

Governance rather than rules: What have we learned from Brazil's environmental policy?

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Abstract

In recent years, Brazilian environmental policies have been criticized when compared to policies implemented particularly from 2004 to 2010. One particular feature is focused on environmental law enforcement governance, taking into account the expanding Protected Areas and Indigenous Lands, the development monitoring systems to detect vegetation loss, and others, like an important task force including Federal Police and other ministries. In this sense, this work aims to tell the rise and fall of Brazil's environmental policies, aiming to present the changing conditions from a strong to weak environmental governance. The hypothesis of the article is based on the idea that law enforcement governance is more important to explain the environmental policies outcomes than rules. Following literature, we use "environmental governance" to refer to the set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes (law enforcement). The research is based on extensive statistical data from Brazil's public data (deforestation, protected areas, illegal harvesting, budget, etc.) and also local and international reports. Additionally, the work aims to identify the environmental governance actors in Brazil: market actors, state actors and, more recently, civil society-based actors such as nongovernmental organizations (NGOs) and local communities. The article evidences the importance of enforcement of the law and the weaknesses of environmental institutions and governance process considering the partisan perspective (state capacity). Finally, some proposals will be presented to overcome the ongoing extractive posture in Brazilian environmental governance.

Keywords: Brazil, Environmental policies, Governance, Law enforcement.

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Introduction

For almost two decades, Brazil was considered a worldwide leader in environmental governance. During that time, it promoted a large system of “protected areas” and developed efficient environmental monitoring within a complex legal framework. From 2004-5, the literature acknowledges that Brazil implemented successful conservation policies that made Brazil **a global example of environmental governance**, expanding protected areas, conservation units, and indigenous lands, as well as developing advanced monitoring systems to detect vegetation loss. In recent years, Brazil has changed its status from an international environmental leader to a pariah. This sudden change in reputation was due to political choices which promoted a dismantling of the country’s environmental protection system. The consequence is visible, particularly in terms of ecosystem degradation: threats to protected areas, increasing fires, and deforestation (Barbosa, Alves and Grelle, 2021).

Historically, Brazil has never been efficient in combating deforestation. According to Jänicke & Jörgens (2020), persistent environmental problems are those where environmental policy has failed to bring about any significant improvement over a substantial length of time. Deforestation used to be a persistent environmental problem in Brazil. Carvalho et al. (2019: p. 127) argue that Brazil’s enforcement and legal systems provide multiple opportunities for violations of environmental laws to go undetected or unpunished. A remarkable exception occurred in the second half of the 2000s, especially from 2004 to 2012. In the mid-2000s, there was a consensus that Brazil had developed rather rich and advanced environmental legislation (Hansen et al., 2013; Drummond and Barros-Plataiu, 2006). However, at that time, the literature called attention to what should be done in terms of enforcement and compliance, especially in the case of economic players.

What is behind such a change? A review of the literature points to a set of reasons, such as the soy moratorium, the Beef TAC (Conduct Adjustment Agreement), and even the high exchange rate at the time, which negatively impacted exports (Carvalho et al., 2019). Above all, we believe it was due to a policy-driven effort implemented and coordinated by the Environment Ministry. According to Hansen et al. (2013), Brazil is a

global exception in terms of forest policy change, with a dramatic policy-driven reduction in Amazon Basin deforestation. According to these authors, “Of all countries globally, Brazil exhibited the largest decline in annual forest loss, with a high of over 40,000 km²/year in 2003 to 2004 and a low of under 20,000 km²/year in 2010 to 2011” (Hansen et al., 2013, p. 850).

We believe **this policy-driven effort promoted effective environmental governance, particularly promoting enforcement of laws and rules**. At the same time, the **dismantling** of this policy-driven effort is the reason behind the inflection of deforestation outcomes. We will argue that more than regulations and the legal system, which comes from the 1980s, the important outcome regarding environmental issues comes from the environmental governance and its **enforcement capacity**. The enforcement capacity extends from the operational capabilities to the systems of supervision and prosecution, which require a massive coordination effort. The mobilization of state agencies, such as environmental bodies, federal police, and public prosecutors are not enough. It is important to have a strong commitment and coordination, particularly from the Environment Ministry.

We will investigate the change of environmental law enforcement governance considering different governments. More than circumventing agreements and legislation, the increase in deforestation from 2012 until now was due to the dismantling of environmental law enforcement governance, especially since 2019, when the new government started implementing an anti-environmental agenda. An expression that translates the government strategy is “passar a boiada” (“pushing the whole lot through”), an expression that shows that infralegal regulations are more important than changes to regulations, particularly using state bureaucracy and institutions responsible for supervising, controlling, and prosecuting those who threaten the environment. More than the dismantling of environmental laws, we see a dismantling of environmental governance institutions. Furthermore, we see the dismantling of the coordination of these institutions with others, such as the federal police and federal prosecutors.

In this sense, it is useful to appeal to Kelsen’s hierarchical perspective. Unlike Kelsen’s proposal, it is at the bottom of the pyramid - where the executive dimension of government is in force - that we find the most important dimension for environmental performance, in particular for law enforcement and policy execution. Using this hierarchical

perspective of Brazil's legal environmental system, the Environment Minister of the Bolsonaro Government suggested in a ministerial meeting a manipulation of environmental standards and infralegal regulations and the rigging of environmental agencies. This was not at the level of the legal system, but at the level of environmental governance. How? By dismantling the environmental systems of monitoring, supervision, and control.

The general objective of the article is to propose an analytical framework to explain the environmental enforcement of the law. In our approach, we will investigate the results of policies to combat deforestation, and our specific objective will be to study Brazilian environmental governance centered on environmental policies to reduce deforestation in the Amazon Rainforest (PPCDAM). Our hypothesis is based on the idea that it is law enforcement governance, rather than rules, that explains the effectiveness of environmental policies in Brazil, particularly from 2000 until now.

The article is divided into three other sections. Section 2 presents the analytical framework to interpret the causes of environmental law enforcement, establishing a connection between environmental governance and state capacity. The following section presents the historical and institutional context of Brazilian environmental policy, highlighting the legal system and the main players. In section 4, we will examine Brazilian environmental policy and governance, highlighting the different administrations from 2003 to 2020. Finally, we will present our conclusions.

Theoretical and analytical framework

To achieve the goals of this article, it is helpful to conceive a framework that highlights environmental policy enforcement. Is it possible to develop an approach to identify the enforcement of environmental policies? In our view, based on a few concepts derived from the institutional perspective,² the answer is yes. This effort is based on the idea in which the efficacy of environmental policies depends on three main dimensions:

1. **Institutions:** institutional arrangements and rules.

² There is a prolific literature that explores environmental policy and governance under institutional “umbrella” perspective. Here we highlight two articles: Caballero and Soto-Oñate (2016) and Beunen and Patterson (2019).

2. **Governance:** environmental enforcement of law and governance (implementation, control and enforcement).
3. **State capacity:** it refers to the 'capacities' of states to implement social goals, especially over the actual or potential opposition of powerful social groups or in light of recalcitrant socioeconomic circumstances Skocpol (1985).

Our hypothesis for such a shift in Brazil's reputation relates to the idea that environmental law enforcement governance, rather than rules, was the main driver in the process. Given that governance is crucial to the interpretation, we suggest a framework based on this theme. There are several approaches to **environmental governance** (Lemos and Agrawal, 2006; Bridge and Perreault, 2009). **Our focus lies on environmental governance structure, which embraces the set of policies, programs, and institutions related to environmental management.** In this sense, it is important to identify the players, the policies, and the environmental institutions that are responsible for **enforcing the law.**

The capacity to achieve the environmental goals depends on good governance, particularly an effective governance that allows greater enforcement of environmental policies more than the existing regulations and legal system. This inclusive governance demands significant state capacity, particularly from state bureaucratic agencies that provide information, supervision, and prosecution ("enforcement path" to reach environmental goals). Our hypothesis – "environmental law enforcement governance rather than rules" - can be viewed from Kelsen's hierarchical perspective. The figure below summarizes the proposed hierarchy and places it at the bottom of the pyramid, not at the top, the sphere in which compliance with environmental laws and rules is observed.

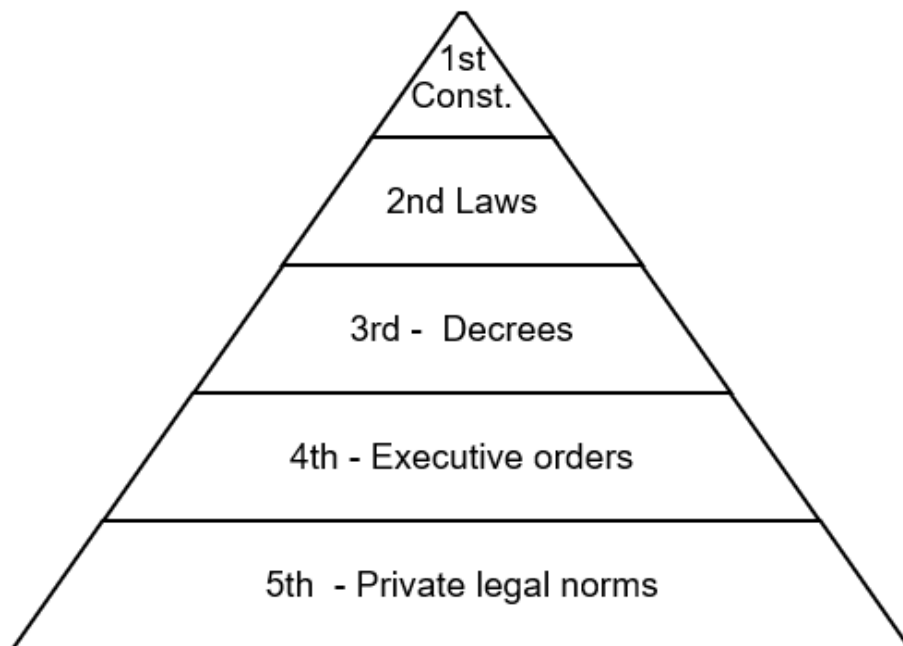


Figure 1. Kelsen's hierarchical perspective, prepared by the author, based on Kelsen (1973).

As we will see, the approach suggests that the ***governance enforcement path*** takes place at levels 3 and 4, demonstrating the central role of state capacity in environmental policy compliance (Schwartz, 2003).³ The state can interfere in the bureaucracy's ability to effectively combat environmental damage actions.

Pillars of framework: environmental governance and state capacity

The core of the framework argument is centered on the efficacy of environmental governance regarding the enforcement of environmental policies and laws. Since the early 2000s and particularly after the Schwartz (2003) article, literature has emerged to identify the impact of state capacity on the enforcement of environmental policies. Recently, UNEP (2019) developed the idea of "environmental rule of law", which integrates environmental needs with principles of the rule of law, creating a foundation for environmental governance. The pillars of the framework are presented below (Figure 2).

³ This seminal article tests the usefulness of state capacity as an analytic tool to evaluate environmental policy enforcement in China. The results of proposed analyses illustrate the central role of state capacity in environmental policy compliance (Schwartz, 2003).

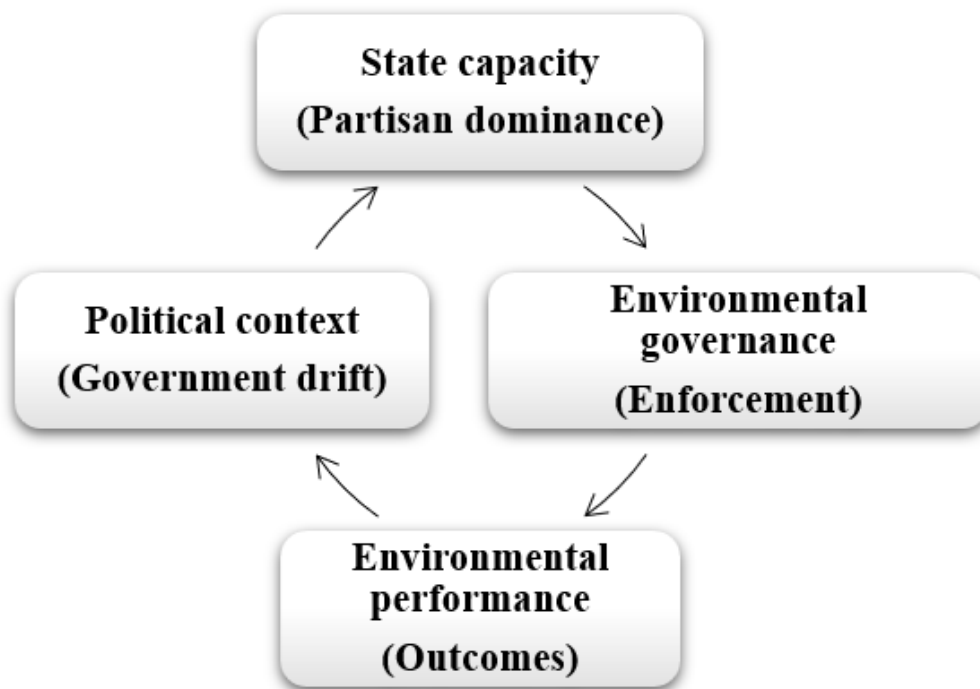


Figure 2. Framework pillars

We need to explore the pillars to explain the environmental performance of policies, divided into two parts: political context and governance and state capacity and governance.

Pillar 1: Political Context and Governance

According to Bridge and Perreault (2009: p. 475), the term governance “explicitly hinges on the economic and the political, and its popularity within the social sciences reflects a broader institutional turn in which greater attention is paid to the relationships between **institutional capacities, the coordination and coherence of economic processes**, and social action.” Naturally, when considering environmental governance, we consider the relationship between public policies ruled by elected governments and their environmental performance.

The above mentioned authors argue that environmental governance articulates the economic with the political, drawing attention to the relationships between institutional capacities and social action, and conclude: “As an analytical framework, then, environmental governance provides a tool for examining the complex and multi-scalar

institutional arrangements, social practices and actors engaged in environmental decision making” (Bridge and Perreault, 2009: p. 491).

Unlike Lemos and Agrawal (2006), who defend the idea of market and hybrid modes of governance, we suggest a “short version” of the environmental governance concept: the State (its agencies and institutions) is the most important player in governance, in a particular way, which is monitoring and supervision. The role of social participation councils is secondary, particularly in decisions associated with environmental governance.

Beunen and Patterson (2019: p. 13) consider that the concept of institutional work “offers promising opportunities to push forward thinking on institutional change, although there are significant challenges in applying it within multi-actor and multi-level environmental governance contexts”. According to the authors, institutional work in the context of environmental governance implies dealing with much heavier politics. Here it is important to emphasize that the literature on environmental governance highlights diverse drivers of institutional change, **including ideas and discourses**.

Contemporary theories of the political economy of development put state effectiveness center stage and have come to view the design of political institutions as a key element. This was argued forcibly, for example, in Acemoglu and Robinson (2012), who emphasize constraints on power and elections leading to states that are more inclusive. In this sense, “The short-term horizon of political actors, who are interested in the electoral logic, contrasts with the nature of those political decisions whose implications only play out in the long run... Actors may recur to the design of governance mechanisms, i.e., institutions and organisations... These formulae may take different forms depending on a number of factors, such as the nature of the operation, the actors, the transaction costs, the institutional environment, etc.” (Caballero and Soto-Oñate 2016, 339-340).

This argument emphasizes the importance of partisan dominance perspective, given that state agencies are vulnerable to political changes affecting their capacity and autonomy (Berch, Praça, and Taylor, 2017). A new government can promote changes in the agencies despite changing the law (rules), but only weakening enforcement capacity. In sum, we can take advantage of certain ideas in the search for a framework conception:

- State-centric environmental governance.

- Ideas and discourse (political dimension) regarding environmental governance.
- Partisan dominance (elections), state capacity, and enforcement.

Pillar 2: State Capacity and Governance

From pillar 1, the importance of state capacity is clear. According to Evans, Rueschemeyer, and Skocpol (1985: p. 9) a widely shared notion of **state capacity** focuses on “the ability of the state to implement official goals, especially over the actual or potential opposition of powerful social groups.”

State capacity affects environmental agencies in policy implementation. One dimension, highlighted by Besley et al. (2021) are professionals in public employment who provide key inputs and decision-making that can impact the effective delivery of the functions of the state.” Williams (2021, p. 3) proposes an emphasis on the idea of bureaucratic capacity: “**Capacity is a convenient shorthand for the complex array of factors that determines whether and how a particular policy is likely to be implemented in a specific case**, but it achieves this convenience by abstracting away from the mechanisms that are critical for understanding and improving bureaucratic performance and policy implementation.”

One specific problem associated with state capacity is the political control of the bureaucracy, affecting two dimensions: autonomy and capacity (Fukuyama, 2013; Williams, 2021).⁴ The performance of bureaucracy matters when it allows the state to be more or less effective in the enforcement of the law. Here we are interested in the study of environmental agencies.

Environmental governance and performance indicators

As stated by Mansbridge (2014, p. 15177), “When an initial solution is adopted, considerable effort is made to dig deeply into the structure of the problem and to monitor

⁴ According to Berch, Praça and Taylor (2021, p. 105): “Fukuyama (2013) issued a clarion call in these pages for conceptual clarity and improved measurement of state capacity, highlighting two dimensions of governance: capacity, conceived of as resources and professionalization, and autonomy, the independence of bureaucrats from political principals”.

various indicators of the system.” The Interamerican Development Report (IDB) proposes three types of environmental governance indicators (IDB, 2020):

- **Input indicators:** Measure the quantity of resources provided for a particular policy, program, or project. In the context of environmental enforcement and compliance, this could include the budget allocated for an environmental authority or the number of compliance investigators employed by a regulator.
- **Output indicators:** Measure the actual activities and practices of environmental authorities and other relevant players. Examples could include inspection activities, money paid as liability for damage, or changes in the behavior of the regulated community.
- **Outcome indicators:** Measure the results or effects of output activities and practices. In the context of the environment, outcome indicators measure environmental quality – such as air or water or pollution – or changes in environmental quality, such as habitats restored following damage.

The 2020 IDB Annual Report is useful for evaluating environmental governance performance. Additionally, we evaluate the environmental state capacity, particularly associated with environmental agencies. According to Williams (2021), it is critical to specify **components of state capacity** that will allow researchers to predict when states are likely to succeed in enforcing their policies effectively. In effect, to evaluate the impact of state capacity, Williams (2021) suggests the identification of three components of state capacity:

- **Human capital:** the technical and managerial skill level of individuals within the state and its component parts.
- **Fiscal strength:** the financial capacity of the state or of a given component of the state; this capacity is a function of both current and reasonably feasible revenue streams as well as demands on that revenue.
- **Reach/responsiveness:** the degree to which the state is successful in extending its ideology, sociopolitical structures, and administrative apparatus throughout society (both geographically and into the socioeconomic structures of civil society); the responsiveness of these structures and apparatus to the local needs of the society.

The approaches by the IDB (2020) and Williams (2021) are useful in Brazil's case considering the main environmental policy launched in the country in 2004, i.e. the PPCDAM. We will investigate the environmental governance and its enforcement of the law considering:

- Strengthening IBAMA agency (**coordination and supervision**);
- ICMBio Creation (IBAMA reformulation) (**management** and supervision);
- Federal Police and Federal Prosecutor task forces (**supervision and law enforcement**);
- **Monitoring** systems (INPE/ IMAZON);
- **Inspection** campaigns.

The historical and institutional context of Brazilian environmental policy

As highlighted by Barbosa, Alves, and Grelle (2021: p. 1): "Environmental laws are necessary to governance and a sustainable use of natural resources. Brazil's federal environmental laws have been improved in the last 50 years, with significant advances in legal provisions and monitoring systems". Environmental policy in Brazil experienced an inflection in the 1980s, after the drafting of the legal system (rules and laws). According to Drummond and Barros-Platiau (2006, p. 84): "The internal shift towards democracy, combined with the new international stance, stimulated the emergence of environmental awareness, movements, organizations, legislation, and policies inside the country. On the whole, however, pro-growth values, expectations, and behaviors dominated the 1934–2002 period."

The development of a legal system and a national environmental system establishes the rules and the players responsible for the fulfillment of objectives regarding the environment. This last dimension – "law enforcement" - is strongly associated with environmental governance, which in turn is impacted by the political dimension, which defines the goals and ongoing environmental policies. The following subsections will present Brazil's environmental legal system as well as its main recent environmental public policy: the PPCDAM.

Rules and players: Brazilian Environmental Legal System

The first turning point occurred with the enactment of the National Environmental Act (“Lei da Política Nacional do Meio Ambiente”) of 31 August 1981, which became Brazil’s cornerstone environmental regulation, introducing the legal definitions of the environment. The National Environmental System (“Sistema Nacional de Meio Ambiente”—SISNAMA), an encompassing management network, was also created. Inside SISNAMA, CONAMA (National Environmental Council) is the central agency for consultative and deliberative tasks. New environmental laws introduced enormous complexity into the Brazilian legal system and, as a result, the 1988 Federal Constitution included an “environmental” chapter (Drummond and Barros-Platiau, 2006).

According to Drummond and Barros-Platiau (2006, p. 95), the Federal Constitution: “...assigned important roles to all public authorities: preservation and restoration of essential ecological processes; promotion of ecological management of species and ecosystems; protection of biodiversity and control of genetic resources; creation of protected areas; obligation of public authorities to demand EISs; control over technologies, substances or productive methods potentially harmful to the environment; and environmental education”.

A second important turning point relates to the creation of the executive environmental agency. The Institute of the Environment and Renewable Natural Resources (IBAMA) was created by Law 7735 of 22 February 1989. IBAMA centralizes the execution of environmental regulations and policies. The agency executes national environmental policies in the fields of preservation, conservation, regulation, and the promotion of the sustainable use of environmental resources, besides monitoring and control (Drummond and Barros-Platiau, 2006). Table 1 presents the evolution of the Brazilian legal system.

TABLE 1

Brazilian environmental legal system: Selected laws, rules, and orders

Year	Order	Content
1981	Law 6938 Law 6939 Law 6340	Environmental National politic law National Environmental System creation (SISNAMA) Ecology Stations and Environment Protection Areas (Law n. 6.340)
1988	Article 225 of the Constitution	Preservation and restoration of essential ecological processes; promotion of ecological management of species and ecosystems; protection of biodiversity and control of genetic resources; creation of protected areas; obligation of public authorities to demand EISs; control over technologies, substances, or productive methods potentially harmful to the environment; and environmental education.
1989	Law 7735	Created the Institute of the Environment and Renewable Natural Resources (IBAMA). It became the country's major executive environmental agency
1990	Decree 99274	Regulate the SISNAMA creation
2006	Law 11284 Decree 5975 Law 11428	Brazilian Forest Service Reforestation and Sustainable Consumption Mata Atlântica
2007	Law 11516 Supp. Law 124	Creation of the Chico Mendes Institute Superintendency of Development for the Amazon
2008	Decree 6527 Decree 6321 Decree 6514	Creation of the Amazon Fund Establishes the legal basis for singling out municipalities with very high deforestation rates and taking differentiated action towards them Provides on the legal penalties resulting from conducts that are harmful to the environment
2009	Resolution 412 Law 12114 Law 12187	CONAMA Resolution (n. 412). National Fund for Climate Change National Policy on Climate Change
2012	Law 12651	New Forestry Code

Source: prepared by the author based on Drummond and Barros-Platiau (2006), Assunção, Gandour and Rocha (2012), and Barbosa, Alves and Grelle (2021).

This article aims specifically at analyzing the deforestation rates in Brazil and the reasons why a significant rate of decrease was only observed in the 2000s. As shown in the above table, Brazil launched a sophisticated legal system and the national

environmental control system, including main players such as the environmental agencies IBAMA (1989) and ICMBio (2007). Once the environmental legal system is drafted, and the players are defined, the environmental performance depends on environmental public policies. This article aims specifically at analyzing the deforestation rates in Brazil and the reasons why a significant rate of decrease was only observed in the 2000s.

The institutional arrangement provided in the Política Nacional do Meio Ambiente (PNMA – National Environmental Policy) – the Sistema Nacional de Meio Ambiente (Sisnama – National Environment System) used to be associated with poor enforcement and coordination problems: “One of the system's bottlenecks is the institutional fragility of the forums for policy pacts between federated entities and between federal government agencies, which compromises shared environmental management” (Leme, 2010: p. 25).

Coordination between government bodies is uncertain, given that it is associated with political players. For a long time, these bodies were not articulated because of the absence of environmental policy coordination (competencies, resources, efforts). That is precisely the reason for the lack of enforcement before 2004-2012. On the other hand, particularly from 2004 onwards, key government bodies were mobilized, including the National Institute for Space Research (INPE), the Federal Police, the Federal Highway Patrol, and the Brazilian Army. Naturally, the effort was coordinated by the Environment Ministry (Assunção, Gandour, and Rocha, 2012).

Environmental policy (from transparency to outcomes) and players to deforestation-control

The inflection in terms of environmental performance – here focused on reducing/curbing deforestation policies – is associated with a specific public policy, the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAM) in 2004, which introduced a new form of dealing with deforestation in the Legal Amazon (Assunção, Gandour, and Rocha, 2012). More than the environmental policy design, the increasing enforcement efforts of the Brazilian environmental agency (IBAMA) are remarkable (Hargrave and Kis-Katos, 2013).

The launch of the PPCDAM integrated actions across different government agencies and introduced new procedures for monitoring, environmental control, and territorial management. The main results are:

- Coordinated activities among government agencies;
- Introduction of real-time remote-sensing forest monitoring technology; and
- Extensive expansion of protected territories.

Assunção, Gandour, and Rocha (2012) add a second turning point to Brazil's deforestation policy, starting from the implementation of new policy measures that affected the capacity, command, and control, as well as the 2008 credit policies, prioritizing some municipalities for more focused prevention and control of illegal deforestation.

- Revision of legislation concerning environmental violations and respective sanctions; and
- Conditioning of rural credit upon the presentation of proof of the borrower's compliance with environmental regulations.

The pathway to the enforcement of the law encompasses a coordination effort considering the following sequence (Figure 3):

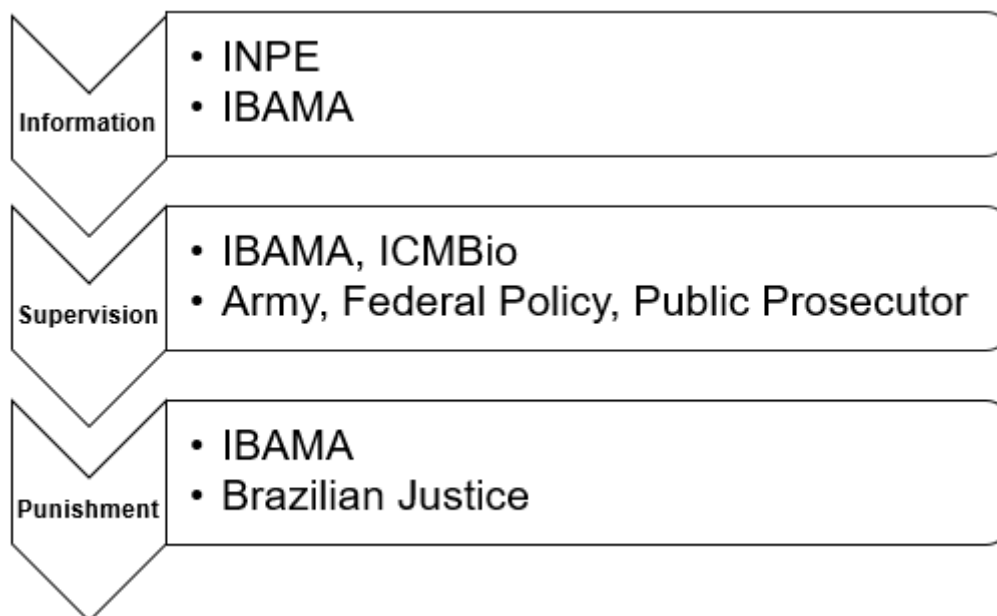


Figure 3. Environmental governance and enforcement in Brazil

The following quote summarizes the pathway to enforcement of environmental law in Brazil in the 2000s:

Mutual cooperation between different levels and agencies of government provided support for stricter monitoring activities. In 2004, remote sensing-based forest monitoring capacity in the Legal Amazon improved significantly with the implementation of INPE's Real-Time System for Detection of Deforestation (DETER) and the creation of the Center for Environmental Monitoring (CEMAM) at the Brazilian Institute for the Environment and Renewable Natural Resources (Ibama). Collaboration between INPE and Ibama allowed for the regular production and distribution of georeferenced digital maps containing information on recent changes to forest cover in critical areas, providing important tools for the targeting of law enforcement activities (Assunção, Gandour, and Rocha, 2012: p. 2. Our highlight);

It is important to note that the entire process depended on state capacity and public expenses and a strong commitment and coordination capacity from the Environment Ministry. Naturally, this is associated with political preferences and priorities as seen in an analysis of the different administrations.

Brazilian environment governance and performance from 2000

To reach the goals of the analytical approach proposed, we reviewed an extensive body of literature on Brazil's environmental policy, governance, and enforcement. We also collect a set of data regarding budget, and human resources to identify state capacity and enforcement from SIOP (Integrated System of Planning and Budget), and IBAMA Management Report information.

Initially, we will present general results on environmental performance in Brazil based on INPE and IBAMA data divided into two parts and summarized in four charts:

1. **Information:** active fires (INPE) and deforestation in the Amazon region (INPE).
2. **Supervision and prosecution:** IBAMA officials and environmental infringement notices (IBAMA).

In both cases, the environmental performance depends on the strengthening of coordination and state capacity (agencies).

Fire responsibility in the Legal Amazon (active fires)⁵ is commonly adjacent to agricultural and livestock farms. It is associated with agriculture and livestock frontier

⁵ Natural forest fires are considered rare in Amazonia.

expansion, given that in the Amazon, there is growing industrial-scale cattle ranching and soybean production.

Figure 4 shows INPE data that highlights a significant reduction, particularly after 2010. Taking into consideration the 2003-2020 average, after 2010 active fires remained below the average, suggesting an improvement when compared with previous years. Still, there is a remarkable increase in the 2019-2020 period.

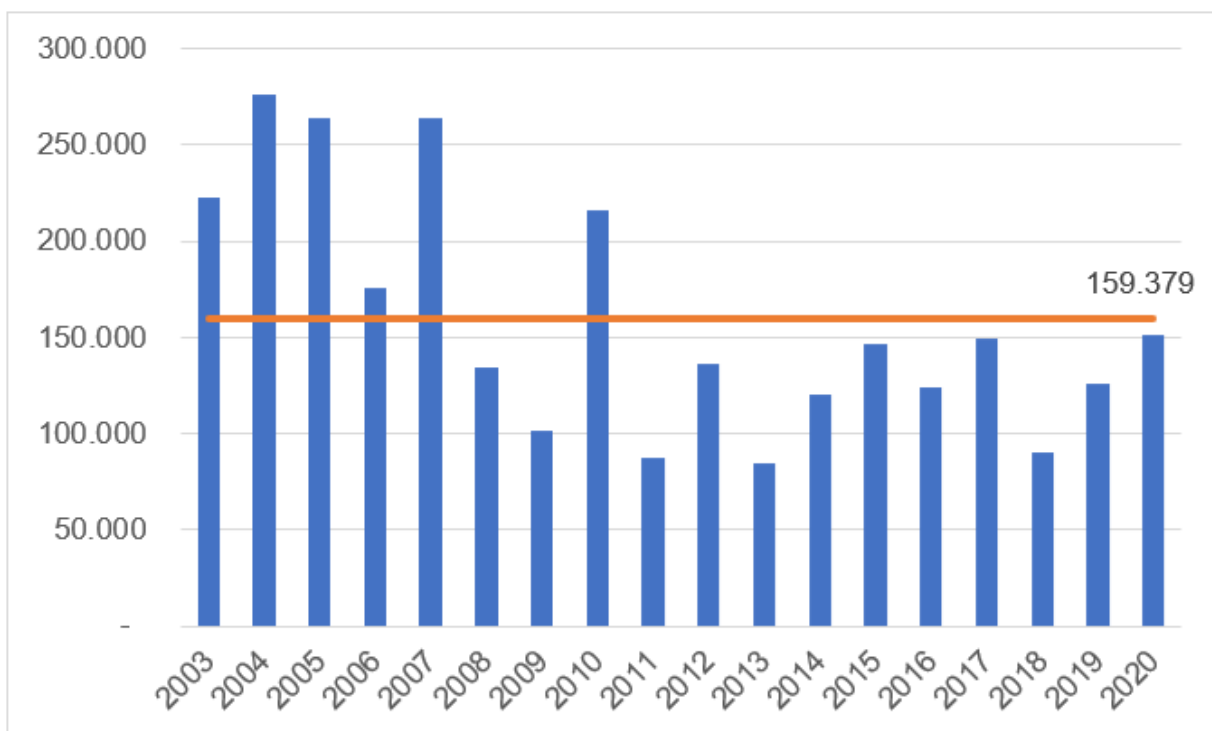


Figure 4. Active fires. Legal Amazon (2003-2020), INPE.

Supervising efforts depends directly on human resource capacity, particularly the number of officials. Two turning points are remarkable and associated with the pension fund reform in Brazil in 2007 and 2018. Good law enforcement (2004-2012) was obtained considering an average of 4,000 IBAMA officials. The trendline, on the other hand, shows a worrisome tendency. Since 2018, the main environmental agency in Brazil experienced a significant loss in human resources, with less than 3,000 officials (Figure 5).

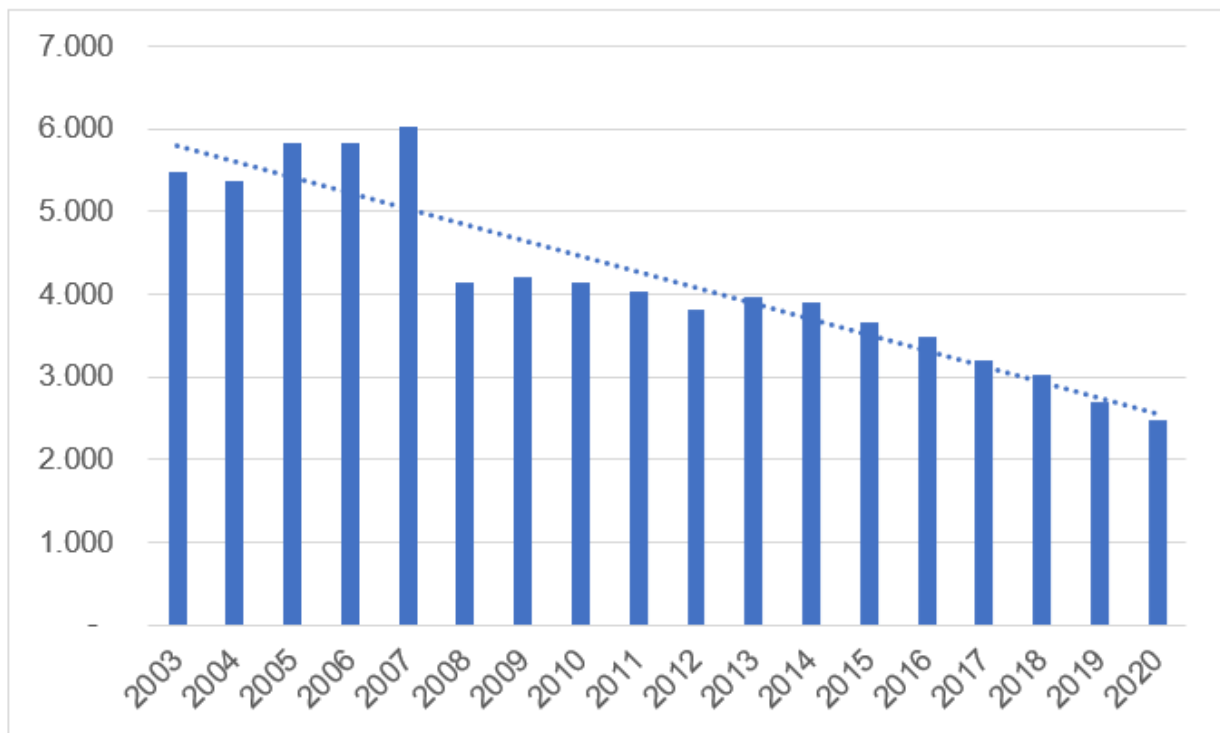


Figure 5. IBAMA officials (2003-2020), IBAMA.

The next chart (Figure 6) shows the great law enforcement, particularly from the launch of the PPCDAM in 2004, highlighting an impressive number of environmental infringement notices by IBAMA, reaching more than 30,000 notices. In contrast, after 2016 there is a clear decrease in violations, which suggests a lower supervising and prosecuting capacity.

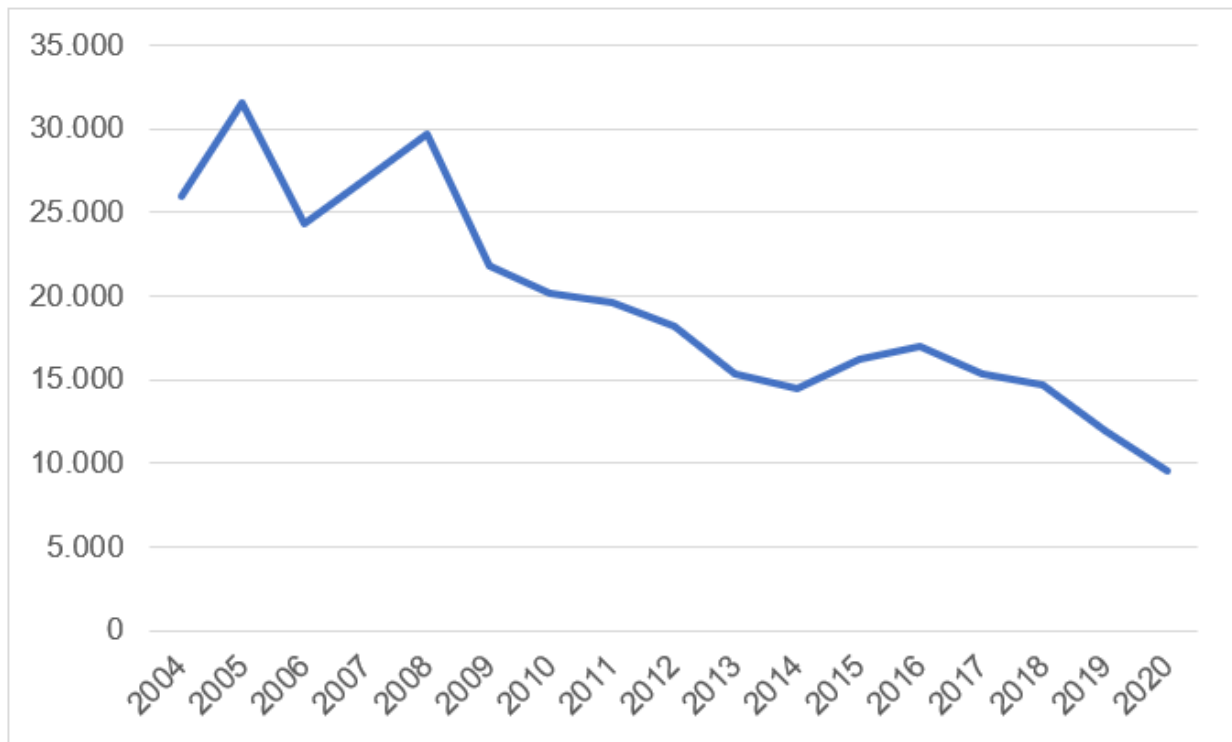


Figure 6. Environmental infringement notices issued by IBAMA, IBAMA.

The main environmental performance indicator, highlighting enforcement capacity, is the deforestation rate data from INPE (Figure 7). The following data shows an impressive reduction in deforestation in the Legal Amazon, from a peak in 2004 to the lowest rate in 2012, suggesting the great efficacy of environmental policy (PPCDAM) and its associated environmental governance. It is important to highlight the increased deforestation rates from 2015, suggesting a weakness in environmental governance.

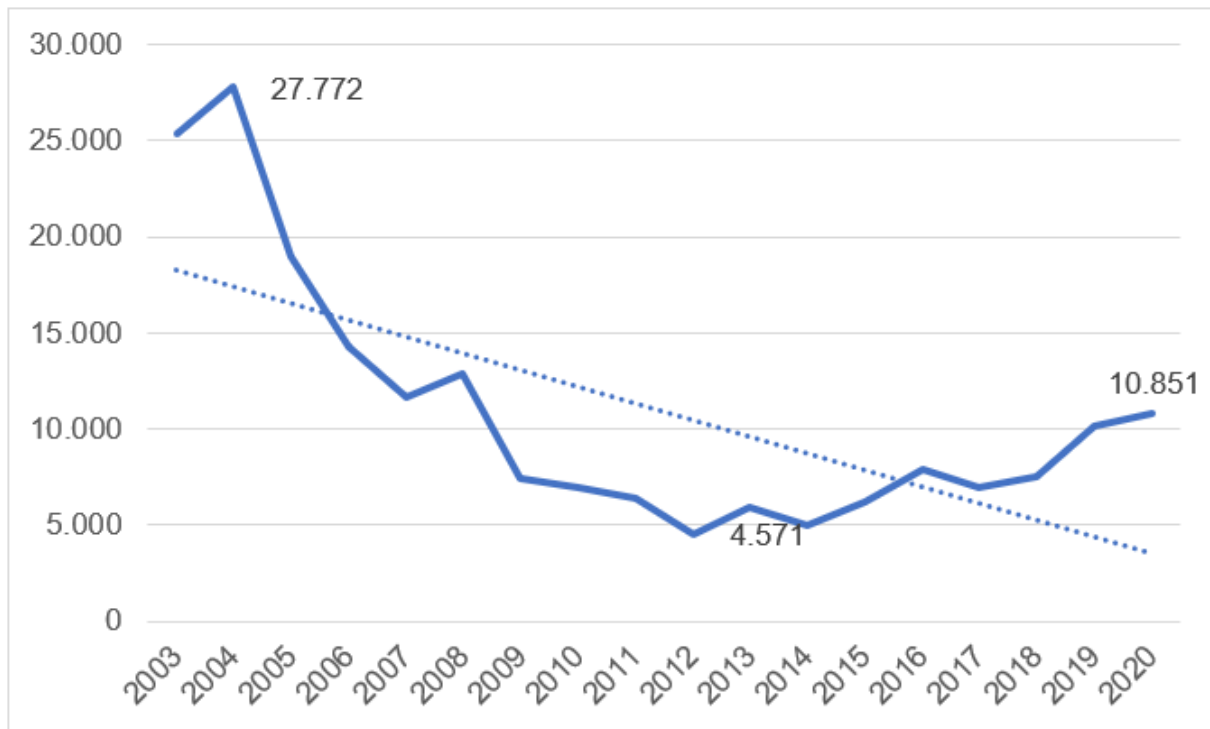


Figure 7. Deforestation in the Amazon Region. Area (Km²), INPE.

The abovementioned increase in deforestation rates is associated with political priorities and clearly with environmental governance changes and their enforcement capacity. In this sense, it is useful to interpret the data considering the partisan dominance, in other words, the different administrations (elected governments).

Brazil's environmental policies according to administration

In this section, we will present a set of data covering a time series from 2003 to 2020. It encompasses six Brazilian administrations (elected governments), divided into:

- **2003-2006:** Luis Ignacio Lula da Silva (Lula I)
- **2007-2010:** Luis Ignacio Lula da Silva (Lula II)
- **2011-2014:** Dilma Rousseff (Dilma I)
- **2015-2016:** Dilma Rousseff (Dilma II)
- **2017-2018:** Michel Temer (Temer)
- **2019-2020:** Jair Bolsonaro (Bolsonaro)

Before presenting environmental performance data, it is useful to review the governments under the perspective of discourse and narratives about government environmental goals.

Based on a review of the literature, several efforts to conserve biodiversity were launched during Lula's I and II administration (Fearnside, 2012; Assunção et al. 2013; Azevedo-Santos et al., 2017):

- Plan of Action for Prevention and Control of Deforestation in the Legal Amazon (PPCDAM).
- A shift in 2007 in Brazil's position in climate negotiations to allow compensation for avoiding deforestation.
- Creation of protected areas.
- Improvements in systems for satellite monitoring of deforestation in near real-time, beginning in 2006.

Rousseff's administrations were associated with unsustainable policies that caused a series of harmful initiatives, with great potential to damage biodiversity and ecosystems. According to Tollefson (2016: p. 147): "The embattled president has promised to maintain Brazil's environmental agenda, including its commitments under the Paris climate agreement. But agricultural and business interests are pushing back against environmental protections set by the Workers' Party under Rousseff's predecessor, Luiz Inácio Lula da Silva, endangering more than a decade of progress on issues such as deforestation." The turning point is related to the Forest Code approval, in 2012 (Law No. 12,651/2012).⁶ It reduced protection requirements on private properties and pardoned 43 years of violations of the previous Forest Code.

Michel Temer's administration started in June 2016 and was associated with conservative politicians known as "ruralists" - a group composed of politicians linked to the production of agricultural commodities or financed by agribusiness groups in Brazil. The government, including the political coalition, approved a number of measures that went against the reduction in deforestation. A few months earlier, the Senate approved PEC 65,

⁶ It is important to highlight this law (rules) change. It was a symbolic inflection regarding environmental policy in Brazil. It was the most important change of rules in recent years, regarding the environmental legal framework. Otherwise, the changes in governance and enforcement of law, as observed during the following years after Forest Code approval, seems to explain more the environmental performance than the law change.

in April 2016, which guarantees freedom to build with only a previous study of environmental impact, and an environmental license is no longer necessary. This Constitutional amendment (PEC 65) has also reduced the federal prosecutor's power to supervise builders and only allows administrative and non-legal punitive measures (Pereira, 2019).

Since January 2019, **Bolsonaro's** administration began with a markedly anti-environmental stance both in rhetoric and practice. Since then, a number of key changes have been made that will have major implications for conservation in the Amazon, including the transfer of the administration of indigenous lands from the Ministry of Justice to the Ministry of Agriculture, and the elimination of the climate sections of both the Ministry of the Environment and the Ministry of Foreign Affairs (Carvalho et al., 2019, p. 123). According to Thomaz et al. (2020), the two environmental federal agencies were significantly dismantled: IBAMA (in charge of law enforcement) and ICMBio (responsible for the management of protected areas). Additionally, the demarcation of indigenous reserves (important areas for biodiversity conservation in Brazil) has been interrupted. Technically qualified federal employees responsible for inspection campaigns, many of whom have important roles in environmental emergencies, were dismissed from their positions.

This short historical review suggests a significant impact on environmental governance and its relationship with state capacity: the budgetary impact on IBAMA is particularly highlighted.

State capacity and enforcement

Initially, we will use the following data to identify "state capacity" in the environmental agency:

1. **Human capital (human resources budget)**
2. **Fiscal strength (discretionary budget)**
3. **Reach (data/ operations/ information/ penalties)**

The government (partisan) affects agencies. The coordinating player is the Environment Ministry.

If we look at the report published by the agency responsible for the public budget, SIOF, the Environment Ministry (MMA) data for each administration provides a sense of the evolution of the coordination capacity in relation to environmental policy (Figure 8). After the implementation of the PPCDAM and the effort to achieve the coordination requirements, a large increase in the MMA's budget is observed. However, a remarkable inflection occurred in Bolsonaro's administration.

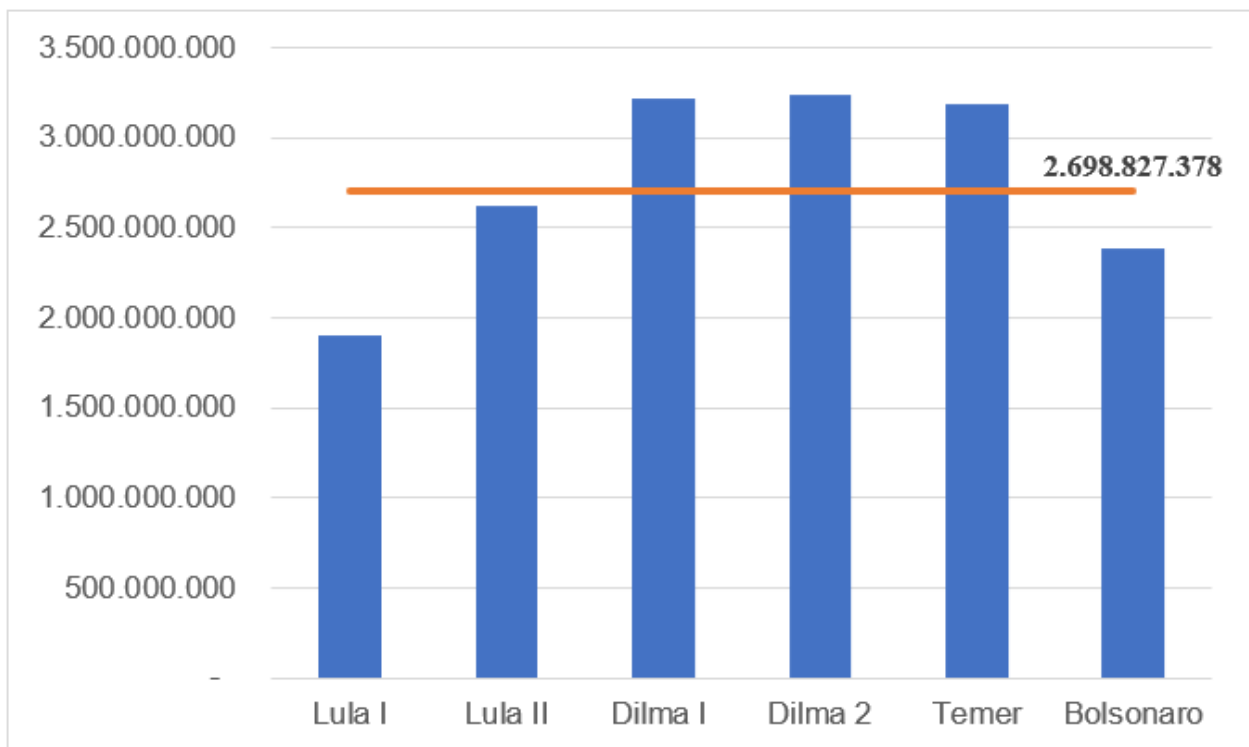


Figure 8. MMA Budget per Administration, prepared by the author based on SIOF data. Data deflated by IPCA (2020=100).

The next chart (Figure 9) shows the positive effects on active fire reduction, reaching the lowest level in Dilma's first administration, suggesting the great enforcement effort initiated in Lula's administration. Nonetheless, a worsening tendency is observed in the following administrations, particularly Bolsonaro's administration, as pointed out by Thomaz et al. (2020) and Barbosa, Alves and Grelle (2021).

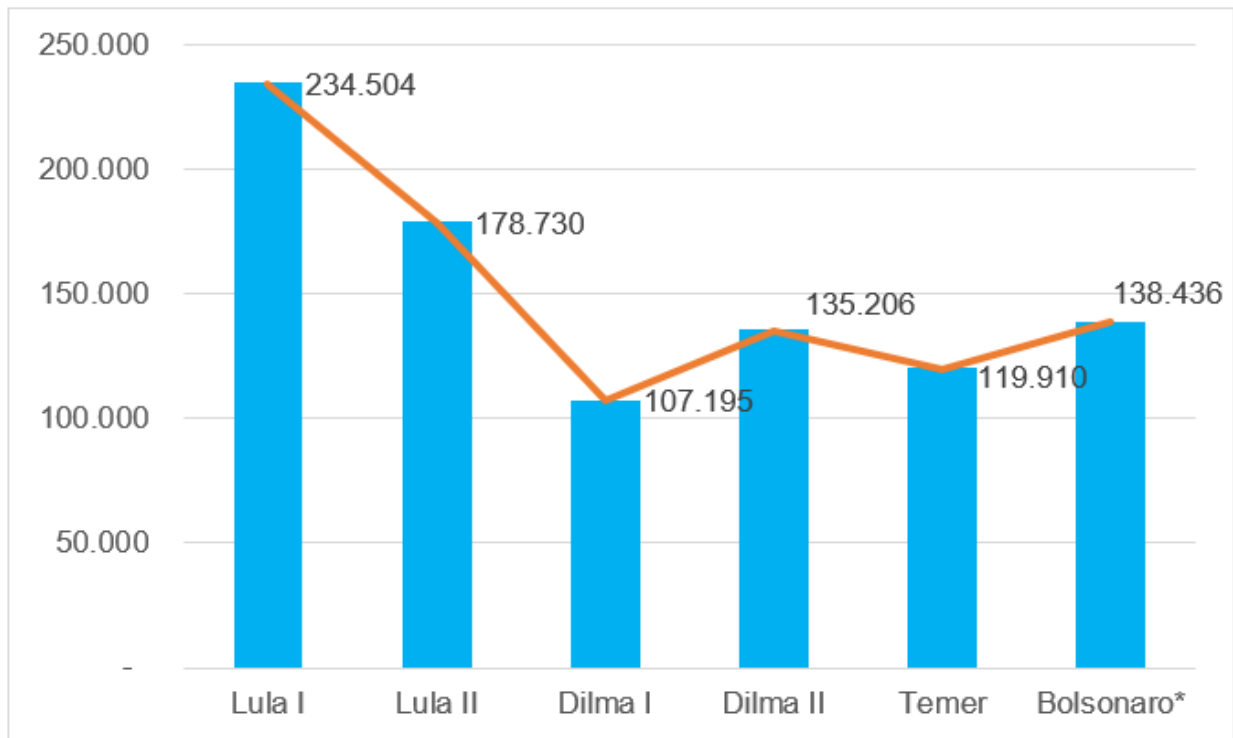


Figure 9. Active fires. Legal Amazon (1999-2020). Average per Administration, prepared by the author, based on INPE data.

A supplement to the previous chart comes from environmental infringement notices, suggesting a weakening of the enforcement system (supervision and prosecution) in Brazil, particularly observed from Temer's and Bolsonaro's administrations onwards (Figure 10).

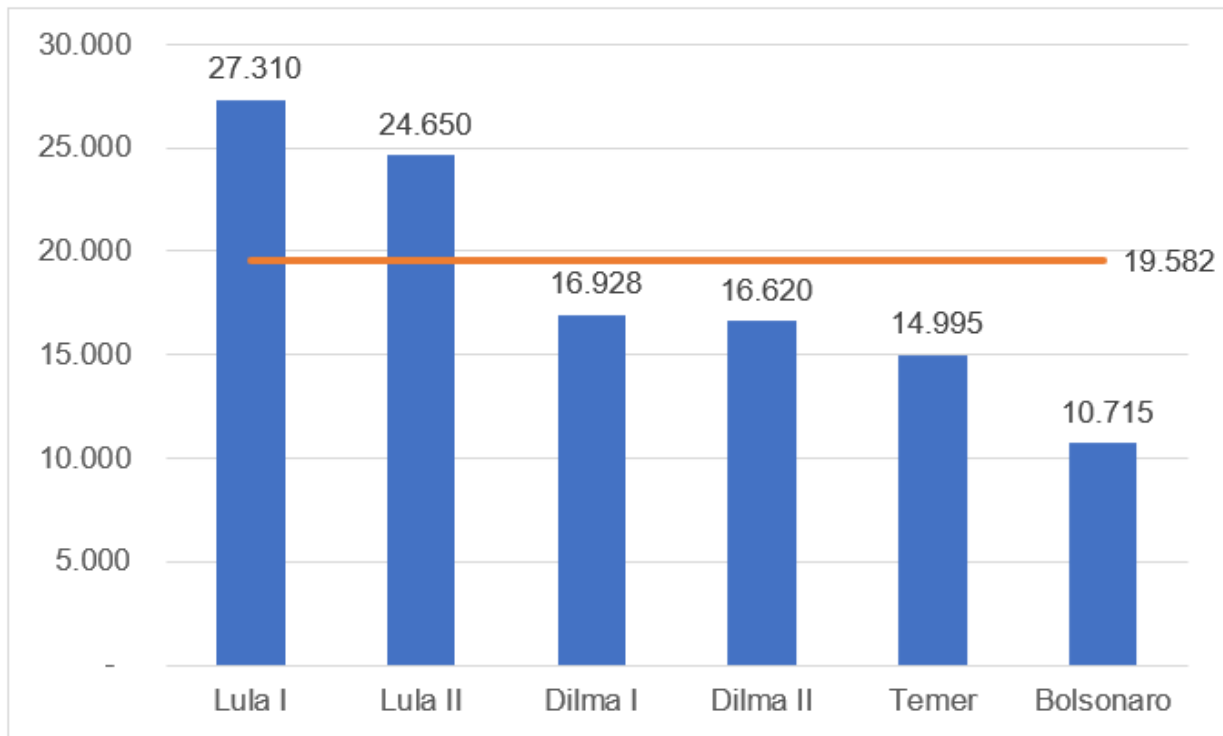


Figure 10. Environmental infringement notices issued by IBAMA. Comparison per administration, prepared by the author, based on IBAMA data.

The specific infringement notices dealing with forest violations are presented in the next chart (Figure 11). From Lula I to Dilma II, we observe a high number of infringement notices when compared to the average of 2003-2020. However, it is remarkable to see the impressive decrease during the Bolsonaro administration, which suggests a lower prosecution capacity of its environmental governance.

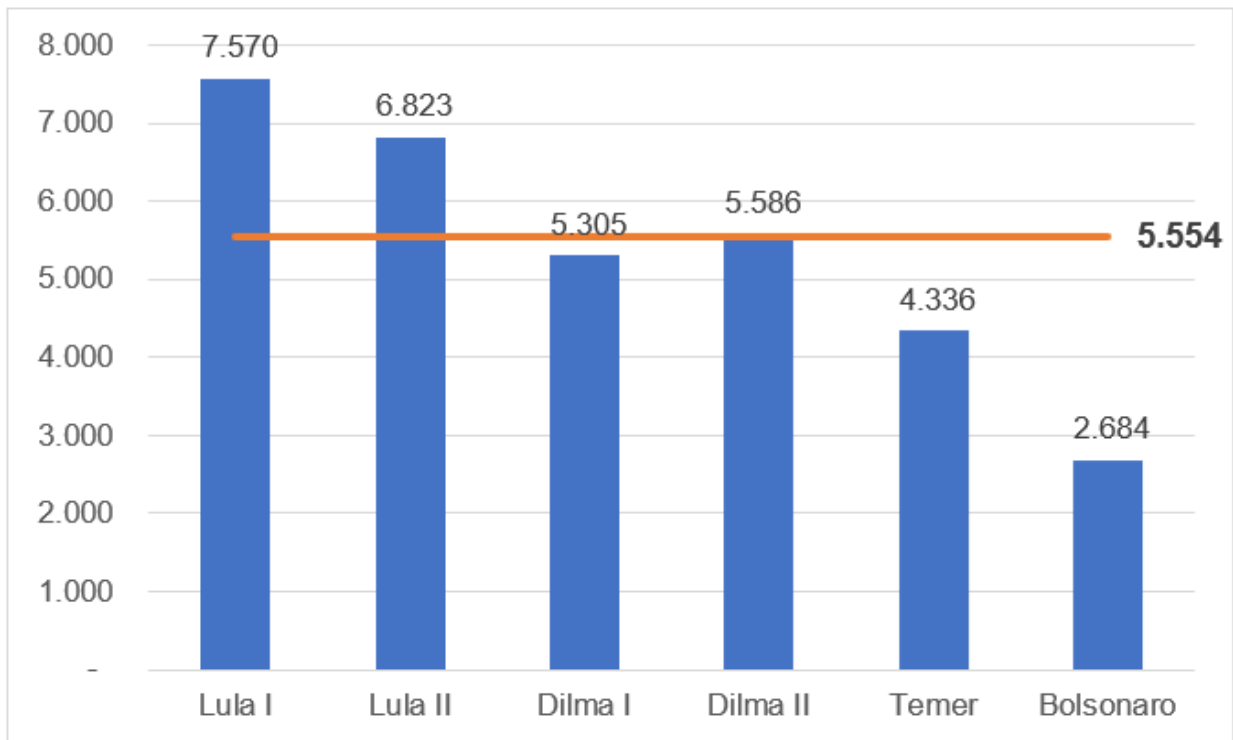


Figure 11. Infraction notices dealing with forest violations, prepared by the author, based on IBAMA data.

The above mentioned problem, highlighted in the previous chart, is strongly related to IBAMA's capacity for supervision and prosecution. As evidenced in the next chart (Figure 12), the main Brazilian environmental agency lost a significant number of officials, severely reducing its availability to enforce Brazilian environmental policies and laws. Compared to Lula's first administration, the number of IBAMA officials was cut by half.

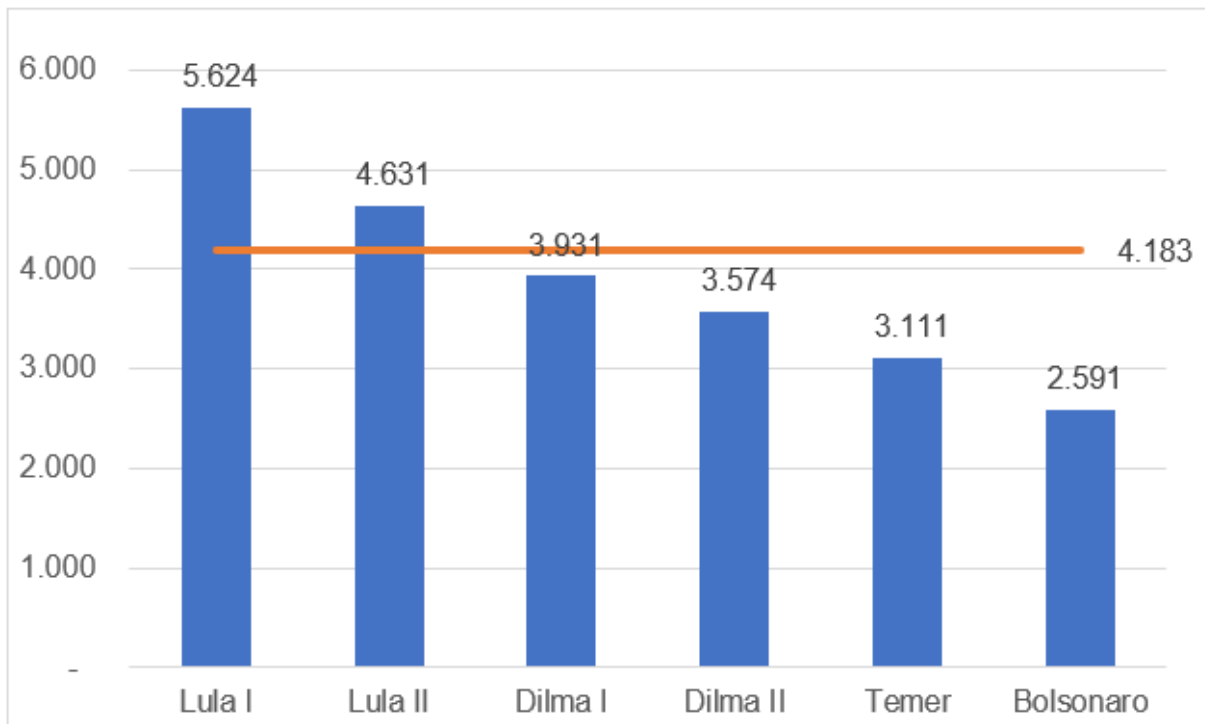


Figure 12. IBAMA officials: per administration and average (2003-2020), Self elaboration based on IBAMA data.

Because of the reduction in an environmental agency enforcement capacity, the data shows a severe decline in environmental performance, here, especially represented by deforestation of the Legal Amazon (Figure 13). After an impressive improvement and fast reduction in deforestation rates, a worsening process is observed from Dilma's second administration, reaching the worst scenario in Bolsonaro's administration, which shows a double deforested area compared to Dilma's first administration.

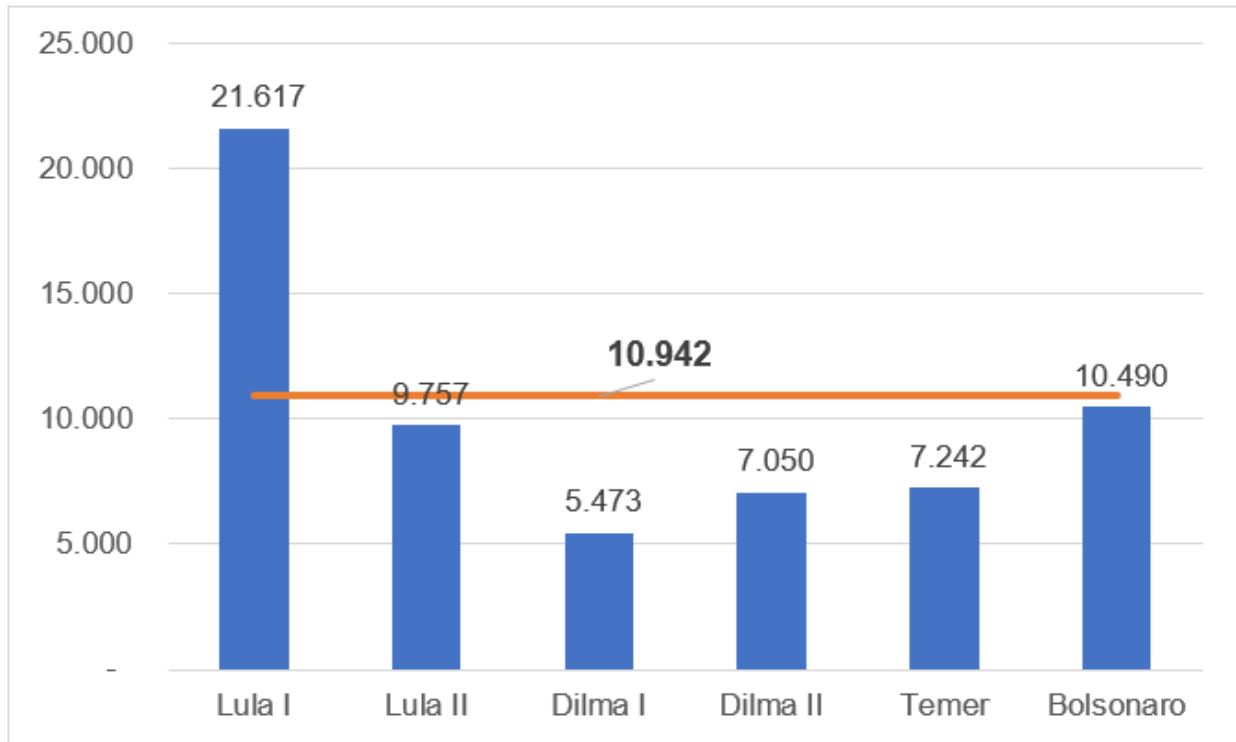


Figure 13. Deforestation in the Amazon Region. Area (Km²), prepared by the author, based on INPE data.

We suggest a final reflection to understand the shift in the environmental policy outcomes, particularly focusing on deforestation prevention policy. As shown previously, the PPCDCAM was launched in 2004 and was divided into three parts:

- Land and territory planning.
- Monitoring and environmental control.
- Development of sustainable activities.

The policy encompasses subsidies for sustainable farming, land use planning, and the creation of conservation units. Additionally, it promotes the enforcement of environmental laws through new technologies that allowed the instantaneous detection of newly deforested areas. As shown in previous charts, the substantial improvement in the environmental governance in Brazil and its enforcement capacity was launched in Lula's administration in response to PPCDAM policy after 2004. A great budgetary effort was made, as highlighted by Infoamazônia Report, as shown in Table 2:

TABLE 2
PPCDAM Budget Expenses (2020=100)

Government expenses	Lula (2007-2010)	Dilma (2011-2014)
Landlord ordering	1,086,040,636	577,611,923
Monitoring	1,269,855,602	930,996,914
Development	6,073,285,031	844,924,482

Source: Infoamazônia. Data updated to 2020 using IPCA.

The Infoamazônia Report published the PPCDAM only for two administrations, but it is enough to show the immense budgetary effort for the development of sustainable activities. The major investments during Lula's second administration help to understand the inflection of environmental performance visible in Dilma's administration. Here we connect environmental governance, the state capacity with environmental law enforcement. This policy is considered a major example of success in fighting tropical rainforest deforestation.

Concluding remarks

The primary motivation for this article was to present an analytical framework to explain environmental policy enforcement. The main argument is centered on the idea that "governance rather than rules" explains the efficiency of environmental policies. The "rule of the law" depends on the environmental governance system and its enforcement capacity.

We analyzed environmental governance from a **state-centric** perspective. The state is responsible for executive orders and decrees regarding environmental policies. Using Kelsen's hierarchical perspective of rules and laws, the state acts at the lower level, impacting law enforcement and environmental policy outcomes. Our analytical framework highlights the importance of "partisan dominance" and the political dimension of the conceptualization of environmental governance. The focus on different administrations (elected governments) highlights the ability to comply with the law and environmental policy objectives.

Those are precisely the lessons taken from Brazil's case. We investigated Brazilian environmental outcomes related to the anti-deforestation policy (PPCDAM) spanning from 2003 to 2020 and encompassing six administrations. The data suggest a rapid reduction in deforestation rates between 2004 and 2012, indicating efficient enforcement and, in other words, "the rule of the law". This was due to a couple of actions: good coordination capacity and large "investment" suggesting an increase in state capacity, particularly regarding Brazil's environmental agencies.

The suggested analytical approach may be a useful framework that can be applied to any environmental policy, not just anti-deforestation policy. However, due to the interdisciplinary nature of the topic of governance, there is a research agenda that offers possibilities for improving and refining the proposed framework, which is still preliminary.

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