

# Environmental violation assessment in southwestern Paraná from 2009 to 2014

## Abstract

Environmental violation assessment in southwestern Paraná from 2009 to 2014. The object of this work was to perform a study of the primary infringements responsible for environmental fines in the southwestern region of Paraná. The performance of the state environmental agency was also evaluated for the period from 2009 to 2014. Data was supplied by the Paraná Environmental Institute and refer to the census of proceedings initiated by this authority. The primary infringements recorded in the period were related to flora, followed by a lack of licensing and crimes against the wild fauna. The municipalities with the greatest number of proceedings were Francisco Beltrão, Marmeleiro and Capanema. The range of action of the IAP was between 100 and 120 km. In monetary terms, the municipalities with the most fines were Francisco Beltrão, São Jorge D'Oeste, Renascença, and Marmeleiro. It is worth nothing that the remaining natural forests continue to be threatened in this region, demanding continued societal control and environmental education.

**Keywords:** forest policy and law, forest administration, environmental policing

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**Abbreviations:** FB, francisco beltrão; MAR, marmeleiro; CAP, capanema; CI, cruzeiro do iguaçu; DV, dois vizinhos; SJ, são jorge d'oeste; REN, renascença; NP, nova prata do iguaçu; SL, salto do lontra; REL, realeza; PSB, pinhal de são bento; PLA, planalto

## Introduction

Brazil has an extensive area of native forests which demand permanent leadership for the efficient policing and control of environmental laws and, more specifically, protection against illegal deforestation. For the southwestern region of Paraná, soil occupation was also based on land use and occupation processes with uncontrolled suppression of native forests. For Padilha Junior et al.,<sup>1</sup> the gross value of agricultural production (GVP) in this region is equivalent to 11% of the State total.

After a period marked by new discussions on the preservation, conservation and sustainable development in the country, law n. 11.428 of December 22 2006, known as the Atlantic Forest Law,<sup>2</sup> was passed to protect one of the most important and nationally representative ecosystems. The enacting of this law came from Decree n. 6.660,<sup>3</sup> which revoked Decree n. 750/1993,<sup>4</sup> in force until that time.

The Atlantic Forest Law recognized this biome as a national heritage,<sup>2</sup> establishing its coverage of the remaining native vegetation in the primary and initial secondary, middle and advanced stages of regeneration. In fact, for the evaluation of what a remnant is this public policy standardized the Brazilian Institute of Geography and Statistics (IBGE) map as a reference, denominated Map of the Area Under Scope of the Atlantic Forest Law.<sup>2</sup>

Conversely, and in the wake of the laws that protect the environment, in the same year the Atlantic Forest Law was passed, the Environmental Crimes Law was updated, promulgated ten years earlier<sup>5</sup> that occurred through Decrees n. 6.514 and 6.686.<sup>6,7</sup> From this, environmental infringements began to be evaluated with objective

criteria for the valuation of fines, which until then were made through Decree n. 3.179.<sup>8</sup>

Considering the concern in preserving the remnants of the Atlantic Forest, and taking the general hypothesis that this biome is still threatened in the southwest of Paraná, the objective of this work was to perform a quantitative and qualitative study of the main administrative infringements that result in environmental fines in the region, and also to verify the monetary values of these fines. As a compliment, the performance of the State Environmental Agency of the municipality of Francisco Beltrão and surrounding areas was also evaluated for the period between 2009 and 2014 after the environmental crimes law was enacted.

## Material and methods

### Study area

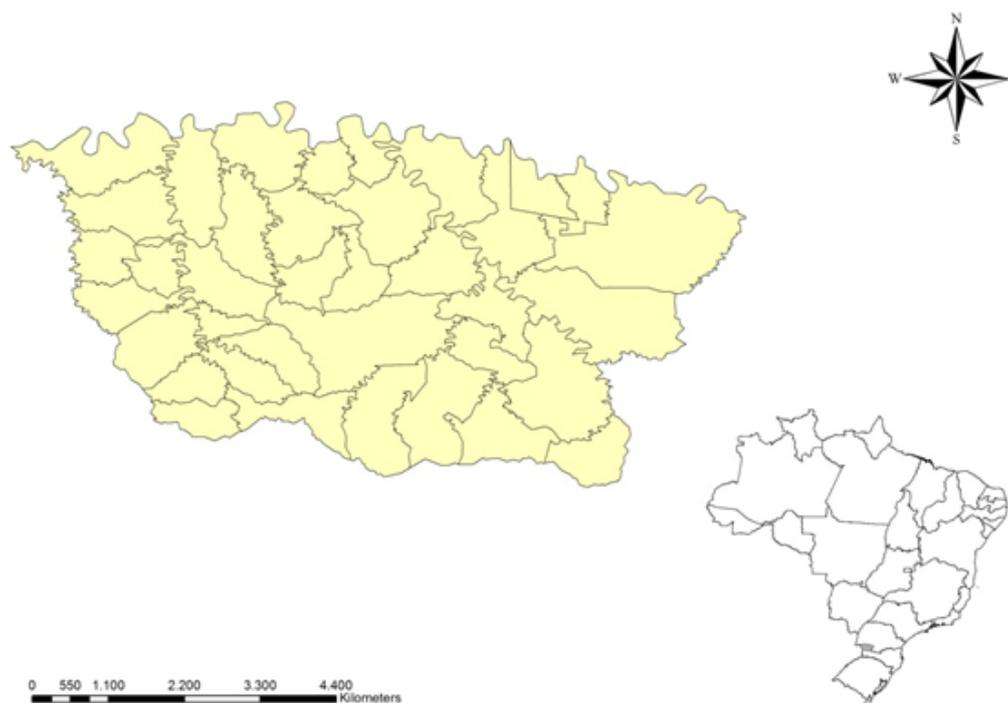
The study was conducted in the southwestern region of Paraná. Tomasetto et al.,<sup>9</sup> state that the region has an area of 11,687km<sup>2</sup> (Figure 1), with 42 municipalities, of which 94% have an area of less than 50 ha. The majority of rural properties in the region perform activities related to family farming, with the production of food for supplying the municipalities themselves, and where dairy farming is prominent.<sup>10</sup>

The data for this research were supplied after a formal request filed with the Environmental Institute of Paraná (Instituto Ambiental do Paraná, IAP), Francisco Beltrão Regional Office. The descriptive statistical method was adopted using documentary research which, according to Marconi et al.,<sup>11</sup> begins with the use of primary and retrospective sources for analysis. For Cervo et al.,<sup>12</sup> the purpose of document research in a historical narrative is to describe and compare the uses, customs and tendencies of present reality with the past.

The information was organized, entered into spreadsheets and analyzed. A polar graph was created which, for Fonseca et al.,<sup>13</sup>

is a representation of a temporal series by means of a polygon, considering the number of proceedings as a discrete variable. Bar graphs were also created both when comparing the number of proceedings per municipalities, but also with the continuous data of

distance in kilometers of the cities where the offenses occurred to the headquarters of the IAP, and as well in respect to the analysis of the monetary value of fines in each locality.



**Figure 1** Paraná southwestern region.

Excel software graphical editing tools were used in regard to the census of all environmental proceedings initiated by the Paraná regional environmental authority from 2009 to 2014 (after the enacting of the environmental crimes law). In fact, the measurements of position and dispersion with the grouping of data (mean, standard error, minimum and maximum confidence intervals), allowed the presentation of the result at a probability level of ( $p < 0.05$ ) for some details.

The suppression of authors was opted for in a manner to preserve the identity of the offenders. Also taking into account the constitutional right that guarantees the broad defense and the contradictory one,<sup>14</sup> it is emphasized that the information presented referred only to the environmental fines adjudicated administratively in the first instance. The administrative processes analyzed complied with IAP Decree n. 157 (IAP, 2011), which governs administrative defense at the state level. Thus, other instances foreseen in the proceedings were either by the president of the authority (art. 5, IAP, 2011) or the Public Prosecutor, who could proceed with the analysis of civil and criminal, as well as administrative liability, whichever the case may be. From the criminal classification provided by the environmental crimes law, the groups “Flora”, “Fauna”, “Pollution”, “Historical and Cultural Heritage”, and also crimes against “Environmental Administration” were used as a classification standard for infractions.

## Results

### Types and number of proceedings

A total of 361 infringements were observed for all group during the period. When analyzing the Francisco Beltrão regional IAP, it can be stated that the “Flora” group held first position for the number of reported infringements, and which primarily referred to logging, illegal cutting and illegalities in the transport of raw material originating in the forest (Figure 2). On average, the IAP lodged proceedings against 38 proprietors per year who performed unauthorized logging. It is estimated that between 19 and 56 proprietors have proceedings lodged against them annually ( $p < 0.05$ ).

### Municipalities with the most proceedings

It is not possible to define a rationale when it comes to the relation of the number of notices issued year on year, since there are several factors that affect environmental policing. For example, a certain region may show more occurrences when a greater number of environmental crimes are reported. Another explanation could be the development of municipalities through the emergence of new businesses and industries, which would result in more cases requiring licensing. On the other hand, better public policies for prevention or the protection of the environment, or the difficulty for environmental

agencies to police their policies are factors which may reduce the number of environmental infraction notices issued.

The town of Francisco Beltrão presented the greatest number of cases with 85 occurrences. The fact that the regional IAP office is

located in that municipality is the most probable reason for this, thus facilitating inspections (Figure 3). The municipalities of Capanema and Marmeleiro had the second greatest number with 30 proceedings each.

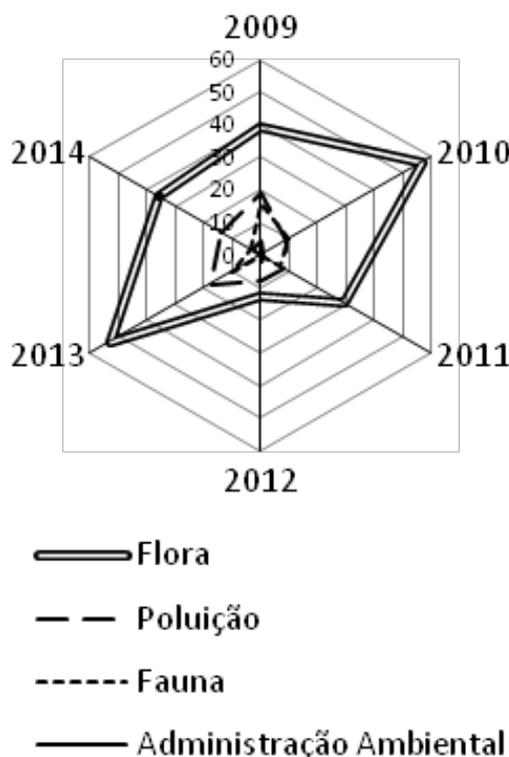


Figure 2 Number of proceedings initiated, by environmental violation category.

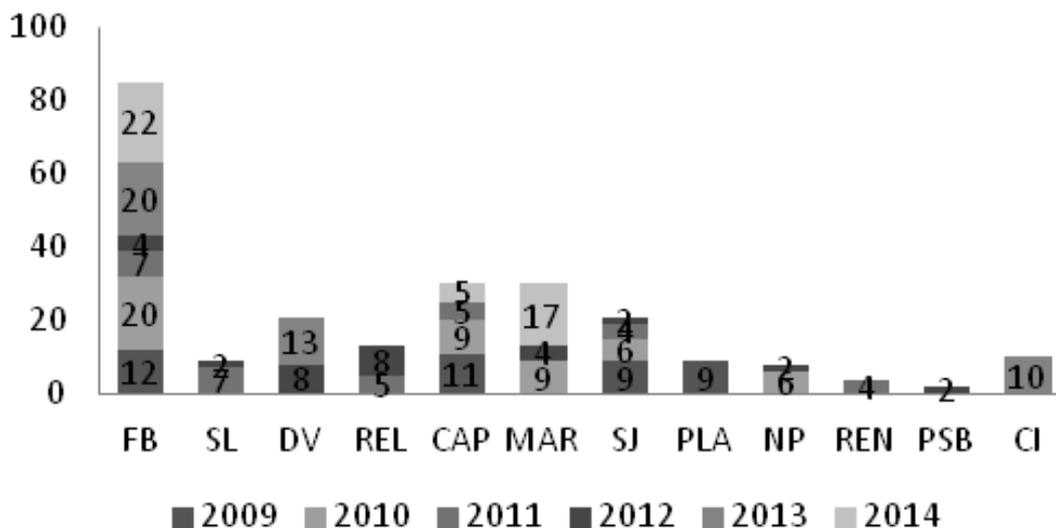


Figure 3 Number of proceedings by municipality.

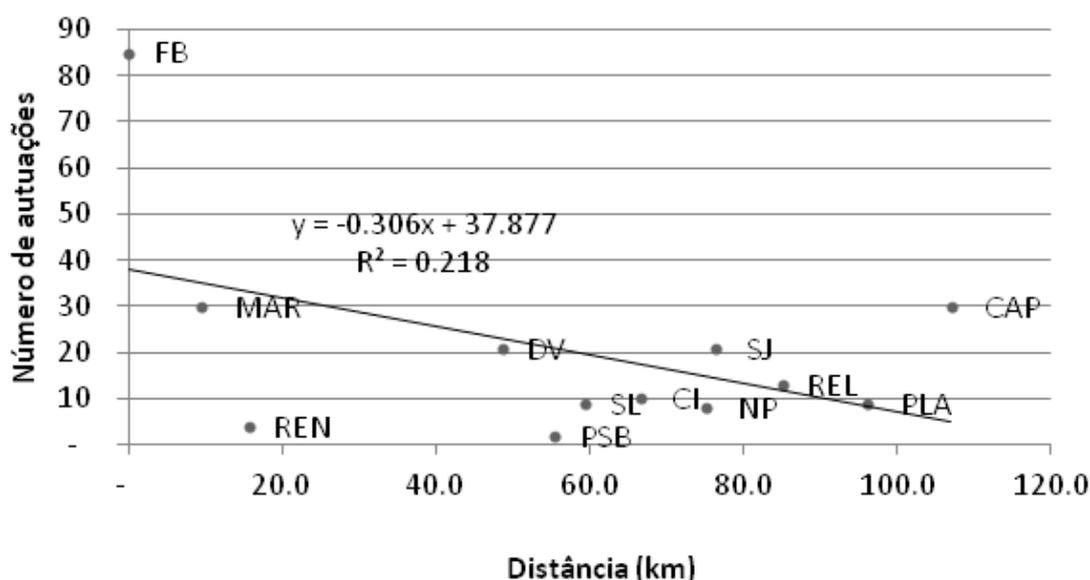
Where: FB, francisco beltrão; MAR, marmeleiro; CAP, capanema; CI, cruzeiro do iguaçu; DV, dois vizinhos; SJ, são jorge d'oeste; REN, renascença; NP, nova prata do iguaçu; SL, salto do lontra; REL, realeza; PSB, pinhal de são bento; PLA, planalto

Based on the hypothesis that a greater distance between a particular municipality and the office of the policing agency would be reflected in a lower number of infringement notices, since it would be related to the greater difficulty in traveling and to the costs associated with the inspection, the dispersion of the points that relate these two parameters is presented in Figure 4. There is a low correlation ( $R^2 = 0.22$ ) between these factors, which discard the hypothesis, making externalities and unknown aspects the most plausible justifications for influencing the number of proceedings. Considering all the municipalities that had proceedings lodged, it can be seen that the radius of action of the

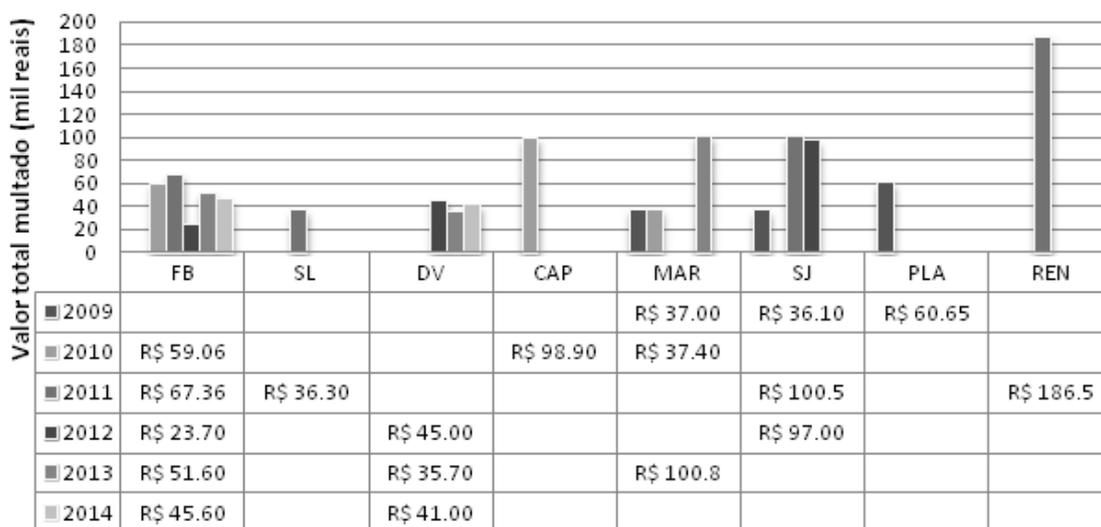
Francisco Beltrão regional office, was between 100 and 120km from the headquarters.

### Fine values in different locations

There was evidence of the effect of randomness in the values for the fines in the different municipalities served by the regional IAP. Francisco Beltrão was the municipality with the greatest number of proceedings (Figure 3). However, in monetary terms, Renascença was seen to have the higher value where, in 2011, the total fine value was found to be R\$186.500 (Figure 5).



**Figure 4** Linear relationship between the location where an environmental proceeding was lodged and Francisco Beltrão. Where: FB, francisco beltrão; MAR, marmeleiro; CAP, capanema; CL, cruzeiro do iguaçu; DV, dois vizinhos; SJ, são jorge d'oeste; REN, renascença; NP, nova prata do iguaçu; SL, salto do lontra; REL, realeza; PSB, pinhal de são bento; PLA, planalto



**Figure 5** Fines (thousands of Reals) to municipalities with the most proceedings during the evaluation period. Where: FB, francisco beltrão; MAR, marmeleiro; CAP, capanema; CL, cruzeiro do iguaçu; DV, dois vizinhos; SJ, são jorge d'oeste; REN, renascença; NP, nova prata do iguaçu; SL, salto do lontra; REL, realeza; PSB, pinhal de são bento; PLA, planalto

Conversely, with the value of the fines for the years 2009 to 2014 and per municipality, it was evident that the highest amount collected was in Francisco Beltrão, totaling R\$ 247.320. As already reasoned, the effect of the environmental agency office location being located in the same municipality, and thus being closer to the community made it more effective in its action and in the complaints filed.

The municipalities of São Jorge D'Oeste (R\$ 233.600), Renasçença (R\$ 186.500) and Marmeleiro (R\$ 175.200) were placed second, third and fourth respectively. The dissemination of these results is strongly recommended so that local government and other entities, such as nongovernmental organizations can act more effectively in relation to environmental education actions.

## Discussion

From the data obtained, it was observed in Figure 2, that there was a reduction in the number of proceedings in relation to illegal logging for the year 2012. This tendency was not observed for 2013. Comparatively, for the Amazon region, according to Santos et al.,<sup>15</sup> the deforestation rate had increased considerably in the period from 2014 to 2015.

It is believed that the decrease in deforestation seen in the southwest of Paraná in 2012 was due to the approval and publication of the reformulation of the Forestry Code.<sup>16</sup> Thus, the absence of its regulation at a state level could justify the increase in 2013, and, precisely due to being regulated in Paraná the following year through Law n. 18.295,<sup>17</sup> there would be justification for the fall recorded for the number of proceedings in the sequence.

In any case, the most plausible justification for the reduction in the proceedings for crimes against flora in the southwestern region of Paraná may have been, precisely, the enacting of the law protecting native vegetation for this State, which would have had a positive influence on the control structures against this type of environmental damage. In other words, the fall in occurrences may have been due not necessarily to the strengthening of the command structures, but due to the effect of publicizing the requirements of the new public policy through the media.

Comparatively, Barreto et al.,<sup>18</sup> also found that for the Amazon region, deforestation, along with fires associated with logging, was the most common infraction. It is inferred, in this sense, that farmers in the southwestern region of Paraná may be more aware of the illegal use of fire associated with agriculture in relation to other locations of the country, once the act of causing a forest fire was criminally and administratively provided for in environmental law.

In fact, such an assertion should not be considered as absolute truth. At the time in which extensive areas with native forests was converted to other uses, it was also carried out in the southwest region in the first half of the twentieth century, and for now only remnants of the Atlantic forest remain. Furthermore, the classification used by the IAP in the Flora group no longer specifically mentioned fires, and this type of infraction could also be classified in the Environmental Pollution item, and thus, can no longer be specifically quantified.

Santos et al.,<sup>15</sup> discuss the elevated environmental impact of the timber economy in the Marajó archipelago in Pará, and that it still exerts pressure on the native forest, resulting in a high number of cases of illegal logging and unauthorized transportation of forestry products. For the author (ibid.), the adoption of a forestry management

system coupled with conservationist initiatives which seek to curb deforestation, would be a predominant factor for the preservation of the forest, especially the rainforest.

Indeed, the criteria to be adopted for the development of the so called Sustainable Forest Management Plans (SRMP) were improved with the forestry law of 2012, and still need to be valued more by society. Considering the reality of the southwest of Paraná, in which the greater part of the forest was deforested in the first half of the twentieth century, it becomes important to highlight the need for joint interpretation of the forestry code with the other Atlantic Forest federal law,<sup>2</sup> which characterizes this biome as especially protected. The SRMP in the region can be developed in remaining forests, provided that they comply with the requirements of Decree 6.660,<sup>3</sup> which regulated the said legal decree, in spite of the possibility of allowing the exploitation of up to fifty percent of the specimens planted within the forests (article 8, Brazil, 2008b), with the rest remaining for vegetative enrichment. However, ordinances 43 and 443 of the Ministry of the Environment,<sup>19,20</sup> which concern the protection of endangered species, harmed the timber use of the remnants.

Infractions relating to the lack of licensing, irregularities in mining areas, and the inadequate discharge of liquid effluents, all of which are classified in the "Pollution" group (Figure 2) are the second most common offenses. On average, the IAP initiated 13 such proceedings per year during the period evaluated. Furthermore, it is estimated that between 7 and 18 infraction notices were issued annually ( $p < 0.05$ ), in contravention of the environmental licensing that should be observed by companies in the region.

Lack of licensing is a routine concern for entrepreneurs, society and public bodies in the region. This concern establishes two opposing positions in which, on the one hand, licensing hinders development and, on the other, it qualifies the venture to the associated economic development. The discussion on this theme in the area covers the delay in issuing licenses, the policing structure, the lack of awareness and the corruption and impunity, to name but some issues.

Aragão et al.,<sup>21</sup> hypothesized that the degree of economic development of an area can be directly related to the increase of environmental proceedings initiated related to lack of urban planning. Based on these results (ibid.), the authors concluded that the most commonly seen environmental infractions in the municipality of Ceará were those regarding pollution and failure to comply with environmental licensing.

It must be remembered that licensing is one of the main instruments of the Environment National Policy,<sup>22</sup> and since the 1990s the country has had a policy for the regulation of human activities which generate environmental impacts. Having provided the polluter pays principle, it appears that humanity in general still lacks enough awareness to comply with this law.

Filipin<sup>23</sup> mentioned that, in the State of Sergipe, civil construction and real estate consultancy exercise an effect on urban expansion and, consequently, give impetus to violations of the flora. This argument also finds resonance in the reality of the southwestern region of Paraná, since the incorporation of rural areas within the urban perimeter requires the actions of the executive and the municipal legislature, in order to change the local master plans, as its permission must be requested by the supervisory body for the developers, at the time in which they seek to adapt to environmental licensing.

In view of this, there must be constant vigilance both from the environmental supervisory bodies, as well as the Public Prosecutor's Office and the third party sector, in order to prevent the installation of allotments without the necessary environmental mitigation and compensation measures being taken by these enterprises. In the case of conservation of remnants of the Atlantic Forest Biome, before the installation license is obtained, allotments ideally would not only satisfy the environmental requirements of the Rural Environmental Registry (CAR) provided for in the forest code, but as well that the Legal Reserves have been converted, or in the case of Private Reserves of Natural Heritage (PRNH), or even in municipal parks, regulated by the National System of Conservation Units.<sup>24</sup>

On the other hand, crimes of mistreatment against wild animals predominated in the "Fauna" group, occupying third position, where nine proceedings per year on average were initiated. It was possible to estimate that between 1 and 14 proceedings ( $p < 0.05$ ) are initiated annually against those illegally hunting in the region. In light of this, it can be said that farmers in the region are still not completely aware of the importance of the Environmental Crimes Law and the Atlantic Forest Law. Local culture, in regard to environmental legislation, needs to be further discussed in the region through environmental education in the schools, prefecture, development and research bodies, and communication vehicles to name but a few.

According to the data obtained in the research of Aragão et al.,<sup>21</sup> the most common types of infractions found in Ceará between 2012 and 2015 were those related to environmental pollution (pollution itself or non-compliance with environmental licenses), with 55.7% of the total number of proceedings. The next most common were infractions against flora (clear felled logging or the transportation of forestry products without documentation proving the legal origin of same), with 22.26%. Infractions against environmental administration (non-compliance with the environmental authority's determination or impeding the action of environmental inspection) ranked third in the number of cases, with 19.2%. This was followed by offenses against fauna (animal abuse or captive animal specimens without due authorization), with 1.4% of the total. The categories that presented the lowest indexes (less than 1.0%) were for those committed exclusively in Conservation Areas (causing damage to the conservation area) and those committed against urban planning and cultural heritage.

In order to compare the data obtained with the above cited research, it can be seen that, being rarer, that fines for the "Historical Heritage" group crimes were not issued by the Francisco Beltrão IAP in the evaluation period. It is noted, however, that in different regions, the most common categories were in relation to flora and environmental pollution. Crimes against the Environmental Authority were observed as well with, on average, 2 (two) occurrences per year. It is estimated that up to 4 proceedings initiated per year can be confirmed for this region.

In addition, Aragão et al.,<sup>21</sup> considered environmental policing as an instrument of territorial management, and emphasized the importance of investments in equipment and trained human resources, which would consolidate an integrated vision of the regions where the policing agencies operate, and would allow appropriate logistical infrastructure and implementation of the instruments aimed at safeguarding the natural resources.

In regard to the number of infraction notices in Ceará in relation to the distance to the headquarters of the state environmental protection agency, Aragão et al.,<sup>21</sup> on the other hand, affirm that logistical factors

were making policing more difficult with greater distances. The cited study showed that what would influence the number of infraction notices (in the municipalities of Ceará) was not the existence of conditions that would increase anthropomorphic pressure on the environment, such as population density, higher rates of urbanization and economic growth, but the logistics of environmental policing.

Several authors highlight several factors that show that impunity is recurrent for the majority of environmental crime proceedings. In this sense, Barreto et al.,<sup>18</sup> presented several limitations found with policing agencies, and suggested measures for deforestation crimes in the Amazon. These include the lack of coordination in activities related to the protection of indigenous lands; the lack of priority in the conclusion of processes for protected areas; the shortage and under utilization of IBAMA (Brazilian Institute of Environment and Renewable Natural Resources) prosecutor's time; insufficient transparency in responsibility, prioritize prevention activities; enforce compliance the law and do not normalize illegal facts; prioritize litigation for cases in protected areas; reinforce command and control measures, increase transparency in responsibility; and make the financiers and consumers of illegal products accountable.

Data collected by Souza et al.,<sup>25</sup> indicated that only between one (1) and two (2) percent of environmental fines are actually paid. According to them, despite being extremely active with environmental policing, SISNAMA agencies face the difficulty of low compliance in paying fines resulting from environmental infractions, and that in the case of the IAP, only 5 (five) percent of the fines are actually received (Ibid).<sup>26</sup>

According to Filipin<sup>23</sup> the speed and time spent to produce the administrative process are essential to achieve compliance with the law, in line with the principle of efficiency of public administration. In his research in the State of Sergipe, the processes originated within a time span of eleven years, 2000 and 2011, and only one out of the 17 processes analyzed was concluded, while the others are still in progress. Taking the average process duration, a value of 7 (seven) years for the final sentence was found.

However, considering the data of the research presented here, and in the case of environmental crimes, the greater effectiveness for combat was only made possible by enacting the law in 2008. The authors understand that over time a reduction of impunity can also be observed, at a time when the judiciary seeks reform to increase the use of computers and other technology, especially for cases that are taken to the last permissible moment. Government command and control structures, however, are beginning to act with more efficiency and resources.

Conversely, a more optimistic outlook for society's awareness of the reduction of environmental crimes will only be more credible once other public policies have been enacted, complementing those currently in force, and more specifically those that value the principle of the protector-receiver, changing the logic of degradation which continues to be resilient.

## Conclusion

The primary infringements recorded in the period between 2009 and 2014 were those against flora, followed by a lack of licensing and crimes against wild fauna. The municipalities issued with the highest number of notices were Francisco Beltrão, Marmeleiro and Capanema. Considering the number of notices issued, the range of action of the IAP was between 100 and 120km. The municipalities where there

were more fines in monetary terms were Francisco Beltrão, São Jorge D'Oeste, Renascença, and Marmeleiro. The Atlantic Forest continues to be threatened in the southwestern region of Paraná.

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## Conflicts of interest

The author declares there are no conflicts of interest.

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