

Climate Policies and Forest Restoration Challenges in Bahia State South, Brazil

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Received 01 November; accepted 19 December.

Abstract

Climate change presents humanity with one of the most complex and pressing challenges of the 21st century. As such, effective public policies and legislation must be implemented to mitigate negative impacts and facilitate the adaptation of societies to new environmental dynamics. These policies are critical in aligning collective efforts toward a more sustainable and resilient economy, providing a crucial legal framework to guide individual, collective, and governmental actions toward climate change mitigation. Thereby, Brazil has committed to restoring 12 million hectares of forests by 2030 as part of its strategy to mitigate climate change. However, the absence of an express initial time frame by law has led to inconsistencies and possible low effectiveness of forest management policies. This study sought to examine Rural Environmental Registries (in Portuguese, *Cadastro Ambiental Rural - CAR*) of properties in the State of Bahia and assess restoration timetables for legal reserve areas, in addition to the challenges and opportunities associated with the formulation and implementation of forest restoration policies. Considering the implications of forest degradation on the environment and human livelihoods, it is a matter of great significance. As such, it warrants a thorough examination and analysis of the various factors involved, including the role of stakeholders, financial and technical feasibility, and the identification of appropriate goals and targets. The study findings indicate that, in 71% of the properties requiring legal reserve restoration, the timetable exceeded the established legal period of the year 2032. Additionally, in 45% of the cases, the term was calculated from the registration of the rural property in the CAR. Consequently, it was concluded that the erroneous interpretations adopted impede the recovery of native vegetation and, more significantly, the Brazilian goal of forest restoration of 12 million hectares of degraded land by 2030.

Keywords: Climate change, environmental policies, legal frameworks, native vegetation.

As Políticas Climáticas e os Desafios da Restauração Florestal no Sul do Estado da Bahia, Brasil

Resumo

A questão das alterações climáticas apresenta à humanidade um dos desafios mais complexos e prementes do século XXI. Como tal, devem ser implementadas políticas públicas e legislação eficazes para mitigar os impactos negativos e facilitar a adaptação das sociedades às novas dinâmicas ambientais. Estas políticas desempenham um papel fundamental no alinhamento dos esforços coletivos rumo a uma economia mais sustentável e resiliente, proporcionando um quadro jurídico crucial para orientar as ações individuais, coletivas e governamentais no sentido da mitigação das alterações climáticas. Em linha com isto, o Brasil comprometeu-se a restaurar 12 milhões de hectares de florestas até 2030 como parte da sua estratégia para mitigar as alterações climáticas. No entanto, a ausência de um prazo inicial expresso por lei levou a inconsistências e a uma possível baixa eficácia das políticas de gestão florestal. Este estudo buscou examinar os cadastros ambientais rurais (CAR) de propriedades no Estado da Bahia e avaliar os cronogramas de restauração de áreas de reserva legal, além dos desafios e oportunidades associados à formulação e implementação de políticas de restauração florestal. É uma questão de grande importância, considerando as implicações da degradação florestal no ambiente e nos meios de subsistência humanos. Como tal, justifica um exame e análise minuciosos dos vários fatores envolvidos, incluindo o papel das partes interessadas, a viabilidade financeira e técnica e a identificação de objetivos e metas apropriados. Os resultados do estudo indicam que, em 71% dos imóveis que necessitam de recomposição de reserva legal, o cronograma ultrapassou o ano de 2032. Além disso, em 45% dos casos, o prazo foi calculado a partir da inscrição do imóvel rural no CAR. Consequentemente, concluiu-se que as interpretações errôneas adotadas impedem a recuperação da vegetação nativa e, mais significativamente, a meta brasileira de restauração de 12 milhões de hectares de floresta degradada até 2030.

Palavras-chave: Mudanças climáticas, políticas ambientais, marcos legais, vegetação nativa.

1. Introduction

The United Nations' 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) highlight the direct link between human quality of life and well-being and the state of the environment (Bárcena and Miguel, 2016). The current climate crisis is recognized as the source of numerous global losses and calamities, with projections indicating a more severe impact on low-income countries (Adger et al., 2003). The warming in tropical regions is expected to result in unprecedented climatic conditions in the 21st century (IPCC, 2018), prompting extensive international efforts to address climate change. Forests are perceived as crucial in this task, as they sequester and store carbon from the atmosphere and when cleared, emit greenhouse gases (Alvarez and Andrade, 2017).

There is currently an unparalleled global movement aimed at rehabilitating ecosystems in degraded areas (Chazdon et al., 2017). The United Nations General Assembly has declared the years spanning from 2021 to 2030 the “UN Decade on Ecosystem Restoration,” with the expectation that restoration efforts have the potential to eliminate up to 26 gigatons of greenhouse gases from the atmosphere (United Nations, 2019).

The promotion of public policies and laws dedicated to mitigating the effects of climate change assumes an indispensable role in addressing this globally significant challenge. These measures serve not only to guide individual and governmental actions but also to establish the necessary legal framework to build a more sustainable, resilient, and equitable future for current and future generations. In the face of the imminent threats of climate change, international cooperation and coordinated action emerge as essential components to ensure a habitable and viable planet for all. Therefore, a concerted effort from policymakers and stakeholders at all levels is required to curb the adverse effects of climate change and build a more sustainable future.

The implementation of robust legislation has the potential to provide legal safeguards to vulnerable ecosystems and communities that are most affected by the impacts of climate change. Additionally, the establishment of laws that promote the reduction of carbon footprints, recovery of ecosystems, and adaptation to extreme climate events can significantly enhance the resilience of nations to these global challenges. By providing a clear normative framework, laws also foster confidence for long-term investments and actions, which are crucial for facilitating the transition to a low-carbon economy.

In the case of Brazil, historically the largest emitter of greenhouse gases through deforestation and forest degradation (SEEG, 2019), a commitment was

made to restore 12 million hectares of forests by 2030 (UNFCCC, 2015). This commitment is considered one of the most ambitious goals among the signatory countries of the United Nations Framework Convention on Climate Change (Kishinami and Watanabe Junior, 2016).

Even as studies prioritize restoration efforts to achieve environmental benefits with lower costs (Zwiener et al., 2017; Strassburg et al., 2018), a misguided interpretation of Brazil's main forest protection law may represent a setback in restoring one of the country's most environmentally protected spaces—the legal reserve.

There are issues regarding the implementation of the Native Vegetation Protection Law, also known as the New Forest Code (Brancalion et al., 2016), that still carry uncertainties. Despite the Supreme Federal Court's judgment of direct actions of unconstitutionality involving provisions of Law 12.651/2012 (In Portuguese, *Supremo Tribunal Federal* - STF, 2018), uncertainties remain regarding the application of its articles, potentially leading to misunderstandings, such as the exact period for the legal reserve's recomposition.

This way, there is a concept defined in Law 12.651/2012 of “consolidated rural area” which is a territorial space of a rural property under human occupation before July 22, 2008.

While several studies have emphasized the 20-year deadline for legal reserve recomposition in consolidated rural areas, the initial and final terms for compliance remain unclear. This ambiguity has led rural property owners and occupants to establish a recomposition schedule, typically based on the registration date of the rural property in the Rural Environmental Registry. The establishment of clear guidelines for the recomposition process is essential to ensure compliance with environmental laws and regulations while also promoting sustainable land use practices in rural areas. (Garcia et al., 2016; Vieira et al., 2017; Rezende and Scarano, 2017; Klein et al., 2015).

For the correct interpretation of Law 12.651/2012 (Brazil, 2012a), it is essential to emphasize that Article 84 established that its validity would occur on the date of its publication, which was May 28, 2012. Some deadlines are explicitly stated in the New Forest Code, with easily identifiable starting counts. Article 13, § 2º, determines that states have five years “from the date of publication of this Law” to elaborate and approve their Ecological-Economic Zonings.

Article 17, § 4º, addresses the recomposition of the legal reserve area irregularly deforested after July 22, 2008, whose recomposition process must commence within two years “counted from the date of publication of this Law,” and this process must be

completed within the deadlines established by the Environmental Regularization Program. As this provision was included by Law 12.727/2012 (Brazil, 2012b), the deadline started with its effectiveness on October 18, 2012. However, there are provisions where this does not occur, as in the case of Article 66, § 2°, which addresses the recompositing of the legal reserve in consolidated rural areas, which must be completed within 20 years, covering, every two years, at least 1/10 (one-tenth) of the total area necessary for its completion. The question then arises: when should the recompositing of the legal reserve area, typically 20% of the total area of the rural property, be initiated and concluded to meet the percentages of Article 12 of Law 12.651/2012?

As there is no explicitly expressed initial term in the law or its subordination to any other institute of the New Forest Code, it is argued that the 20 years should be counted from the entry into force of Law 12.651/2012. Decree-Law 4.657/1942 (Brazil, 1942), called the Law of Introduction to the Rules of Brazilian Law, governs legal norms, how they apply in time and space, and its provisions are called over-right norms (Gonçalves, 2017). The validity of a law, from any branch of law, occurs throughout the country 45 (forty-five) days after being officially published unless otherwise provided, as was the case with Law 12.651/2012, whose validity occurred on the date of its publication on May 28, 2012.

Per Coelho's (2014) perspective, the interpreter must adopt an environmental approach when making decisions. When it comes to recompositing the legal reserve, in cases where there is uncertainty about the deadline, the period began with the enactment of Law 12.651/2012. This approach ensures a consistent and reliable interpretation of the law and its application to practical situations.

Considering the estimated deficit of 11 million hectares only of legal reserve areas to be recovered (Guidotti et al., 2017), representing more than 90% of Brazil's goal under the Paris Agreement, this article aimed to analyze Rural Environmental Registries of properties located in the southernmost region of the State of Bahia, especially regarding their legal reserve recompositing schedule. The intention was to verify the proposed period for its initiation and, from there, reflect on possible relationships and reflections on the national policy of native vegetation recovery and the Brazilian goal of restoring 12 million hectares of forests by 2030.

2. The study area in the south of the Bahia state

The study area is the southernmost region of the State of Bahia, the largest and most populous state in the Northeast region of Brazil. The study focused

on 13 municipalities (Mucuri, Nova Viçosa, Caravelas, Alcobaça, Prado, Itamaraju, Jucuruçu, Teixeira de Freitas, Medeiros Neto, Ibirapuã, Lajedão, Itanhém, and Vereda), covering an approximate total of 1,851,901 hectares within the jurisdiction of the Regional Environmental Public Prosecutor's Office in Teixeira de Freitas.

Since the establishment of the mentioned Public Prosecutor's Office in May 2011 until July 2020, a total of 1,619 rural properties have accumulated, whose responsible parties have officially committed to environmental adjustments through the signing of Conduct Adjustment Agreements (*Termos de Ajustamento de Conduta* - TACs), including the restoration of their permanent preservation areas and legal reserves.

To delimit the scope of the study, it was considered that in the year 2011, there was only one TAC signed with two pulp and paper companies operating in the southernmost region of Bahia. Therefore, for a more detailed observation of the Rural Environmental Cadastres (*Cadastro Ambiental Rural* - CARs), the analysis focused on rural properties whose owners signed conduct adjustment agreements in the year 2012, encompassing 321 rural properties and with a much greater variation of responsible parties for the areas.

The oversight of the conduct adjustment agreements signed before the Public Prosecutor's Office of the State of Bahia occurs in administrative procedures, recorded with a numbering system in the integrated data system. These procedures include documents from the Rural Environmental Cadastre, called the State Forestry Registry of Rural Properties (CEFIR) in the State of Bahia. Based on the owner's self-declaration that the rural property is environmentally compliant, a CAR certificate is issued. In the presence of environmental liabilities, the registration issues a commitment agreement, which must include a schedule for the restoration of permanent preservation areas and legal reserves.

Through individual verification of the Rural Environmental Cadastres of the 321 rural properties, the need for the restoration of the legal reserve area was identified in 85 rural properties, and their schedules and respective periods were surveyed, cataloged, and evaluated. The consolidation of data systematization was performed, and the results are presented in the following section.

For the georeferencing of the properties, vector files of property boundaries, permanent preservation areas, and legal reserves were extracted from the CAR, in SIRGAS 2000 Datum coordinates. The data were spatialized in a geographic information system to generate illustrative maps of rural properties. It is noteworthy that vector files were obtained for only 268 properties due to the lack of

registration in the CAR or problems with the vector files of 53 rural properties.

For the analysis of the forest legislation applicable to rural properties, a systematic review of specialized literature was conducted using secondary data sources such as books, manuals, articles, legislation, and jurisprudence.

3. Complexities of Forest Restoration Policies in Bahia State

In recent years, there has been a significant effort towards forest restoration worldwide, driven by the growing awareness of the importance of forests for the health of the planet. In this context, the United Nations (UN), with the “Decade of Ecosystem Restoration,” plays a crucial role in encouraging and supporting reforestation and the restoration of degraded ecosystems. This is achieved through tree planting programs, biodiversity conservation, and environmental education initiatives to reverse environmental damage and promote sustainability.

The state of Bahia has a history in the pursuit of balance between development and preservation. Since its roots, environmental legislation has transformed, following national and international trends in environmental awareness. From the early regulations focused on the protection of natural resources and biodiversity (Bahia State Law 3.163/1973) to contemporary approaches promoting sustainability (Bahia State Decree 15.682/2014), the legislative trajectory demonstrates a growing commitment to the conservation of ecosystems.

The survey in this research indicated the existence of 1,619 rural properties subject to terms of conduct adjustments before the Regional Environmental Prosecutor's Office of Teixeira de Freitas, which were entered into from the year 2011 until 2020. There is significant variability in the number of rural properties and those committed to the terms of conduct adjustments over the years, which is why the analysis was limited to 321 rural properties, equivalent to 20% of the total, and representing 183 different committed parties, 34% of the overall total (Table 1).

The rural properties and possessions, whose rural environmental registries were analyzed, are in the municipalities of Mucuri, Nova Viçosa, Caravelas, Alcobaça, Teixeira de Freitas, Medeiros Neto, Itamaraju, and Vereda (Figure 1).

In the Rural Environmental Registries of the analyzed rural properties, it is possible to distinguish between the timetables for the restoration of legal reserve areas that were planned until 2032 (20 years from the publication of the New Brazilian Forest Code) and those that exceeded this year. Among those that exceeded the maximum restoration deadline until

2032, the possible connection of the 20-year restoration period for legal reserve in consolidated rural areas with the year the property was registered in the Rural Environmental Registry was also identified. Only in 25 (29%) of the 85 rural properties where the owner declared the need for the restoration of the legal reserve area, was the restoration schedule established until 2032.

Of the 60 (71%) rural properties where the final deadline for the restoration of the legal reserve area exceeds the year 2032, in 27 (45%) properties, there was a variation in the final deadlines of the schedules because the 20 years were counted from the registration of the rural property in the CAR. In terms of representation by legal reserve area, the result of the necessary restoration in the 85 rural properties is 4,231.08 hectares. Adding the legal reserve areas of properties whose restoration schedules go beyond the year 2032, we have a total of 3,121.80 hectares, which corresponds to 74% of the total.

Global agreements and treaties provide a multilateral context for collaboration between nations seeking joint solutions that result in targeted public policies and laws. By setting goals and regulations, climate policies create an environment conducive to technological innovation and investments in eco-friendly sectors, contributing to sustainable economic growth. Through these mechanisms, countries can share best practices, resources, and knowledge, expanding the impact of climate policies on a global scale.

When Brazil proposed in 2015 to the United Nations Framework Convention on Climate Change (UNFCCC) to restore 12 million hectares of forests by 2030, as one of the measures to meet international commitments to address climate change through its Nationally Determined Contribution (NDC), it can be presumed that the Brazilian state considered the use of various existing and future tools to achieve this goal.

Large-scale forest restoration requires efficient alignment of norms, policies, and practices (Scaramuza et al., 2016), leading Brazil to institute a National Policy for the Recovery of Native Vegetation (Proveg) through Decree 8.972/2017 (Brazil, 2017), to promote different types of environmental benefits. In addition to coordinating, integrating, and promoting policies, programs, and actions that induce forest recovery, Proveg aims to drive the environmental regularization of Brazilian rural properties.

The registration of rural properties in the Rural Environmental Registry, as provided in Article 29, § 3º of Law 12.651/2012, has been subject to successive extensions. Currently, according to Law 13.887/2019 (Brazil, 2019), despite being mandatory, it has no specific deadline. There is also a deadline for joining the Environmental Regularization Programs (In Portuguese, *Programa de Regularização Ambiental* -

PRA), which was recently modified to be requested within 2 years from the effective date of the same Law 13.887/2019, considering the registration deadline in CAR until December 31, 2020 (Article 59, § 2° of Law 12.651/2012).

It is argued that the deadline for registering rural properties in the CAR and joining the PRA should not be confused with the deadline for the obligation to restore the legal reserve. While the deadline for CAR registration is indefinite and the deadline for joining the PRA has been extended until October 18, 2021, the restoration of the legal reserve in consolidated rural areas must be completed within 20 years. This period involves, every two years, a minimum of 1/10 (one-tenth) of the total area needed for its completion, counted from the publication of Law 12.651/2012.

The Rural Environmental Registry and the Environmental Regularization Program were implemented by states at different times, with some not even having a PRA (Lima and Munhoz, 2016; Forest Code Portal, 2020). The mentioned Law of Introduction to the Norms of Brazilian Law states in Article 6 that the law in force will have immediate and general effect, respecting vested rights, acquired rights, and *res judicata*.

Therefore, there could not be different deadlines depending on the location of the rural property, as it would conflict with the establishment, in federal law, of its general effect (Akaoui and Glina, 2012), that is, a single rule for the entire country, also known as the simultaneous obligation (Monteiro and Pinto, 2016).

Even though there is a need for validation of the information declared in the CAR (Savian et al., 2014), including the approval of the location of the legal reserve, there is no final deadline for this to occur (Santiago et al., 2017). Thus, linking the start of the deadline for the restoration of the legal reserve to the registration or validation of the CAR is delaying the recovery of this important environmentally protected space to an uncertain date, dependent on the conduct of the rural property owner and circumstances in each state.

In the scenario investigated in this study, over 70% of the properties may have their schedules for the restoration of the legal reserve validated with deadlines exceeding 20 years, counted from the publication of the New Forest Code in 2012. In some cases, the final deadlines even reach the year 2037.

The first Brazilian Forest Code, Decree 23.793/34 (Brazil, 1934), brought several innovations, including the mandatory reservation of twenty-five percent of native vegetation on each rural property (Dean, 1996). This provision, considered the genesis of the legal reserve, aimed to ensure a supply of wood (Alston and Mueller, 2007).

Under the Forest Code of 1965, Law 4.771/1965 (Brazil, 1965), and already seen as a kind of protected area (Medeiros, 2006), the legal reserve was conceptualized. If the responsible party for the property did not have the percentages stipulated by law, they should restore the area by planting, every three years, at least 1/10 (one-tenth) of the total area needed for its completion. It can be observed that the protection of the legal reserve is not a novelty in Brazilian law; however, there is a constant and repeated postponement of its effective implementation.

The New Forest Code caused a significant loss of areas to be restored (Soares-Filho et al., 2014), mainly due to the provision of the criticized consolidated rural area (Garcia et al., 2016). Socioeconomic aspects can limit the expansion of ecological restoration (Maier et al., 2018), and there is a low restoration of deforested areas, even after inspection by competent authorities (Schneider et al., 2018). Suppose the mistaken understanding regarding the start of the deadline for the restoration of the legal reserve is adopted, specifically linked to the registration of the rural property in the CAR, it will be another factor that could compromise the reestablishment of vegetation in the environmentally protected space in question, as its recovery is delayed.

4. The principle of *in dubio pro natura* in environmental law and its application in conservation policies

The Latin legal principle, “*in dubio pro natura*”, translates in English to “in doubt, favor nature”, which reflects a preference for interpreting laws and making decisions in a manner that is favorable to the protection of the environment and nature. It is a principle that is often applied in environmental law and reflects the idea that when there is uncertainty or doubt in legal interpretations, the decision should be in favor of preserving and safeguarding the natural environment (Ayala and Leite, 2022). The principle recognizes the paramount importance of environmental conservation and sustainability. In practical terms, it necessitates that when there is ambiguity or uncertainty in legal provisions related to environmental issues, the interpretation or decision should lean towards protecting nature and the environment. This legal principle underscores the significance of environmental considerations in the decision-making process, encouraging a cautious and protective approach when addressing legal questions related to the environment.

The *in dubio pro natura* principle has been understood as a recognition of the biocentric or ecocentric view of the environment in some Latin

American countries (Olivares and Lucero, 2018), as evidenced in the Constitution of Ecuador, which recognized since 2008 that nature is a subject of rights. The STF in the Direct Action of Unconstitutionality (ADI) 3,540-1MC DF, confirmed that economic activity cannot be exercised in disharmony with principles aimed at making environmental protection effective. The integrity of the environment cannot be compromised by business interests or be dependent on motivations of a purely economic nature, especially considering that economic activity, considering the constitutional discipline that governs it, is subordinated, among other general principles, to the one that privileges the “defense of the environment” (CF, art. 170, VI), which translates into a broad concept of natural environment, cultural environment, artificial environment (urban space), and occupational environment. Doctrine. The legal and constitutional instruments aim to enable the effective protection of the environment, so that its properties and attributes, which are inherent to it, are not altered, causing unacceptable compromise to the health, safety, culture, work, and well-being of the population, as well as causing serious ecological damage to the environmental heritage, considering it in its physical or natural aspect.

It should be noted that this same path has been followed by several judicial decisions in Brazil. Consider the example of the Public Civil Action of the Public Prosecutor's Office of Minas Gerais, which sued a rural landowner who deforested an area with native vegetation, culminating in the judgment of the Special Appeal 1,145,083-MG in the Superior Court of Justice (in Portuguese, *Superior Tribunal de Justiça* - STJ) in 2012, which determined *in-natura* recovery and compensation for environmental damages caused, based on the interpretation of the *in dubio pro natura* principle, as follows: Administrative. Environmental. Public Civil Action. Deforestation in a permanent preservation area (riparian forest). Damage to the environment. Cerrado biome. Arts. 4, VII, and 14, § 1, of Law 6.938/1981, and art. 3 of Law 7.347/1985. Principles of the polluter-pays and integral reparation. *Reductio ad pristinum statum*. Function of special and general prevention of civil liability. Cumulation of the obligation to do (restoration of the degraded area) and to pay a certain amount (compensation). Possibility. Remaining or reflex environmental damage. Art. 5 of the Law of Introduction to the Rules of Brazilian Law. Interpretation *in dubio pro natura*.

The same understanding was reiterated by the STJ in REsp 1,198,727/MG, August 14, 2012: “2. The legislation supporting vulnerable subjects and diffuse and collective interests must be interpreted in a way that is more favorable to them and that can best enable, in terms of effectiveness, judicial provision, and the *ratio essendi* of the norm”. Legal-

environmental hermeneutics is governed by the *in dubio pro natura* principle.

Again, the STJ, in Special Appeal (REsp) 1,367,923, of August 27, 2013, determined that: “4. Environmental norms must serve the social purposes for which they are intended, that is, the interpretation and integration according to the hermeneutic principle *in dubio pro natura* is necessary”.

This systematic understanding of environmental protection demonstrated in the decisions of the Brazilian Superior Courts indicates the direct application of art. 4, item VII and art. 14 of Law 6.938/1981, indicating that there must be full reparation of the environment, with, whenever possible, *in-natura* reparation and the obligation to compensate for all damages, both patrimonial and collective extrapatrimonial (Fulanetto, 2014; Olivares and Lucero, 2018).

As already decided by the Superior Court of Justice, environmental norms must serve the social purposes for which they are intended, and, therefore, their interpretations must occur following the principle *in dubio pro natura* (STJ, 2013). This principle “must guide the interpretation of environmental law, to prioritize the sense of the law that best serves environmental protection” (STJ, 2015) or “when there is a plurality of possible meanings, it must choose what best guarantees essential ecological processes and biodiversity” (Benjamin, 2014). In this context, it should be highlighted that the *in dubio pro natura* principle is a principle that demonstrates the expansion of environmental law, as well as the transformation of the State, which must now consider the environmental variable in the foundations of the constitutional State, affirming a new model of development, namely, sustainable development (Olivares and Lucero, 2018).

Countries must put this principle into practice. The principle states that “in doubt, the environment must be protected,” meaning that when there is doubt about whether an activity may be harmful to the environment, this question must be resolved in favor of environmental protection (ciliary forest – In Portuguese, *mata ciliar*). It is an autonomous principle that: a) serves as a hermeneutical criterion to guide judges and public administrators to understand when there is a lack of certainty regarding the interpretation of certain regulations to be applied; b) serves as a criterion to resolve conflicts of attribution of responsibilities between different levels of government (Fellmeth and Horwitz, 2009; Baldin and De Vido, 2022).

The environmental importance of the legal reserve institute is known (Wollman and Bastos, 2015; Santiago et al., 2017; Krell, 2023), as well as the social relevance of forest restoration for the development of the local economy (Benini and Adeodato, 2017). The

legal reserve is a type of protected natural area but with permission for economic exploitation, ensuring the maintenance of a minimum number of environmental services (Silva and Ranieri, 2014).

The principle of *in dubio pro natura* assumes a paramount role in the intricate landscape of forest conservation policies in Brazil, with a specific focus on the state of Bahia. Although this legal doctrine advocates a predisposition towards decisions that favor nature in cases of uncertainty, practical application faces formidable challenges. The historical dedication of Bahia to strike a delicate balance between development and environmental preservation is evident in the evolution of its legislation.

Nevertheless, the recent scrutiny of rural properties subjected to conduct adjustments before the

Regional Environmental Prosecutor's Office reveals the complexities and obstacles embedded in the implementation of forest policies. Variability in restoration schedules, discrepancies in legal reserve areas, and delays in execution underscore the formidable task of translating environmental ideals into actionable strategies. As Bahia State grapples with the intricacies of sustainable forest management, the interplay of legal, environmental, and socio-economic factors underscores the need for a nuanced approach, recognizing the intricate challenges of preserving nature while fostering responsible development.

Table 1 - Number of rural properties subject to conduct adjustment agreements before the Regional Environmental Prosecutor's Office of Teixeira de Freitas, with the obligation of their environmental regularizations, and the respective number of obligors, per year, in the south of the Bahia State (Brazil). * Represents the number of obligors linked to Rural Environmental Registries (in Portuguese, *Cadastro Ambiental Rural - CAR*) of the rural property and not those who signed the Conduct Adjustment Agreements (in Portuguese, *Termos de Ajustamento de Conduta - TACs*). The number per year was considered, even though the obligor may be repeated.

Year	Number of rural proprietors	Number of compromisers*
2011	779	2
2012	321	183
2013	142	95
2014	123	90
2015	60	42
2016	73	56
2017	33	23
2018	41	18
2019	33	21
2020	14	10
Total	1,619	540

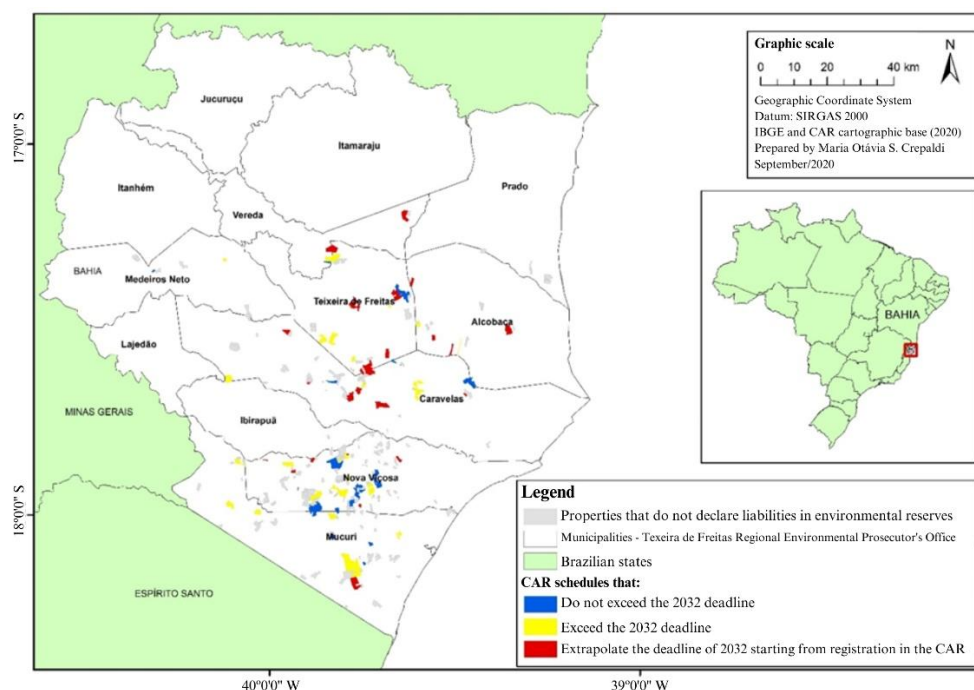


Figure 1 - Properties and Rural Environmental Registries (in Portuguese, *Cadastro Ambiental Rural* - CAR) analyzed in the south of the Bahia State (Brazil).

5. Conclusion

The alarming percentage of properties requiring legal reserve restoration with deadlines extending beyond 2032, attributes this issue to the lack of clarity in Law 12.651/2012 and the need for an integrated interpretation of environmental laws. The failure to regulate the matter in the general norms of the Environmental Regularization Program (In Portuguese, *Programa de Regularização Ambiental* – PRA) and the Rural Environmental Registry (In Portuguese, *Cadastro Ambiental Rural* - CAR) aggravates the problem. The non-implementation of measures and policies in Law 12.651/2012, coupled with a mistaken interpretation of the law's final deadline for legal reserve restoration, could have severe consequences for environmental protection and climate change mitigation in Brazil. The responsibility lies with those regulating Environmental Regularization Programs and managing the Rural Environmental Registry, underscoring the importance of the correct application of rules. The text calls for a concerted effort between the government, civil society, and landowners to achieve the ambitious goal of restoring 12 million hectares of forest and reducing greenhouse gas emissions.

Acknowledgment

To the Federal Institute of Education, Science, and Technology of Bahia (IFBA), especially to the Pro-Rector of Research, Postgraduate Studies, and Innovation (PRPGI/IFBA), and to the Federal University of Southern Bahia (UFSB) for the institutional and financial support (CAPES/PROAP/PPGCTA/2023) provided for this research.

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