



The evolution of Brazilian forest concessions

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Abstract

In 2006 Brazil passed legislation allowing concessions for industrial timber harvest in public forests. This decision was part of a broader effort to control deforestation, which had spiked to its second highest level, of about 25,000 km², in 2004. Specifically, concessions were implemented as a means to control a rampaging timber industry while providing a source of accessible timber for sustainable harvest. Timber concessions, however, are not without their critics worldwide. Here we review the process undertaken to address international concerns over concessions in the policy design, we discuss the process of implementation in Brazil from 2007 to 2014 and then attempt to provide insight into the challenges that lie ahead. Our findings suggest that even though Brazil's policy designers had the full knowledge of the difficulties with timber concessions, and attempted to design a concession framework to address those concerns, deeper structural problems within the industry and within government itself have prevented the successful scaling up of the concession model. Key hurdles include: government overlap and duplication causing unbearable transaction costs and risks to investors; an industry ill prepared and unwilling to adapt to the stringent requirements set in the policy; and little success in curtailling illegal logging beyond concession borders. While concessions remain a potentially important tool for the management of public forests, additional resources and time will need to be invested to overcome these barriers.

Introduction

From the 90's to early 2000's, the Brazilian Amazon experienced high deforestation rates, peaking in 1995 with over 29,000 km² deforested and then again 25,000 km² in 2004 (INPE, 2013). The opening of new frontiers of development in the Brazilian Amazon region follows well known patterns of land use. Economic agents finance the clearing of the land in part by selling timber, then start farming or ranching activities (Schneider, 1995; Stone, 1998, Nepstad et al., 2003, 2004). This synergy between logging and other economic activities, therefore, plays an active role in the joint process of deforestation and land speculation.

In the last two decades, however, the Brazilian government has successfully applied key policies - especially law enforcement at deforestation frontiers - and achieved a 70% decline in deforestation from 2005 to 2013 (Nepstad et al., 2014, Arima et al., 2014). However, punitive measures alone are thought to have temporary effect unless accompanied by complementary incentives for legal sustainable use.

In 2000, the Ministry of Environment launched the first National Forest Program with the objective of coordinating sectorial policies to promote sustainable development and combine conservation with the use of Brazilian forests. The period leading up to the formulation of the program was characterized by discussions among the government, the forest industry and civil society organizations to test the feasibility and acceptance of strategies that were being planned for the Amazon region. One key strategy for sustainable use on public lands was the possibility of allocating forests for timber harvest by the private sector. The rationale behind the initiative was the recognition that 60% (314 million ha) of Brazilian forest is in the public domains (CNFP, 2013) and much of the illegal logging came from these areas. Furthermore, formal access to these forests would increase rural employment and offset some of the costs of protecting the forests.

The Brazilian government made considerable effort to engage national and international actors into the debate on forest concessions. The discussion focused on lessons learned from international forest concessions

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Table 1. Main concerns related to forest concessions

Category	Type	Main issues	Sources
Concession design	Allocation of concession	Political power based bidding	Ferraz and Seroa da Motta, 1998.
		Exclusionary process for small and medium entrepreneurs	Merry and Amacher, 2005.
	Non-compatible systems with sustainability	Concession periods too short or too large logging areas	Hyde and Sedjo, 1992; Gray, 2000.
	Payment instruments	Inefficient mechanism to collect rent	Vincent, 1990; Hyde and Sedjo, 1992; Gray, 1997; Leruth et al., 2001; Amacher et al., 2001; Merry and Amacher, 2005.
Concession implementation	Regulation and monitoring	Weak monitoring and application of penalties	Merry and Amacher, 2005.
	Law enforcement	Lack of institutional capacity	Ferraz and Seroa da Motta, 1998; Keller et al., 2007.
		Corruption	Gray, 2000; Amacher, 2006.
	Industrial structure and competition in the timber market	Demand for qualify labor supply and impact on local jobs	Ferraz and Seroa da Motta, 1998.
		Competition between large and small companies	Ferraz and Seroa da Motta, 1998; Gray, 2000.
		Competition with illegal logging	Merry and Amacher, 2005; Amacher et al., 2006.

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and the details of the operational mechanisms to be included in Brazilian concessions. In 2006, the Law on Public Forest Management (Law 11,284 / 2006) was approved by the National Congress, but not without significant dissent. The basis of the antagonism was unsuccessful experiences of forest concessions around the world (Gray, 2000) and the fragility of the Brazilian institutions at that time. Brazil coming, as it did, late to the game was in the privileged position of having hindsight. Here, we first review the main international concerns related to forest concessions design process undertaken to address international concerns, and then how Brazil addressed these issues in its system design and process of implementation from 2007 to 2014. We focus on federal concessions as they are the only experiences to date. Finally, we provide insight into the challenges that lie ahead.

Forest concession design and implementation

Problems common to a number of countries with forest concessions fall into two broad categories: design failures and implementation failures (Table 1), and are mainly related to mechanisms for the allocation of concessions, revenue generation, inequitable access, regulation, and monitoring (Ferraz and Seroa da Motta, 1998; Gray, 2000; Merry and Amacher, 2005).

For example, bribery and corruption in the granting of timber concessions has been discussed extensively (World Resources Institute, 2000; Gray, 2000; Amacher, 2006) and a competitive process, such as bidding, is recommended to minimize the problem (Klein, 1998; World Commission on Forests and Sustainable Development, 1999; Merry and Amacher, 2005). The advantages of auctions for the allocation of concessions are lower transaction costs (no need to previously select companies); the increase of the bid value; and the potential for revenue generation. There are two fundamental aspects of an efficient auction: (1) the revenue generated for the government should be maximum to capture part of the rents associated with concession areas; and (2) the concession should be attributed to the company with the highest valuation for the area (Ferraz and Seroa da Motta, 1998). It is also argued that the imposing of a minimum price and stimulating the presence of several competitors in auctions should minimize low bid values offered by participants (Ferraz and Seroa da Motta, 1998).

In addition, the conditions under which timber concessions become financially attractive to potential bidders have been widely debated. Some believe that concessionaries under long-term tenures and with large forest areas may have little incentive to manage the forest (Vincent, 1990; Walker and Smith, 1993; Boscolo and Vincent, 2000; Gray, 2000). It has been suggested they are more likely to liquidate the forest and invest the proceeds elsewhere at a higher rate of return. Others advocate the opposite: that since tropical forest concessions are usually in remote areas with difficult access, large long-term concessions are necessary to make them profitable and attractive for potential investors.

The choice of revenue collection instruments is also not trivial and may be decisive to meet societal demands regarding protection of public forests. Indeed, inefficient mechanisms to collect rents are among the

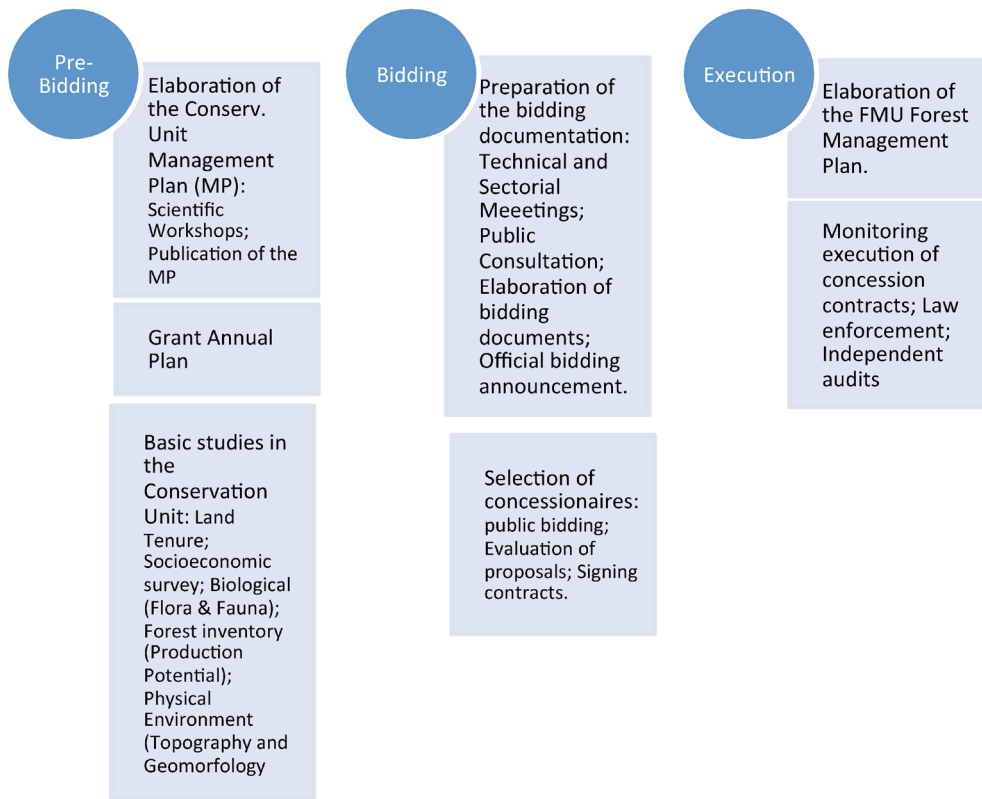


Figure 1
Summary of activities to develop a concession bidding process in Brazil.

The design and implementation of forest concessions in Brazil encompasses three main phases: Pre-bidding, Bidding, and Execution.

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main failures in international concessions (Vincent, 1990; Hyde and Sedjo, 1992; Gray, 1997; Leruth et al., 2001; Amacher et al., 2001; Merry and Amacher, 2005). Three main types of government revenue collection mechanisms have been suggested (Ferraz and Seroa da Motta, 1998): (1) Multiple part tariffs: an initial fee plus a royalty on the timber extracted; (2) Fees at the beginning: generate revenue for monitoring and also decrease speculation behavior in the action process; (3) Annual charges: based on area or minimum stumpage prices based on concession area. All, however, present bottlenecks. The first is thought to be less feasible due to asymmetric information between concessionaire and government. The second may impose heavy costs prior to the concessionaire beginning work. The third may encourage overharvesting. Finally, the choice amongst them must account for regional or national peculiarities and the institutional capacity for monitoring.

Once a concession is granted, the implementation of an efficient and credible monitoring system, with sanctions for non-compliance activities and clearly stated performance bonds for incentives is among the key actions for a concession success (Gray, 2000; Merry and Amacher, 2005). In addition, there may be some place for third party monitoring and auditing process to increase transparency and credibility.

Another important implementation hurdle to overcome is the changing dynamics of local job markets, where the skilled labor required by well run timber harvest may not be available, requiring that outside labor be imported and minimizing any local social benefits (Ferraz and Seroa da Motta, 1998). Thus, if social goals are to be met, there may have to be carefully crafted job qualification and training policies. Furthermore, with high barriers to entry it is possible that larger companies may have advantages over small and local firms, concentrating forest concessions in few hands. Additionally, if the illegal logging is not curbed and continues to compete in the same timber markets, loggers are likely to continue harvesting from open access areas and provide cheaper timber (Merry and Amacher, 2005; Amacher et al., 2006). And finally, without clear government goals, commitment and capacity even the best concession design will fail.

Brazil's choice

Aware of these issues surrounding forest concessions, the Brazilian government sought to draw up a system that minimized the known problems while giving incentives to an industry that would have to transform from overwhelming illegality to strict oversight. Two key choices were made: the granting of long-term contracts and the use of a competitive bidding process to allocate the concessions. Although not covering every detail, below we try to convey the complexity of the policy design and the requirements placed on the concessionaire. The design and implementation of forest concessions in Brazil encompasses three main phases: Pre-bidding, Bidding, and Execution (Fig. 1).

Pre-bidding

Before any conservation unit (CU) is designated as eligible for a concession Law 9.985, which creates the National System of Conservation Units, requires that several studies be completed as the basis for the proposed management plan (Fig. 1). The management plan for the CU (different from a sustainable forest management plan) indicates, among other things, where forest management is allowed within the CU. Only once the management plan is approved - a process of indeterminate time - can the CU be eligible for a concession. The Brazilian Forest Service (Portuguese acronym, SFB) then prepares a Grant Annual Plan, which contains all potential areas for concession in either National Forests or Production Forests. This plan must be approved by the Ministry of Environment before any bidding process can begin.

With the CU management and concession granting process run by different government institutions (Instituto Chico Mendes de Conservação da Biodiversidade - ICMBio and SFB, respectively) the process has proved to be very time-consuming and poorly orchestrated. Currently, the lack of synergy between these two institutions may be responsible for the excessive delay in scaling up concessions in Brazil.

Bidding

With forests qualified for concessions, the preparation of a bidding announcement begins. First, technical meetings are organised with different actors in the regions where concessions are to be established. The meetings introduce these actors to the concession system and the socioeconomic benefits that may be generated by its implementation. Examples of actors are Municipal mayors, organised communities, the local parliament, timber producers, and local citizens amongst others. The SFB then produces a draft of the bidding announcement and by means of public consultation in the municipalities where a concession is proposed, receives reviews and suggestions to improve the bidding document. Only after the suggestions are incorporated and the document approved can the auction begin.

The bidding announcement comprises the rules of the process and is normally composed of more than 20 documents to help investors decide about participating in the public tender. Examples of documents are maps, available infrastructure, forest inventory report, economic feasibility studies, product pricing methods, socioeconomic studies, rules for bidding and selection criteria, a draft of the concession contracts, rules for guarantees, indicators for selection of the best bid, etc. The winner may refund the Government for studies and other investments in the forest management unit and the items will be described in the documents.

According to law 11,284/2006, only Brazilian companies with their headquarters in Brazil may compete for forest concessions. Also, the future concessionaire may explore forest products and services but not genetic, mineral and hydrological resources, as well as wild animals, fishing resources and carbon credits. Resources used by traditional communities are also excluded from the process.

In first step of the bidding process competitors present proofs of their technical capacity and financial, legal and tax consistency. For those who pass this exigent first filter, proposals are selected using a combination of the best price and the best technical description (included the lowest environmental impact, the highest direct social benefits, the highest efficiency and the highest added value to the product or service). The criteria for judgment of the proposal is established *a priori* and included in the documents available for the participants.

Before harvest can begin, however, the winner must deposit a guarantee equivalent to the estimated revenue of one year of production and paid in cash, or as government bonds, insurance or bank security. After the first concession was granted in 2007, this was reduced to 60% of the estimated annual production and paid in three instalments: 30% by the time of signature of the concession contract; 30% by the approval of the forest management plan; and 40% by the approval of the second annual plan of operations.

In Brazil, the charges levied for the forest concession include the ad-valorem royalty on the predicted harvest volume as well as the other investments offered by the concessionaire in the bidding process now enshrined in the contract. It was believed that although easier to apply, the alternative of charging based on concession area was not a good alternative as it could be an incentive for overexploitation the resources by the concessionaire, especially in highly productive units. The charges may be divided in parcels during the first year. Regardless of harvest volumes, however, the concessionaire must pay a floor price of 30% of the projected revenue. If the production is less than 30% of the planned for a harvest season, the concessionaire remains obligated to pay the minimum. It is believed that this mechanism would discourage both market speculation and concessionaires more interested in forest protection than production (e.g. environmental institutions). The final royalty may also have revisions and adjustments described in the contract.

As part of the granting of a concession, penalties and performance bonds are stated at the beginning of the bidding process and in the final contract. The government performance bond includes social, environmental and efficiency criteria. If the concessionaire achieves the performance established in the contract, a discount is applied. On the other hand, non-compliance with the contracted activities result in sanctions, which varied from fines to contract cancellation.

To make a concession more attractive to different investors, potential concessionaires may bid on different sizes of forest management units. Currently, the forest concessions already granted (a total of 460 thousand

ha in four National Forests- Flonas) have units varying from 17 thousand ha (Flona Jamari, Rondônia state) to 219 thousand ha (Flona Crepori, Pará state). To safeguard against economic concentration, however, a concessionaire may not submit more than two contracts to the same auction. Also, each concessionaire, individually or in consortium, has a maximum allowable percentage of the proposed concession area. This percentage is established based on the total area available for concession.

The contract period may vary from the established timber harvesting cycle (usually 30 years) to a maximum of 40 years. However, all of the concessions contracts so far have used the maximum period, which is thought to increase the likelihood that the concessionaire to harvest in a sustainable manner since there will be 10 additional years of harvesting after completing a production cycle. Service concessions (e.g. tourism) have different rules. The periods of contracts may vary from 5 to 20 years.

Finally, microenterprises and associations of local communities interested in participation in a bidding process have alternative ways to present guaranties and cover royalty and investment charges. Despite this encouragement, no local communities or microenterprises have won a Brazilian concession in a competitive process. The reason is mostly due to their low technical and administrative quality.

Execution

The monitoring of a forest concession is, once again, shared among several governmental agencies, independent auditors, and society. Among federal agencies, the SFB monitors the concession contracts; the ICMBio monitors the conservation unit (e.g. National Forest) where the concession is placed; and Instituto Brasileiro do Meio Ambiente e Recursos Renováveis (IBAMA) is responsible for the approval and monitoring of Sustainable Forest Management Plans of the concessionaires. Undoubtedly, this arrangement brings an operational complexity that may obscure any possible benefit. Not only the three agencies have to synchronize their interests but the concessionaires have to deal with all of them during harvesting and processing.

To increase transparency, operation and monitoring reports of all forest concessions are available on the SFB's website. Additionally, annual reports on Public Forest Management are submitted to the evaluation of the National Congress. Also, a participatory commission, including members from the government, civil society and private sector, was created within the SFB to contribute in the decision making process and monitoring. And finally, by law, an independent audit is required every three years. The cost is borne by the concessionaires but they must choose from a list of government-accredited agencies, which is hoped will avoid the concessionaire selecting non-reputable agencies or ones with conflicts of interest. And in one final nod to transparency, any person or legal entity is allowed unfettered access to visit the concession.

During the past decade some updates have been made to the original concession design. First, to better control of timber harvest and processing is now applied to create a chain of custody from harvest to sawmill. This guarantees traceability of concession's products and is hoped that it will have a positive impact on the society and timber consumers. Second, to catalyze local development and income distribution, one of the performance bonds now favors local hiring. Third, as many timber companies at Amazon region are low-tech family enterprises, the SFB organizes training in forest operations (e.g. road construction, administration and accounting, reduced impact harvesting techniques). SFB also attempts to build bridges between concessionaires and technical partners to conduct the trainings. Finally, the stumpage price which formerly was calculated by species groups is now listed as a single compound price representing all commercial species. That measure decreased controversies about prices and administrative costs associated with frequently updated lists. The price is established according to a survey carried out in the region where the concession is planned to occur. It takes into account the harvest logistics of each management unit within the concession. So, depending on the quality of transport infrastructure, the stumpage price charged by government can be adjusted. Additional measures introduced during the past decade were: independent certification schemes, such as FSC or similar, as part of the concession requirements (encouraged via performance bonds); management and quality performance of forest operations, management of quality of social responsibility, health and labour safety; management of quality of the industrial process.

So, as one might imagine given the description above, running concessions in Brazil requires multidisciplinary teams, including economists, lawyers, biologists, and foresters, as well as social scientists to monitor the technical, social and economic impacts of concessions. The SFB has recently recruited such professionals and is in process of training them to monitor the concession contracts. As the area of concessions grows these teams may need to increase and use intelligent tools to cope with the task. SFB added two remote monitoring systems: vehicle tracking for forest product transport and the use of remote sensing for selective logging. Regardless, the SFB is underfunded and struggles to effectively monitor and broaden the concession program.

Did Brazil succeed?

There are 32 national forests in the Amazon, covering approximately 14.3 million ha. In the past decade, Brazil has managed to grant concession rights in four, covering a total of 460 thousand ha (3% of total) and creating a potential sustainable production of approximately 306,000 m³ per year (460,000 ha/30 year

rotation = 15,300 ha per year * 20 m³ per ha = 306,000 m³/year), which is less than 2 percent of current demand. Clearly, Brazil's capacity to implement concessions was severely challenged during the first decade by the delays and bureaucracy. However, it is likely we may see increasing efficiency with practice and familiarity with the system. Indeed, in the last two years the Brazilian government has managed to launch an additional 18 concession units, in four Flonas (Altamira, Itaituba I, Itaituba II and Amana, in Pará state), covering 885 thousand ha. Therefore, by the end of 2015, Brazil should have 1,345,000 ha under concession. However, according to SFB, 25 of 32 Amazon national forests have conditions for profitable forest production when considering aspects of logistics, productivity, economic feasibility and community use. Together these sum to almost 12 million ha, which means that in eight years only 11% of the potential production area was achieved (considering only Federal Areas). Assuming the same rhythm for the future, it would take another 72 years for Brazil reaches its full potential. Therefore, it seems fair to wonder whether Brazil concession scheme succeeded.

From international experience, however, it is clear that forest concessions are complex and their implementation not easy. Therefore, it is important that we examine this experiment and share lessons from what is an important effort in tropical forest policy and management. First, Brazil, and in particular the SFB in the early stages of design, took the time and effort to effectively engage almost every single interested sector, which is an impressive achievement that is often suggested by international experts, but rarely done. Brazil has taken almost every suggestion made by social, environmental, and economic advisors regarding concession design and implementation to heart. Secondly, Brazil with its large forest estate, established industry and market has a good chance of success, and so long term investment in the sector is possibly warranted. Third, Brazil for all its lofty goals and missed targets has managed to allocate 460,000 ha to concessions under the most stringent government control and oversight, and now has an additional 900,000 ha underway, which is no slight feat. And fourth, the presence of concessionaires in National Forests has reduced the vulnerability of those forests to invasion and degradation. Any sign of illegal logging in the surrounding area is immediately reported to SFB, which take measures along with environmental agencies and Federal Police to catch offenders in the act.

In contrast, a number of challenges can be listed among institutional, political, business, and social aspects. The current system involving three institutions increases transparency and provides checks and balances between institutions, but unfortunately also brings exponential operational complexity, costs and has significantly constrained the implementation of the program. Also, since the individual States tend to copy the Federal system, the complexity is reproduced throughout the Amazon. Those issues would be easier to overcome with increased political will toward the development of a forest-based economy in the Amazon. The lack of attention has resulted in a damaged forest industry, ill prepared to the stringent requirements set in the concession policy and market. Moreover, the industry still has to deal with the cheaper timber from illegal logging, a practice widespread in the Amazon, although it has purportedly declined from 80% to 30% in the last decades (Pereira et al., 2010). Finally, the sharing benefits expected from a public forest concession with local populations have not yet succeeded. Mechanisms to increase the participation of communities (e.g. collecting non-timber forest product) or community enterprises (e.g. to have a concession) in forest concessions are far from being fulfilled.

In conclusion, if we take a comprehensive and encompassing view of the process and results, the concession experiment in Brazil can be said to be maturing slowly but steadily. However, it can definitely benefit from critical improvements. Here we present four considerations for the short term. First, the SFB should be provided with institutional conditions to manage forest concessions alone. Second, the bidding process should be streamlined and initial investment requirements reduced. Furthermore clear, stable, and transparent rules should be maintained to encourage more investors. Third, the economic, environmental, and social impacts of the concession should be monitored frequently and advertised to society. And finally, concession timber should be fully traced and differentiated in the marketplace in an effort to seek a higher price and compete with illegally sourced product. These four considerations are detailed below.

If Brazil's intention to develop a forest-based economy in the Amazon as a counterpoint for the expensive command and control strategy is to be taken seriously, it needs to provide an institutional framework able to implement the strategy with the agility and effectiveness demanded by business environments. The transaction costs associated with intense government bureaucracy, including variable protocols and philosophies, will inevitably deter potential investors. For example, even in Federal areas designated for sustainable use in average only 60% of the area is available for forest management. This restriction is supported by ICMBio, which has a conservation mandate. However, the choice may negatively influence the economic development sought by government when the area was originally allocated to sustainable use. With protected areas in Brazil already designated for restricted protection or sustainable use, their management should perhaps be through institutions with the relevant vocation.

It is also quite clear that the investment conditions for timber concessions are not attractive yet, especially considering the harsh Amazon conditions. The initial high investments and government bureaucracy may discourage investors. Furthermore, small and medium scale enterprises are unable to compete under the current conditions. A careful review of profitability for timber concessions and balance between oversight and investment opportunity should be undertaken. If forest concessions are to be a positive influence in the local community and economy, the constraints to this eventuality must also be identified (e.g., limited

skilled labor pool) and overcome. Moreover, since these are public forests, the government needs to ensure the maintenance of forest health throughout the concession period. This will require the establishment of environmental monitoring protocols. Some of these protocols are easier to establish (e.g. reduced impact management techniques) than others (biodiversity monitoring). The problem is usually related to the degree of change accepted, since changes are expected in managed systems (Azevedo-Ramos et al., 2005).

And finally, it is quite obvious that all this effort may be useless if the tropical timber market is flooded with cheaper products from unsustainable production. Clear traceability of legal products complemented by monitoring and enforcement of illegal production will hopefully increase returns to timber concessions. It may also be prudent to differentiate concession products (Cai and Aguilar, 2013) and to examine the potential export markets for legal timber as some countries have already adopted barriers to the entry of products purchased with non-proven sustainable sources (EFI, 2008).

Based on the experience of the past decade and the evidence of continued challenges ahead, it seems too early to say that Brazil has succeeded with its system of forest concessions. Without doubt, important steps have been taken and some advance made. But if concessions are to succeed the Brazilian government must now give clear signals of its intention to strengthen this public policy and to make the necessary course corrections.

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Contributions

- Contributed to conception and design: CAR, FM
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