

Legal Framework on Protected Areas and Land Use Change in Brazil

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Abstract. This paper reviews pertinent literature about international and domestic environmental law regarding especially protected areas, land use, and land-use change in Brazil. It also identifies and analyzes Brazil's main legislation on Protected Areas and legal land clearing possibilities, particularly in Legal Amazon. The National System of Conservation Units (SNUC - Law No. 9.985/2000) and the Forest Code (Law 12.651/2012) are studied in relation to the Convention on Biological Diversity (CBD), the Paris Agreement's goals and the country's Nationally Determined Contributions (2016 NDC). We look into the historical process of Legal Amazon occupation and the current state of protection, describing more than 12 (twelve) types of protected areas ownership regime, main purpose (conservation, sustainable use, land-use change restrictions in private lands), and possible activities. Complexities, instruments, and fragility of Brazil's main environmental laws are gathered and described, emphasizing the country's legal strengths to comply with international laws and global objectives to face the climate crisis.

Keywords. Legal Amazon, Protected Areas, Brazilian Forest Code, Land Use, Land Use Change.

1. Introduction

The 2015 Paris Agreement and the Biological Diversity Convention (CBD) are two milestones in environmental international law, with inestimable social, economic, and political repercussions worldwide. The CBD entered into force in 1993 and has been agreed upon by 196 nations at the 1992 Rio de Janeiro Earth Summit (ECO-92), it is focused on safeguarding the biodiversity of the planet, while ensuring the sharing of benefits and sustainable use of genetic resources by all countries. The Paris Agreement, also adopted by 196 parties at the 2015 United Nations Climate Change Conference (COP-21), aims to improve worldwide response to the climate change threat by addressing the issues of global warming, food production safety, greenhouse emissions, and the necessary financial flows for these goals. An essential instrument of the Paris Agreement are the Nationally Determined Contributions (NDCs), goals that each participant nation must establish, and update every 5 (five) years, in their domestic context in order to "...reduce national emissions and adapt to the impacts of

climate change" [1].

As it is vastly reported, deforestation is one of the main concerns regarding the climate crisis and Brazil's negative contributions to the rising global temperatures average and biodiversity loss especially in the Amazon rainforest ecosystem [2]. This is why Brazil's 2016 NDCs expressly address environmental law enforcement as one of the measures to maintain global temperature rise below 2°C (two degrees celcius). Through literature review, identification and analysis of the legal regulatory framework of protected areas in Brazil we are going to explore Brazilian dispositions on land use, land-use change, forestry, and land clearing, and how the country's complex environmental legal system complies with the international commitments and the Nationally Determined Contributions (NDCs) [3] made by the parties in the Paris Agreement and the CBD.

2. Legal Amazon

The Amazon Rainforest, in its geo-ecological

meaning, represents the largest biome in Brazil and covers 49,5% of the national territory [4]. Although, since 1953, aiming to facilitate and rationalize regional planning, development and integrational purposes, a sociopolitical administrative concept has been in use: the Legal Amazon.

The Legal Amazon has an approximate area of 5.217.423 km² (about 61,3% of the country's territory) and comprises nine states: Acre, Rondonia, Amazonas, Roraima, Para, Amapa, Tocantins, and 181 municipalities of the state of Maranhão located west of the 44th meridian [5].

The occupation of the Amazon region has been traditionally promoted and incentivized by the State [6][7] faced as a matter of the National State sovereignty and security, answering both national and transnational interests [6][8]. Usually reputed as "empty territories" and "demographics voids" [9] to be rationalized and exploited in a continuously modernized colonial framework [10]. The main activities which have historically fostered the occupation of the Amazon region are mining, agriculture and livestock, also, forest extractive activities, such as the latex/rubber industry, logging, etc. and the large scale infrastructure and energy projects [10][7].

However, this exploration and production, more recently constituted as "...the commodities consensus: the power pact around the agro-mineral-hydro-bio-carbon-business and commodity exports." [7], has led to complex social and environmental impacts, being the large-scale deforestation [7][11] [12][13] one of the most concerning and impactful of them.

2.1 Arc of Deforestation

From 1985 to 2020, Mapbiomas [14] land use and land cover tracker shows that the Amazon biome has lost 44 Million hectares¹ of native forest vegetation, mainly to agriculture. The arc of Deforestation is the region where the highest rates of deforestation are observed in the Legal Amazon, boosted by road vectors and enterprises that follow these territory openings

Fig. 1 - Limits of the Brazilian Legal Amazon and the spatial distribution of deforestation, with emphasis on the "Arc of Deforestation" (adapted from Brasil 2008). Reprinted from "Ocupação Humana e Transformação das Paisagens na Amazônia Brasileira" by G.H. Lui and S.M.G. Molina, 2009, Amazônica - Revista de Antropologia, 1, p. 206.

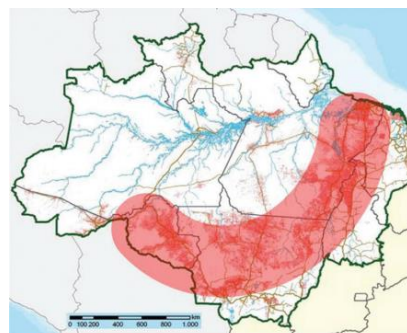
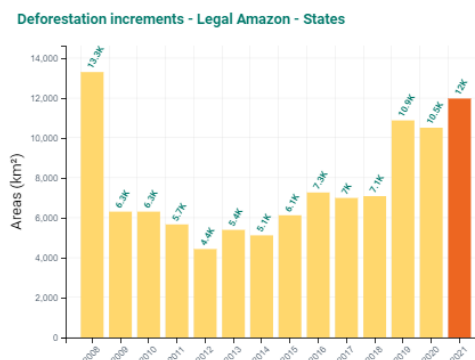


Fig. 2 – Deforestation increments in the Legal Amazon from 2008 to 2021.



In 2021, under President Bolsonaro's government, the National Institute for Space Research (INPE) registered the most expressive peak in deforestation rates (Fig. 2) since 2006². Pará accumulates the highest rates of deforestation (Fig. 3) - including records of deforestation in Conservation Units (Fig. 4).

Fig. 3 – Accumulated deforestation increments in the Legal Amazon States.

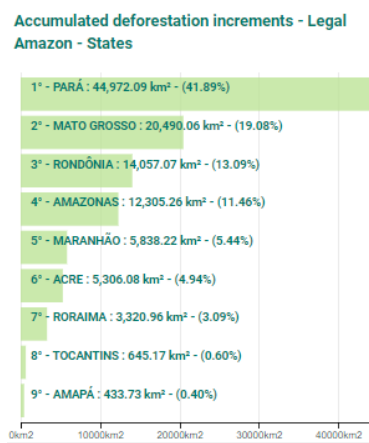


Fig. 4 – Accumulated deforestation increments in the Legal Amazon Conservation Units – 8 (eight) out of the 13 (thirteen) are in the State of Pará.

¹ An hectare is a measurement of an area of land equal to 10.000 square meters. 1 hec. = 10.000 m².

² As it is possible to verify in TerraBrasilis Geographical database, Project PRODES (Monitoring of the Brazilian

Amazon Forest by Satellite, since 1988), developed by INPE. Available from: <http://terrabrasilis.dpi.inpe.br/en/home-page/>

Accumulated deforestation increments - Legal
Amazon - Conservation Units



3. Protected Areas in Brazil

The story of legal protection of special areas in Brazil goes back to the beginning of the 20th century, in 1911, when took place the creation of the first Forest Reserve in Acre which has never been implemented. However, it was only in the 70s, aligned to the international debate and impulses of the environmental movement, that the process, policies, and criteria of planning and creation of Specially Protected Areas started to mature and gain the contours of today's structure [15][16][17].

In light of that, since 2000 Brazil has had a national and unified system of conservation units, the National Conservation Units Management System (SNUC), established by Law No. 9.985/2000 [18] (regulated by the Decree-law No. 4.340/2002) [19] which stipulates two main kinds of conservation units, **Fully Protected Conservation Units**³ and **Sustainable Use Units**, and its 12 (twelve) specific Protected Areas (PA).

According to the Brazilian Conservation Units Panel, Brazil has 18,7% (eighteen point seven percent) of its continental area protected as Conservation Units [19]. Also, data from the Brazilian Agricultural Research Corporation (Embrapa) [21] shows that until 2018, almost 60% (sixty percent) of Brazil's area was under some kind of protection, approximately: 13% (thirteen percent) as indigenous lands; 18% (eighteen percent) as Conservation Units; 25% (twenty-five percent) as legal reserves or others registered in the Environmental Rural Registry (CAR).

3.1 National System of Management of Conservation Units

Conservation Units are established by the public administration at the federal, state, and municipal levels in order to ensure the protection and/or the sustainable use of natural resources. All of them allow visitation for educational purposes and Scientific Research following the unit's Management Plan and/or other applicable regulations and

³ For comparison effects, other useful denominations for the Fully Protected Conservation are: Integral Protection

previous authorization.

In Fully Protected Conservation Units the goal is to preserve nature, allowing only the indirect use of its resources (art. 7 SNUC, §1), and there are 5 types of them: Ecological Station (ESECE); Biological Reserve (REBIO); National Park (PARNA); Natural Monument (MONAT); Wildlife Refuge (REVIS).

- Ecological Station, Biological Reserve, National Park are Conservation Units of **public possession and public domain**.
- Natural Monument and Wildlife Refuge **can be of private ownership**, as long as it is possible to reconcile the objectives of the protected area and the use of land and resources by its owner. In case of incompatibility, the area must be expropriated.

On the other hand, Sustainable Use Units primary goal is to make nature conservation compatible with the sustainable use of part of its natural resources (art. 7 SNUC, §2), for which 7 kinds of units can be created: Environmental Protection Areas (APA); Area of Relevant Ecological Interest (ARIE); National Forest (FLONA); Extractive Reserve (RESEX); Wildlife Reserve (RFAU); Sustainable Development Reserve (RDS); Private Heritage Natural Reserve (RPPN).

- RDS, RFAU, FLONA, and RESEX are Conservation Units of **public possession and public domain**.
- APA and ARIE **can consist of both public and private land**. Rules and restrictions to the use can be imposed upon the private land.
- RPPN is of **private ownership**, created at the initiative of the landowner and registered in perpetuity in an agreement with the environmental agency, as long as that is of public interest.
- **Traditional peoples and communities residing** in the area of a FLONA **at the time of its creation may remain**, following the unit's Management Plan. For the other Sustainable Use Units the area must be expropriated.

Beyond those, SNUC also institutes other solutions regarding the Conservation Units' integrated and participatory management, for instance the Conservation Unit Mosaics (art. 26 SNUC) and the Ecological Corridors (art. 2 SNUC, XIX). Yet, Medeiros (2006) alerts for the common mistake of narrowing Brazil's Specially Protected Areas to those in SNUC, as some other areas, mainly in the State and Municipal levels were left out of the system, due to historic, jurisdiction and political conflicts [19][16][22]. Such as Forest areas regulated by international agreements, i.e., Ramsar Sites,

Conservation Unit and Strict-use protected areas.

Biosphere Reserve, Natural World Heritage Sites; and areas regulated by older and/or local legislation, as Listed Areas (i.e. São Lourenço Fort, in Bahia), Ecological Parks and Urban Parks (usually created by the municipal government) and Ecological Reserves (Decree-Law 89.336/1984).

It is also important to point out that the development of Brazilian PAs is inextricably linked to the matter of traditional populations territories, such as indigenous, quilombolas and other communities. The Constitution of Brazil (CF/88), promulgated em 1988, and the Temporary Constitutional Provisions Act (ADCT) reflect core provisions on that matter.

4. Protected Areas regulated by the Forest Code

Brazilian Forest Code (Law No. 12.651 / 2012) [23] is the main law that regulates vegetation protection, land use, land-use change, and forestry according to sustainable development principles, including in private lands. Then, If SNUC is about conservation in the integral space of an area, the Forest Code, on the other hand, is focused on reserving amounts of productive lands where land-use changes and economic activities are expected. However, society and the legislator understood it to be essential to maintain and restore portions of its natural conditions.

Protected Areas established by the Forest Code are 4 (four): Permanent Preservation Area (APP - art. 3, II), Restricted Use Area (AUR - Chapter III), Legal Reserve (LR - art. 3, III), Green Urban Areas (art. 1, §2, XX).

4.1 Permanent Preservation Area

According to article 3, I, of the Forest Code, an APP is a protected area, usually demanded in rural areas, covered or not by native vegetation, set to preserve water resources, the landscape, geological stability and biodiversity, facilitating the gene flow of fauna and flora, protecting the soil and ensure the well-being of human populations.

About the regime of APPs' (chapter II, section II, Law No. 12.651 / 2012) we highlight:

“Art. 7 The vegetation located in a Permanent Preservation Area must be maintained by the owner of the area, possessor or occupant in any capacity, individual or legal entity, of public or private law.”

- The owner, possessor or occupant has the obligation to promote the **reforestation** of the area **in case of unauthorized land use change**;
- **Land use cover changes can only occur** in cases of public utility, social interest or low environmental impact uses. In the case of native vegetation protecting springs, dunes

and sandbanks, deforestation, change is only possible when declared public utility;

- People and animals can access APPs for obtaining water and carrying out activities with low environmental impact.

APPs are generally delimited considering water rivers and other water bodies, therefore, is it generally correct to assume that riparian areas are APPs. More specifically, the APP size is measured according to the water body width as stated in chapter II, section I, of the Forest Code.

In small or family properties, as long as it does not imply the suppression of new areas of native vegetation, it is permitted to plant temporary and seasonal short-cycle ebb crops in the strip of land that is exposed during ebb season.

4.2 Legal Reserve

According to article 3, III, of the Forest Code, a Legal Reserve is a protected area located inside a rural property or possession, set to ensure the sustainable economic use of the natural resources of the rural property, assisting the conservation and rehabilitation of ecological processes and promoting the conservation of biodiversity, as well as the shelter and protection of wild fauna and native flora. More objectively, it is an area that varies according to the size of the land and its location, in which native vegetation must be kept out of use and conserved by the rural estate property's owner, landholder, or occupant, public or private (art. 17).

Without prejudice to areas regulated as APPs, art. 12 of the Forest Code determines minimum percentages for Legal Reserve areas, especially addressing areas within the Legal Amazon (Tab. 1).

Tab. 1 - Productive vs. Legal Reserve minimum percentages according to Brazil's Forest Code (Law No. 12.651/2012).

Land Use	Brazil	Legal Amazon		
		Forest	Cerrado	Grassland
Productive (%)	80	20	65	80
Legal Reserve (%)	20	80	35	20

All rural properties must register the Legal Reserve area in the Environmental Rural Registry (CAR), by the presentation of the property's location, layout and descriptive memorandum. On possession, the Legal Reserve area is guaranteed by a term of commitment signed by the holder with the competent body of the National Environmental System (SISNAMA), with the force of an extrajudicial executive title (Art. 18, § 2).

To prevent the reduction of the original area, in the

occurrence of fractioning or subdivision of the property by transmission or dismemberment, it is prohibited to alter Legal Reserve's ecological purpose (art. 18). Also, the insertion of the rural property in the urban perimeter defined by municipal law does not release the owner assister from maintaining the Legal Reserve area (art. 19).

Finally, the APP area can be accounted for the RL percentages as long as (art. 15): the benefit does not imply the conversion of new areas for alternative land use; the area to be computed is conserved or in the process of recovery; there is an existing request of inclusion of the property in CAR.

As long as authorized by SISNAMA, it is possible to economically exploit the Legal Reserve area through forestry sustainable management (art. 17, § 2), as it follows: Art. 21 - it is free to collect non-timber forest products, such as fruits, vines, leaves and seeds, (restrictions observed); Art. 22 - it is possible to explore the RL's vegetation for commercial purposes (logging, timbering, etc.), following an Sustainable Forest Management Plan and in compliance with some guidelines; Art. 23 - for the consumption of the property itself (non-commercial purpose), it is not necessary to have authorization for eventual forestry exploitation. The motivation and the volume exploited must be previously declared to the environmental agency, limited to 20m³ (twenty cubic meters) annually.

It is important to note that the same limitations apply to areas out of the Legal Reserve.

The new Forest Code, as it had been called for some time, regarding the social function of the rural property: "...established two distinct regimes: one applicable to properties where illegal deforestation occurred in a legal reserve area or permanent preservation area – called a consolidated rural area – before July 22, 2008, and another regime applicable to properties that suffered deforestation after that date." [24].

Therefore, it was mandatory to immediately suspend activities in a Legal Reserve area irregularly deforested after July 22, 2008. Also, according to art. 17, §4, in those lands where the Legal Reserve minimum percentages, and/nor the APP preservation (art. 15) had not been observed, the process of recomposing the Legal Reserve had to be initiated until December 2020 and completed within the deadlines established by the Programa de Regularização Ambiental (PRA) [Environmental Regularization Program], without prejudice to administrative, civil, and criminal sanctions.

Joining PRA guarantees the landowner or possessor some benefits, such as sanctions suspension, rural credits, and others. For those areas with APPs and/or Legal Reserves degrades beyond the legal limit before July 22, 2008, art. 66 commands its regularization by the adoption of some alternatives: I - recomposing; II - allowing the natural regeneration of vegetation, and or; III - compensating

the Legal Reserve area with another area. The compensation must be done in areas of the same biome and of equivalent size, and if outside the State, located in conservation-priority areas. It can be done by (art. 66, §5): I - Cota de Reserva Ambiental (CRA) [Environmental Reserve Quota] acquisition; II - environmental servitude lease; III - donation of land located in a Public Domain Conservation Unit pending land regularization; IV - destination of same ownership exceeding area for LR purposes.

One of the polemics associated to the Forest Code was the worry that it would "... drastically reduce the parameters of conservation in comparison with the previous law and would favor the intensification of deforestation in the Amazon." [11]. Brazil is recognized as a country with one of the most restrictive land use change regulations (Mueller and Alston 2007), and the Legal Amazon percentages for Legal Reserve are expressive. Despite that, many exceptions to the minimum size of the protected area are described by the code itself and other laws, making it possible to reduce the Legal Reserva 80 (eighty) to 50% (fifty percent) of its original area in some cases, i.e., the Ecological-Economiz Zoning (ZEE), the main instrument to territorial planning, development, and environmental governance, which has been usually implemented in regions and/or in states.

On that matter, in February 2021, Federal Deputy Zé Vitor presented a bill of No.36/2021, under analysis in the National Congress with the objective to: a) extend the deadline for small rural producers to register in CAR, until December 2024; b) extend the deadline for registration of owners in the PRA, which continues to be up to 2 (two) years, but no longer with a deadline defined by law, but only after the competent authority identifies the existence of environmental liabilities.

In light of that, it is still relevant to say that the "Legal Reserve is one of the most controversial instruments [of the code], due to the peculiarity of its application to properties located in the Amazon." [24] and historical changes that brought legal uncertainty and lack of efficiency to the institute.

5. Findings and Conclusions

In this article, we have compiled and translated information about Brazilian environmental legislation that is generally dispersed and only available in Portuguese. By analyzing the National Conservation Units Management System Law, No. 9.985/2000, and the Forest Code, Law 12.651/2012 we found that currently, Brazil has more than a dozen types of protected areas, grouped by their main goals: Fully Protected Conservation Units - preserve nature, with the indirect use of its resources and services; Sustainable Use Units - promote the sustainable use of natural resources while preserving the area; Permanent Preservation Area - protect portions of vegetation, mainly those by water rivers and other water bodies; Legal Reserve - limit

the process of land-use change in private lands, particularly in the Legal Amazon.

Besides, it has become clear that the Legal Reserve institute and the Environmental Rural Registry (CAR) are crucial instruments for the control and reduction of deforestation. However, the Code itself presents many flexibilities to the percentages of areas protected as Legal Reserves. Alongside, a bill has been proposed to extend the deadlines for rural properties⁴ environmental regularization, burdening, even more, the public administration by easing the private landowner responsibilities and weakening the CAR, and as it turns out, the fulfillment of the NDCs. Besides, in the last 4 (years) we have been watching the weakening of environmental policies and laws with notable increase of deforestation rates.

After reviewing the aforementioned laws and the literature on the issue, we have concluded that Brazil has a robust and intricate system of Protected Areas and very restrictive conditions to land use, land-use change, and biomes protection. In future studies, these conditions will be compared to those set by the Czech Forest Act No. 289/1995 and Nature Protection Act No. 114/1992 including the general framework of EU NATURA 2000, in order to find out possible insufficiencies in the legal protection of forests and on the opposite side, identify more effective regulations and instruments to achieve international law objectives.

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⁴ The old Forest code was Law No. 4.77, from 1965.

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