

Brazilian forest concessions: the contrast between goals and actual impacts.

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Abstract. In 2006, the forest concessions are established in Brazil as a means to control deforestation and provide sustainable timber production. This article presents a study on this mechanism and its impacts, using bibliographic study and data analysis on the history of Brazilian forest concessions and the forest-based industry. The main results obtained were that concessionaires comply with indicators and contract clauses, productivity has been lower than estimated, and there are improvement measures to be implemented in relation to environmental and social indicators. It led to the conclusions that forest concessions in Brazil have great potential for growth and show that it is possible to merge production with sustainability while reducing environmental degradation and generating local jobs and social investments, but there is a need for new discussions to achieve greater results. The study highlights the importance of forest management for the production of timber and not timber products and provides insights about the performance and results of forest concessions in Brazil.

Keywords. Forest concessions, Brazil, forest management, impacts of concessions

1. Introduction

"What will happen if (...) the current ways of life of rich peoples actually become universal? The answer to this question is clear and unambiguous: if this were to happen, the pressure on non-renewable resources and the pollution of the environment would be such (or, alternatively, the cost of pollution control would be so high) that the world economic system would necessarily collapse. [1].

The conclusion of the renowned author of the Brazilian economy about the effects of the world industrialization is presented as a prophecy of economic collapse. Currently, this prediction is noticeable and recognized by most authorities around the globe.

Concerns about the irreversible processes of environmental degradation have been demonstrated since the end of the last century, as in the Kyoto Protocol (1997) and extends to the present moment with constant reviews of global climate agreements and events such as the Paris Agreement (2015), Climate Summit (2021) and COP27 (2022).

The Brazilian role in combating the environmental crisis is extremely relevant due to the historical high

of greenhouse gas (GHG) emissions, mainly caused by the Land Use Change and Forest sector, responsible for about half of the total national emissions [2]. The Brazilian forests cover about to 58.5% and 36.5% of its total extension is composed of public forests, whether their native or planted. In addition, most of these are located in the Amazon biome [3]. Thus, measures to combat deforestation of public forests are necessary and urgent given that Brazil has assumed the goal of reducing emissions by 50% of the base from 2005 by 2030 and the conservation areas of the forest sector store 4.5 billion tons of CO₂ [4].

Two opposing regulatory alternatives emerge from the concerns with the preservation of forest areas. The first is based on government action through the "command and control" mechanism. The second is carried out through market mechanisms and civility [5]. At first, total control by the government it appears to be the most appropriate option, due to the high importance of preserving these regions. However, the high costs of conservation in line with the inability of the Brazilian government to eliminate the high rates of deforestation at the end of the twentieth century culminated in the need for new forest management instruments.

In 2006, the Law on Public Forest Management (Law

11,284 / 2006) was established in order to regulate the sustainable uses and production of these areas. The innovative instrument of this legislation is the forest concession, which is defined as an onerous delegation, by the granting authority, of the right to practice sustainable forestry activity for the exploitation of timber and non-timber products and services through a management plan, by means of bidding, to a legal entity, in consortium or not, that achieves the requirements of the respective bidding notice and demonstrates financial and technical capacity for its performance for determined period [6]. This legislation aimed to coordinate policies to promote sustainability in line with the productive use of forests, optimizing preservation costs and providing managed performance in the extractive activity.

The main objective of this paper is to analyze the contrast between the expected results and the actual impacts of Brazilian forest concessions, especially in their social, environmental and economic aspects. Initially, the forest concessions and the forest-based industry will be characterized, later, the goals and results will be exposed.

1.1 Forest Concessions

The design and implementation of forest concessions involve coordination between the government, the private market and civil society, especially traditional communities and native peoples located near the concession area. The need for this instrument in the Brazilian economy stems from the effect of government relief and the improvement in the efficiency of the control of the national wealth contained in public forests.

The process of the concession can be divided into 3 phases: 1) pre-bidding, 2) competition and contracting (BID) and 3) implementation of the contract. The starting point is the realization of the National Registry of Public Forests, followed by the creation of a Management Plan and complementary technical studies and, finally, there is finalization of the bidding process and signing of a contract [3].

In 2022, there is a total area of 1.153 million hectares of public forests under concessions, established in 19 forest management units (UMFs). They are located in seven federal forests in the states of Rondônia, Amapá and Pará and are managed by 11 concessionaires. At the moment, there are 8 other forests in the BID phase, 5 in the Amazon region and 3 in the southern region [3].

According to the Annual Forest Grant Plan [7], which defines the federal public forests that have a vocation for concessions, there are 5.4 million ha available for concession, located in eight states – Amazonas, Amapá, Pará, Rondônia, Roraima, São Paulo and Santa Catarina. This proposition denotes the expansive potential of concessions, especially in other Brazilian producing regions, such as the southeast and south.

1.2 Forest-based industry

Forest production is divided between timber and non-timber products. In the national territory, the timber-based materials have greater relevance and can be categorized into three main production chains, according to Valverde et al., 2012 [8]:

- 1) Industrial wood: pulp, paper and reconstituted wood panels;
- 2) Mechanical processing wood: sawn and plywood;
- 3) Wood for energy: firewood, chips and charcoal

In Brazil, the pulp and paper sector is the most representative in terms of production and international trade. The structure of this industry is characterized by a relevant history of mergers and acquisitions, competition between large corporations and large investments in R&D, mainly due to the need for genetic improvement of species and constant technical expertise. The paper industry has great productive resourcefulness and its commercialization is centered in the domestic market. Although this sector presents great market relevance, its production is carried out in planted forests owned by large companies and does not usually suffer direct impacts from public forest concessions.

The timber industry is the object of the concessions and has a high productive relevance in the domestic market. Its main subsegment, sawn wood, has maintained a constant production level since 2016, with production around 10 million m³, with more than 90% of its total directed to the domestic market. The wood panel sub-segment has shown remarkable growth, with a volume of 8.9 million m³ of sales in 2021, of which 8.2 million are domestic consumption. Despite the large timber production, Brazil does not stand out among the main exporters, which shows the weight of the domestic market for the industry [9] and the possible lack of international competitiveness. This industry offers a wide variety of products with different forest species. Moreover, the type of production varies considerably according to the format of the forest (planted or native) and territorial location. Log wood is the base of the production chain, categorizing the extractive activity and most of its production from native forests is concentrated in the Amazon region of Brazil. As for the processing industries, the higher the added value of the wood product, there is a greater productive displacement to the Southeast and South, which concentrate the largest number of companies in the country.

Regarding the profile of timber companies, AMBICI, 2019 [10] outlines two distinct categories:

- 1) Small business: they are sprayed throughout the national territory and usually have high dependence on the timber market, because they are not verticalized.

They are labor intensive and pays reduced tax burden;

- 2) Medium and large business: they are usually located in timber poles, due to the verticalization of production, which reduces their vulnerability to the log market. Such companies tend to be more technological and position themselves strategically in the foreign market, ensuring great relevance to international certifications and standards;

This production chain does not present high market concentration rates due to the expanded presence of small and medium-sized companies, without predominance of large groups. However, the sub-segments of wood have differences about the concentration, given that large companies have greater capacity for processing and international trading.

Most timber companies have not yet achieved market consolidation, pointing to low productive yield, low levels of investment and technology. In addition, the problem of the commercialization of illegal timber at low prices directly harms the development of the sector, since competitiveness through price war is fierce. Thus, Brazil has a strong forestry vocation and the external scenario is favorable due to the growing demand for wood in its various levels of processing. However, the timber industry is incipient, requiring deeper incentives.

In general, the productive chain of the forest-based sector has a 7.3% share in the value added of the national transformation industry. Between 2010 and 2021, the wood products industries grew by 11.8 percent, while the total value added of the transformation industry declined by about 11 percent. The potential growth of this sector is expanding, with a forecast of R\$ 60.4 billion in investments between 2022 and 2028 [4]. Given the domestic and international panorama, a substantial effort by the private sector and the government is necessary to promote and ensure long-term supply and gain new markets. Among the main trends is the growing demand for certified products, which it is in line with the expansion of forest concessions.

2. Metodology

This article was developed through bibliographic study and data analysis on the history of Brazilian forest concessions and the forest-based industry. For the analysis of the impacts, a case study was carried out based on the BID notice documents and Summary Reports of the Independent Forest Audits (IFAs)[11], which are mandatory for all concessionaires. In this sense, the last IFAs (2019-2021 cycle) of 11 FMUs in operation in the period will be used.

3. Results and discussion

3.1 Social, environmental and economic

expected impacts of forest concessions

In this session, the main objectives and requirements to be achieved by a Brazilian forestry concession will be highlighted. Such analysis will be made based on the bidding notices existing so far, focusing on the following annexes: Object of the Concession, Technical and Economic Viability Study and Parameterization Form of the Indicators.

It is common to all processes that the selection of the concessionaire company is carried out through the presentation of the best technical proposal (indicators) and price. The indicators are divided between eliminatory (basic and essential requirements for proper forest management) and bonuses (factors that enhance the benefits of the concession). The achievement of the first is mandatory in the contract, while the second presents an advantage to the concessionaire when reached. Thus, these parameters will be considered a relevant part of the expected objectives of the concessions. In addition, official positions released by the granting authority and civil society will also be used.

In short, impacts are expected on 4 main fronts: environmental, social, productive efficiency and adding value to the forest product/service. In each concession project, there is a different weight for each front, given the specificities of each forest. Therefore, forests located in regions with greater need for local economic development will give more weight to social indicators. As well as places with a higher incidence of environmental degradation, it will give greater weight to the parameters of preservation and monitoring.

In general, the indicators of highest incidence and relevance are:

- 1) Environmental: reduction of damage to the remaining forest during forest exploitation and monitoring of the dynamics of growth and forest recovery;
- 2) Social: investments in the local community (infrastructure and services), generation of local jobs and in the concession and training for employees and the surrounding population;
- 3) Efficiency: diversity of products, species and services exploited in the management unit, use of waste wood and adoption of innovations associated with forest management;
- 4) Value addition: degree of local processing of the product.

In this way, it is expected that the concessions will be sustainable, protecting the native area with efficient and monitored management. It is also expected to have positive impacts on the economy and society around it, from income generation and continuous structural improvements, without creating negative

externalities. In addition, there is an expectation of an optimized production, with the search for constant technical improvements and the use of all forest potential, boosting the entire forest-based industry.

3.2 Performance and actual impacts

In this section, the objective is to understand the overall performance of current concessions and their real impacts.

The eliminatory indicators mentioned above become mandatory contractual clauses, so the independent audit oversees the full compliance with all these requirements. Considering the management units with active operation between 2019 and 2021, we have that 84% of the total contracts were being fulfilled until the beginning of the audit. After the audit, it was observed that of 63 nonconformities found, 52 were fully resolved or already had action plans in place. The resolution rates of nonconformities can be seen in Table 1.

Table 1: Nonconformities of contract fulfillment and resolution rates.

FMU	Concessionaire	Nonconformities	Resolution rates of NCs (%)	Concessionaire experience (in years)
Jacundá I	Madeflona	3	100%	10
Jacundá II	Madeflona	3	100%	10
Jamari I	Madeflona	1	100%	10
ST (Lote Sul) IA	Ebata	3	100%	10
Jamari III	Amata	5	100%	10
ST II	Ebata	13	100%	10
Altamira I	RRX	7	100%	5
Altamira II	RRX	8	100%	5
ST (Lote Sul) IB	Samise	8	63%	5
Altamira III	Pataúá	6	33%	5
Altamira IV	Pataúá	6	33%	4

It is observed that companies with longer experience in concessions tend to have lower numbers of nonconformities. In short, the most recurrent nonconformities are related to environmental and social indicators. In the environmental aspect, most of the problems concern the demarcation and effective Forest Protection Plan, which reflects the difficulty on the part of some concessionaires to control extensive regions. However, the proactivity of the agents in the negotiations with the granting authority to balance the problem is notable. In the social scenario, small inadequacies stand out in relation to the structure and training provided to employees, which may represent an erroneous attempt to cut costs by the concessionaires. In general, the concessionaires comply with the indicators and the forest concession contract. The contractual non-conformities are known to the managing body and able to corrections through action plans. Thus, the performance of the concessionaire companies so far is considered positive.

Under the productive aspect, it was observed that only 61.5% of the annual production estimated by the public notices was achieved by the concessionaire during the 2019-2021 cycle. In this case, the only public forest that demonstrated to

have effective productivity higher than estimated is Sacará-Taquera, which presented a high number of nonconformities and low resolution rate in one of its FMUs. Contrasting the annual productive potential, calculated by the Brazilian Forest Service (SFB) [12], and the production realized in the period, an even lower general index is observed, with less than half of the potential being reached (Table 2). According to the SFB [12], this performance can be explained by several reasons, mainly by the presence of defects that compromise the commercialization of the wood, inexistence or reduced acceptance of certain tree species by the market, impossibility or convenience of the companies in relation to the full operation of the authorized management area. Such indexes may represent problems beyond productivity; however, it is an indication of reduced level of it.

Table 2: Productivity in public forest concessions.

Public Forest	Actual Production Estimated Production	Actual production – 2021 Potential production – 2021
Altamira	42%	47%
Caxiuana	46%	33%
Jacundá	76%	62%
Jamari	70%	89%
Sacará-Taquera	124%	50%
Total	62%	49%

In relation to environmental degradation, it was analyzed that, although there are improvement measures to be implemented, the regions under the operation of concessionaire agents significantly reduce predatory and illegal exploitation. According to the Instituto Escolhas [13], the deforestation observed in the FMUs is lower than in other parts of the public forests and when deforestation advances on the public forests, it also threatens the concessioned management areas. In this way, the activities of sustainable management of forest concessions and government actions of command and control of deforestation complement each other. In this sense, the concessionaires are active in the mapping, surveillance and denunciation of illegal invasions, providing support for inspection. In addition to these actions, SFB [3] has a contract to generate selective cutting alerts with Planet images focused on the areas, identifying wood thefts and illegal mining.

In the social aspect, the level of formal jobs arising directly from concessions was 1. 140 positions in 2019 and was estimated to generate 2,000 indirect jobs in the same period, according to SFB [3]. In addition, case studies estimate local job growth in some affected municipalities, even in periods of recession, as shown by Ribeiro, J. R., Azevedo-Ramos, C., & dos Santos, R. B. N. [14]. A possible impediment to the increase of this generation of local jobs is the shortage of skilled labor in municipalities of small economic magnitude, which can move these vacancies to larger municipalities, also reducing the level of wood processing in poorest regions. In addition, from 2015 to 2018, R\$1,154,613.17 was invested in infrastructure and social services in 4

surrounding municipalities [12].

In economic aspects, forest concessions generated about R\$28 million in revenue in 2021 and have a growth trend, due to the increase in concession projects in the last year [12].

In relation to the market performance of the companies, there is an untapped potential in the diversification of products and services. In this sense, most of the current concessions do not cover the commercialization of non-timber products and services, and those that do tend not to be complied with by the concessionaires. In addition, there is an explicit prohibition of research with genetic heritage and commercialization of carbon credits, making the design of concessions more rigid. According to a study conducted by the Instituto Escolhas [13], the implementation of carbon credits in concessioned and concessionable forests in the Amazon region can reach up to US\$ 24 million/year, which corresponds to 2 times the volume of credits generated in avoided deforestation projects in Brazil. In the Atlantic Forest region, the potential for generating credits for reforestation is equivalent to US\$ 980 thousand/year, which represents 3 times the current volume of Brazil credits. In addition, the study also predicts that carbon credits can increase concession revenues from wood management by 43%, complementing the income from the activity and improving the cash flow of concession projects.

Therefore, the current design restricts the economies of scope that can be created from forest products and makes concessions less attractive to companies, given the needed structure for contractual execution and the few alternatives for economic exploitation. Although there is a recent advance in the discussion in question, the design of the concessions still contains few incentives for the innovation of forest products other than wood.

The impacts of forest concessions on the timber industry can be classified in terms of price, competitiveness and international reputation. The certification of legal wood from concessions enables a greater number of companies to achieve international standards. In addition, the seal of sustainability and quality of noble species raise the added value of wood. In competitive terms, the increase in supply can lead to greater competitiveness, stimulating the search for innovations and attempts to differentiate the product. However, in the current scenario, in which most timber companies do not have market consolidation, the availability of forests for concession without any other incentive policies may lead to market concentration, given that small companies will not have the capacity to process and execute the robust concession contract.

4. Conclusion

In conclusion, the Brazilian forest concessions are an advance in the public management of forests and

there is a great potential for growth. Concessionaires performance shows that it's possible to merge production with sustainability. Moreover, studies and audits also reveals that ambiental degradation is reduced in forest management units and the population benefits from generation of local jobs and social investments. In economic terms, forests concessions raise the added value of the timber by sustainability certification and can lead to greater competitiveness to the industry. However, the production in these areas are reduced in comparison to the expected. In addition, the design of concessions forbid the revenue from carbon credit and the low interest of companies restricts the economies of scope that can be created from non-timber products and forest services. Thus, it is needed new discussions about these topics to achieve greater results.

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