March 2005. These evaluations raised a number of unresolved issues. These included doubts about whether interruptions in the system would cause interruptions in the productive process, about the

procedures to be used in case of corrections to the original e-ATPF, about sub-contracting the transport, about how this system can be adapted to the needs of small producers and whether in the future companies would have access to subsidised credits to help them purchase the necessary equipment. One of the most serious doubts was about the dependence of the system on the company that developed the software for the tracking system. A strong effort is being made by the current administration to base all information systems on software with free access (Azevedo, 2006, pers. comm.).

With the decentralisation to States and municipalities of the responsibility for licensing and controlling forestry activities, the States also gain the responsibility of setting up their own forest administration and verification system. In fact, some States already have one. IBAMA will not require that the States use the DOF or SIRMAT system, only that, whatever system the States decide to implement, it must be compatible with the SISCOM database. This will enable IBAMA to perform control functions, allow its users to check transport permits against existing management plans and licences, and make logging information available to the wider public.

As value-added taxes are collected at the state level, decentralisation of the responsibility for controlling logging activities to the state environment agencies creates an excellent opportunity to link the state level logging control system with fiscal control. This is under preparation in a number of States. In the Amazon, the State of Mato Grosso has apparently progressed most in this direction. According to IBAMA, it is likely that a link between the DOF, or any other State verification system of the origin of harvested timber, and fiscal control mechanisms will be made in the near future, but

Box 3 : Environmental Licensing of Rural Properties in Mato Grosso

In 2000 the State Environmental Foundation of Mato Grosso (FEMA) implemented the SLARP-System with the objective of reducing illegal deforestation. SLARP combines environmental licensing of rural properties with monitoring and control of land use changes. Environmental licensing of properties implied geo-referencing boundaries and defining forest protection areas and legal reserves. By overlapping satellite images, deforestation of protected areas and of the 'legal reserve' areas could easily be detected and enforcement activities initiated. Nevertheless, data from 2004 showed that deforestation was not significantly reduced in licensed areas compared with unlicensed areas, proving that enforcement and sanctioning of illegal deforestation continued to be weak. Unclear definition of competences and jurisdiction between FEMA and IBAMA, diminishing enforcement capacities and unclear land tenure were identified as the main reasons.

In May 2005 a spectacular police action called *Operação Curupira*, coordinated between IBAMA, the *Ministério Público* and the Federal Police, dismantled a criminal network of civil servants from IBAMA, FEMA and logging companies which had laundered 1.9 million cubic meters of timber using deforestation permits and fraudulent management plans. FEMA's President and IBAMA's Executive Director for Mato Grosso were imprisoned alongside 57 other civil servants of a total of 101 others. FEMA was intervened and replaced by SEMA (Environmental State Secretariat of Mato Grosso), which signed a decentralisation agreement with IBAMA in September 2005 and is now in charge of all competences regarding forest administration, verification and control in the State, concurrently with IBAMA. Under this agreement the State will integrate SLARP and the new forest products producer cadastre SISFLORA into the national system, SISCOM, in order to guarantee transparency and full access to all public and civil society actors.

(Sources: MMA, 2005, EcolNews, Federal Police of Brazil, SEMA)

fiscal control is currently not sufficiently computerised in most States in the Amazon to make this link.

(iii) Verification and control

Both systems improve the administration of timber transport permits (ATPF) and increase cross-checks and controls. The move to electronic administration should free efforts previously devoted to paperwork, to verify and monitor the implementation of the management plans in the field.

This urgent need is illustrated best by the revision of approved management plans done in 2001, which found that on a score from 0 (non-existent) through 1 (bad) to 5 (excellent), the average score on a wide range of variables of 132 management plans in the State of Maranhão was 1 or lower (IBAMA, 2001). In part this is the result of the lack of capacity within IBAMA to assess and verify proposed management plans. IBAMA currently has a staff of only 40 forest engineers to cover the whole of the Amazon (Hummel, 2006, pers. comm.).

On the other hand, the decentralisation of forest administration and control to the States, as introduced in the Law on the Management of Public Forests, should, in principle, increase the overall institutional capacity to verify the quality of forest management. A similar impact might be expected from the creation of the Forest Service and the generation of additional funding for the forest sector through the creation of the FDNF. In addition under the new law, part of this responsibility will be contracted out, as concessions given out on public forests will be subject to independent audits every three years,

In this new setting of a decentralised forest administration and audits by independent third parties, IBAMA's role is expected to evolve towards strategic control through the use of satellite technology and intelligent tracking and verification systems.

In addition to the existing deforestation monitoring system (PRODES), IBAMA has recently started to use the satellite images of the DETER programme. This system, which was developed by the National Institute for Space Research, allows deforestation to be tracked almost in real time, as opposed to the PRODES system that only allows annual monitoring. According to information from the Ministry of Environment (Azevedo 2006, pers. comm.), the Space Agency is working, in collaboration with Imazon, on a high-resolution automated remote sensing analysis system to monitor selective logging in the Amazon (Asner, 2005) which should be operational by the end of this year. This system would allow assessment of the timber harvesting operations by monitoring the impact on the forest and, hence would help to optimise and target verification and enforcement efforts. Whether this will work as envisaged and be able to compensate for some of the current lack of capacity in the environment agencies, only time will tell.

(iv) Enforcement

When illegalities are discovered, IBAMA and state environmental agencies are responsible for applying

finances and confiscating equipment, or where criminal offences are concerned, referring the case to the police and the Public Prosecutor's Office (*Ministério Público*). This Office is responsible for promoting the protection of public and social heritage, the environment and other collective interests. The *Ministério Público* is an independent body that is neither part of the judiciary nor the legislative or executive bodies of the public sphere. It represents the rights of citizens and public interests and is, in that context, responsible for controlling the proper implementation of legislation and instigating criminal proceedings (see Despouy, 2005).

The enforcement capacity of IBAMA and the state agencies is quite weak, as is the Public Prosecutor's. The consequence is that effective enforcement too often depends on the political will to act. A good illustration of this is that in 2005 IBAMA applied a total of R\$2.2 billion in fines, of which only a little over 1% (R\$24 million) was paid (IBAMA, 2005b).

However the satellite system DETER, and possibly the new system under development, will potentially be able to direct enforcement activities better towards illegal operations. In fact, the environment agency in the state of Mato Grosso is already using the DETER information, in co-operation with IBAMA and the state and federal Prosecutor's Office, to inform and guide enforcement activities.

3. Conclusions

Are all these elements part of a comprehensive verification system? As argued in this article, several elements seem to come together forming a more coherent set of instruments for the verification of legal forest production than has ever existed before in Brazil. However, that does not imply that this yet constitutes a coherent and comprehensive system.

A chain is usually as strong as its weakest link. The capacity of State agencies in the Amazon varies a lot. In some States, environment agencies seem to have a solid base on which further capacity can be built to create an effective control system (e.g. Mato Grosso, Acre, Tocantins). Other States will need a lot of effort to catch up (e.g. Roraima, Rondônia). Although the creation of a Forest Service and a Fund for forestry development will make the system somewhat less dependent on the political priority attached to environmental management by elected state governments and governors, political will is still one of the major factors that will determine the capacity of the States to become functional and effective partners in this system. Nevertheless, the vast scale of forests and forestry in Brazil seems to have no other solution than a decentralised one, with the concurrent exercise of verification and control competences embedded into a comprehensive information system, in the face of powerful local interest groups.

Another extremely weak link is the forest professionals. Not only is there an evident deficit of trained managers for natural forest (ITTO, 2002; Sabogal, 2005), but also a lack of clarity about their responsibilities regarding forest management and delegated forestry administration in the verification scheme.

Land tenure and the lack of capacity of INCRA continue to be a problem. Although some steps have been made to try to reduce *grilagem*, much remains to be done to resolve land-grabbing practices. The confusing land tenure situation may even cause considerable delays in the implementation of the Public Forest Management Law. After all, as long as it is unclear which lands are public, concessions are likely to remain restricted to the National Forests Conservation Units, assuming that there are no claims on these lands and that their land tenure situation has already been resolved. The importance of unresolved land-tenure as the main constraint for forest legality in Brazil, as well as in most other countries of the region, cannot be stressed enough.

The quality of environmental legislation in Brazil is relatively high but, because of a lack of capacity in environment agencies and the judicial sector, its application leaves much to be desired.

Nevertheless we think that the current changes are going to have a real impact. First, although decision-making on issues pertaining to environmental questions was often a participatory process in the past, it usually involved only the segments of society with common interests. More recent discussions (on, for example, deforestation and the preparation of the Law on Public Forest Management) involved a much wider group of stakeholders and institutions and have, therefore, created a broader base of support. In addition, this broad discussion is also expected to ensure a more practical and pragmatic approach, doing what is possible, rather than what would be ideal from the perspective of environmentalists or foresters. One remarkable element is the coordinated effort of different governmental bodies around the NFP and the Inter-ministerial Working Group against deforestation. What the process in Brazil seems to confirm is that a trans-sectoral approach to forest policy issues, political leverage at the highest level of decision making and strong individual leadership are indeed the critical ingredients that participatory processes need for success.

Second, it usually takes a while before the effect of new legislation and procedures is noticeable on the ground. In this case, there is a sense of urgency and the opportunity is there to coordinate activities in the region that will be affected by the paving of the Cuiabá-Santarem road. These efforts have already started with the creation of new conservation units and more and better co-ordinated enforcement activities, which have already achieved a significant reduction in deforestation in the region. Another interesting element is the strategy of concentrating efforts on specific regions of high vulnerability, to achieve quick and visible results.

In the past 10 years Brazil has witnessed a steady process of adaptive improvement in the legal framework regulating forest management and land use change. Both legal instructions in force (IN03 and 04/2002) are simple and applicable instruments; nevertheless they still leave scope for laundering timber of illegal origin. Deforestation permits of less than 3 hectares/year for volumes less than 20 m³/ha do not require a forest inventory nor any inspection by the administration, creating an opportunity for the use

of timber transport permits to launder timber from illegal sources. The amount of timber laundered with deforestation permits is unclear, but probably varies considerably between States depending on the frontier dynamic. While in Pará logged and deforested areas were both around 5,200 square kilometers in 2001; in Acre, Roraima and Rondonia the deforested area was 3 to 8 times bigger than the selectively logged area (Asner, 2005). This clearly shows that a great deal of laundered timber originates in deforestation permits, of which the smaller ones are beyond the control of the administration. It is not clear to what extent this and other loopholes are part of an intentionally gradual tightening of the rules, or the result of a trial and error process. But the slow success of the continuous process of legal change and adaptation is evident.

The Law on Public Forest Management, which will hopefully undo the relation of interdependence that exists today between loggers and farmers, is a major breakthrough. Much will depend on whether the policies discussed will be able to resolve the land-tenure situation and ensure that the real prices of land and the social and environmental costs of conversion of the forest into agricultural land and of the concentration of land are factored in. If they are, it will be interesting and important to monitor the impact on the socio-political context at the local level.

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Footnotes

¹This includes also National Forests (FLONAS) which were explicitly created to promote sustainable forestry within its borders.

²'Terras Devolutas' are public lands with no specific public utilisation. They may, however, be occupied by small-holders (up to 100 ha), who after having worked the land for 5 years may solicit legal claim.

³'Small' farms have a size of up to 4 fiscal units. The size of a fiscal unit depends on the type of farm and the average size of these types of farms in each municipality.

⁴Presidency, Ministry of Agriculture, Ministry of Science and Technology, Ministry of Defense, Ministry of Agrarian Development, Ministry of Development, Industry and Trade, Ministry for National Integration, Ministry of Justice, Ministry of Environment, Ministry of Mining and Energy, Ministry of Work and the Ministry of Transport.

⁵Conaflor members are a) Nine (9) National Ministries: Agriculture, Science and Technology, Agrarian Development, Industries and Foreign Trade, Education, National Integration, Energy and Mining, Planning and Budgeting; and Labor and Employment b) Ten (10) representatives of different sectors from civil society and ENGO's c) 6 representatives from different industry sectors d) Five (5) representatives from the state environmental authorities e) Four representatives of the academia and forest research organisations f) Three (3) from the National Environmental Authority (MMA and IBAMA).

⁶A new legal instruction intended to set different standards for SFM not according to the actors involved, but depending on the impact caused to the forest, was being elaborated and discussed by the time this study was being done.

⁷*Grilagem* comes from *grilo*, (cricket) due to the practice of putting fake land tenure documents in a drawer for five days together with five crickets, in order to make them look old and authentic.

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