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SciELO

Environmental Inspection Of Pesticides In Brazil

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Abstract: This paper aims to evaluate the experience on inspections of pesticides, conducted by the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA). It takes into account a typification of infractions identified, their temporal evolution and their spatial distribution in the territory. Data were collected from the IBAMA's Integrated System of Registration, Collect and Inspection. It was identified an increasing of 100% of infractions detected in the period 2009-2017, but a decrease of 21% and 60% in 2018 and 2019, respectively. Concerning the spatial distribution of infractions, there is evidence that the environmental inspections are not compatible with the locations where exist the most intense pesticide consumption. These results reveal a logic of intervention which is not based on a strategic planning at national level but rather in local initiatives from the environmental inspection officers.

Keywords: Public policies; Environmental regulation; Environmental inspection; Brazilian Institute of Environment and Renewable Natural Resources (IBAMA); Pesticides.

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São Paulo. Vol. 26, 2023

Original Article

DOI: http://dx.doi.org/10.1590/1809-4422asoc20210201r2vu2023L1OA

Introduction

Environmental inspection over pesticides in Brazil has been a relevant issue ever since the country became a leading global pesticide consumer. Brazil is estimated to be the world's second largest pesticide market, with sales of around US$ 12.1 billion in 2020 (SINDIVEG, 2021).[1] From 2000 to 2019, Brazil's pesticide consumption rose from approximately 162,000 to 620,000 tons of active ingredients (AI), a 280% increase (IBAMA, 2020[a]).

This accelerated increase in the country's pesticide consumption and its territorial dimensions (8.5 million km2) make any effective environmental inspection in this market a major challenge. As the federal environmental authority, the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) is responsible for the analysis, registration and control of pesticides, their components, and related products, and for the inspection and application of administrative environmental penalties, as the law stands today[2] (BRASIL, 2002, 2017).

Despite the importance of environmental inspections over agrochemicals for the environment and society, literature on the subject is scarce. The objective of this article is to evaluate IBAMA's experience in environmental inspections of pesticides, based on the types of infractions, their evolution over time and their distribution throughout Brazil.

Environmental Inspection as an Object of Public Policy Assessment

According to Deubel (2006), public policy assessment is a tool for addressing three major challenges of contemporary democratic governments, understanding, communicating, and controlling: understanding processes induced by public measures in order to inform future actions, communicating substantiated information to the public, and ensuring a government's responsibility to control the measures it takes with public resources.

Under Brazil's National Environmental Policy (PNMA), the objective of the government's decisions and actions is the preservation of environmental quality that favors life, ensures socioeconomic development, and protects human dignity. One of the principles of this objective is that the state's actions must ensure and protect the collective use of the environment, as a public interest asset. One of this policy's instruments is the application of disciplinary penalties for non-compliance with measures required for environmental preservation (BRASIL, 1981). This instrument is applied through environmental inspection, which is considered a program or purpose of the PNMA. As a dimension of that policy, it must be assessed based on outcomes of its procedures or on its operational processes.

Understandings of the role of the state in society regarding environmental issues may vary, depending on different theoretical conceptions of state-society relations, as

1 - The USA is the largest market, with sales of US$ 16.5 billion in 2020 (USDA, 2021).

2 - Besides IBAMA, the registration of pesticides in Brazil involves approval by the Ministry of Health (through the National Health Surveillance Agency, ANVISA) and the Ministry of Agriculture, Livestock and Food Supply (BRASIL, 2002).

well as the social and economic weight attributed to the environment. For the neo-institutionalist model of public policy analysis, state institutions play a central and active role in society, by constraining individual behaviors and preventing particular courses of action (DIMAGGIO; POWELL, 1991; PETERS, 1999; HALL; TAYLOR, 2003). From this standpoint, state institutions are essential to ensure the collective right to a balanced environment. They do this both through interventions and through their relations with social groups (SKOCPOL, 1985). Therefore, the actions or omissions of the state, through its institutions, such as IBAMA, have direct impacts on the environment, on society, and on society's relationship with the environment.

Bañon (2003) sees the assessment of public actions as a means to legitimize public power, a key aspect for any democratic government. Referring specifically to environmental inspection, Schmitt (2015) points out that the absence of consistent assessments of inspection efforts and their outcomes casts doubt on the performance of public authorities. In this sense, Deubel (2006) stresses that public actions are always more complex than anticipated, because the means, outcomes, and impacts are uncertain. Assessment activities also allow both institutions and citizens to obtain more information about the state's decisions and actions. The availability and transparency of information foster a greater commitment of public agents to society.

Through its environmental regulations, the state is expected to exercise control over the behavior of individuals who pose risks to the environment and to the community. The environment's status as a public and commonly used good dictates the need for limits to its individual appropriation. Environmental regulation arises from this need for the state to intervene in society, to set limits to the appropriation of the environment, in order to compel environmental compliance (EISNER, WORSHAM; RINGQUIST, 2006).

Effective enforcement is vital for environmental regulation as a tool to deter wrongdoing and encourage compliance. Gunningham (2010), when discussing enforcement strategies, goes beyond the dichotomy of persuasion versus punishment, emphasizing the need to find a balance in the use of these strategies. The cooperation strategy is based on persuasion, rather than direct confrontation, and is cited in the literature as a compliance strategy. It is equivalent to alternative regulatory tools that include the use of market mechanisms, such as subsidies for environmental protection and environmental certifications, as well as environmental education, communication, and assistance to regulated parties. The focus is not on punishment for damage done, but on prevention and encouragement to comply with the laws. Black (2002) explains that cooperation is a product of interactions between the regulator and those who are regulated, rather than the wielding of authority. It takes place in the absence of legal sanctions. The deterrence strategy, on the other hand, is based on the punishment of anyone who breaks the law.

Rechtschaffen (1998) finds the traditional approach of punishment-based deterrence to be more effective. A stimulus strategy based on cooperation, on the other hand, does not improve compliance with environmental laws. According to this author, full belief in the spontaneously lawful behavior of regulated agents would be a naïve attitude, with few practical results. Cooperation strategies could nevertheless be adopted to complement

traditional deterrent mechanisms.

Oliveira et al. (2018), consider environmental compliance as a possible tool for cooperation and negotiation between public and private agents with the purpose of establishing sustainability practices. Instituting compliance depends on both private and public agents, to ensure their accountability and responsiveness for actions that simultaneously impact the economy, society, and the environment.

Pacheco-Veja (2020) and Van der Heijden's (2020) review of the literature on environmental regulation observed a trend to transform conceptions on the state's role in this area. Instead of interventionist government policies, aimed at correcting the behavior of agents, they note the adoption of more flexible approaches to cooperation with private agents (governance mechanisms). They emphasize the importance of adopting a pluralistic approach, involving a variety of instruments to dissuade and stimulate private agents in the formulation and implementation of more restrictive standards for the emission and control of pollutants.

In fact, despite the trend towards adoption of alternative approaches, a traditional, deterrence-based approach is still the core of environmental regulation in most countries (EISNER; WORSHAM; RINGQUIST, 2006; FARMER, 2007; VAN DER HEIJDEN, 2020). In Brazil, the traditional command-and-control regulatory approach prevails, in which deterrence underlies the inspection strategy adopted by IBAMA (IBAMA, 2016). Araújo (2013) points out that regulatory instruments involving self-regulation by the productive sector, environmental taxation, or other economic tools are still in their infancy. However, there are some successful initiatives, such as the Ecological Tax on the Circulation of Goods and the Rendering of Interstate and Intercity Transport and Communication Services (ICMS). There are also other initiatives along these lines, such as reverse logistics systems, environmental certifications, like the Forest Stewardship Council (FSC) seal on timber and the International Standards Organization (ISO) 14000 environmental management certification for companies, the green building concept in civil construction, and green bonds in the financial market.

Farmer (2007) sees environmental regulation as a system comprising a set of interconnected activities: legislation, strategic planning, licensing, monitoring, inspection and enforcement, and communication. Interactions among these activities enable effective implementation of a regulatory apparatus by imposing enforcement and compliance elements on the regulated agents, and by allowing regulators to reflect and be held accountable for their actions to society.

The great challenge of environmental regulation is to effectively punish violators while encouraging and promoting voluntary compliance. For Eisner (2017), the lack of strict government oversight weakens environmental regulation, leaving it to private interests either to preserve or exploit the environment. Indeed, the combination of deregulation and underinvestment in the state regulatory apparatus creates a setting prone to environmental wrongdoing. Despite so many regulatory shortcomings, therefore, state regulation is still vital in society.

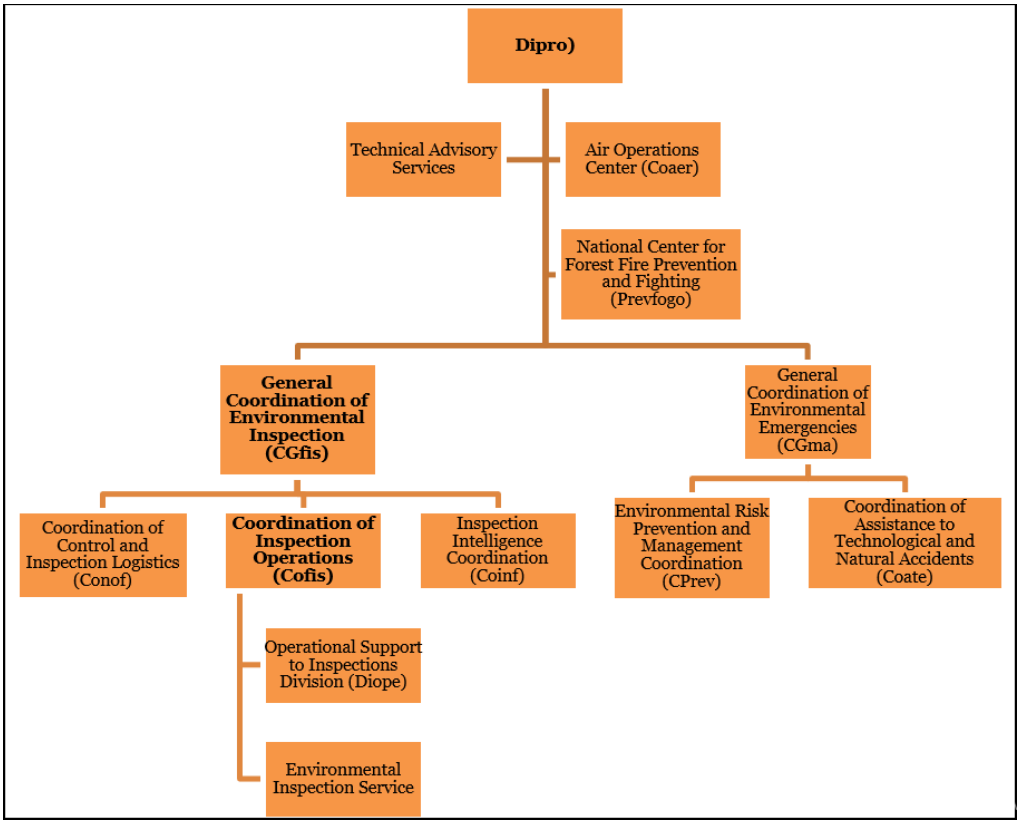
IBAMA and the Environmental Inspection of Pesticides

IBAMA is the autonomous federal agency under the Ministry of the Environment responsible for implementing the PNMA for the federal government. Its institutional mission is to protect the environment, guarantee environmental quality and ensure sustainability in the use of natural resources, performing federally empowered actions (BRASIL, 1981). It is headquartered in Brasilia (the federal capital) and is represented around the country by 27 State Superintendencies, located in each of the Federation's Units.

The environmental inspection of pesticides is legally defined in Brazil by Federal Decree 4074/02, in its article 70, which mandates the inspection of production, handling, import, export, transport, storage, marketing, use, labeling and the final disposal of unused pesticides, residues and containers, their components and related products. This norm also stipulates that IBAMA is responsible for inspecting the production, imports, and exports of pesticides, as well as their use in quarantine and phytosanitary treatments carried out in international transit. The inspection of the use, trade, storage, transport, return and proper disposal of pesticide containers is the competence of the states, although IBAMA plays a supplementary role to the states in these areas.

In IBAMA's organizational structure (Figure 1), inspection is assigned to the Environmental Protection Directorate (DIPRO), which is responsible for coordinating, controlling, and performing federal actions related to inspection and environmental emergencies. Within this Directorate, the General Coordination of Environmental Inspection (CGFIS) is responsible for promoting, orienting, coordinating, and executing prescribed inspection activities, throughout the country. Under CGFIS is the Coordination of Inspection Operations (COFIS), responsible for coordinating, planning, supervising, executing, and guiding the institution's inspection actions, as well as proposing, coordinating, and supervising inspection actions carried out by the states (IBAMA, 2020[b]). For organizational purposes, environmental supervision is internally divided into thematic areas: licensed enterprises and activities; fauna; flora, genetically modified organisms, genetic heritage, fishing; and polluting and contaminating activities. Pesticide control comes under this latter topic (IBAMA, 2020[c]).

Figure 1 - Organizational structure of inspection at IBAMA



Source: Authors, based on IBAMA (2020[b])

A specialized inspection course is a prerequisite to work in this activity at IBAMA (IBAMA, 2016). Complementary training in specific areas may be pursued, depending on one's university background and main activity. For pesticide inspection, however, specific training was a limiting factor raised by interviewed employees, as will be discussed in the following section.

Besides this, excessive demand, coupled with a growing shortage of inspectors, makes it difficult to cover all specific areas. From 2010 to 2021, there was a reduction of 49% in the number of inspectors, from 1311 to 668 agents assigned to all of IBAMA's inspection units nationwide (IBAMA, 2018; SOUZA, 2021). This means an average of 24 inspectors/state. Considering the country's total land area, each inspector is responsible for approximately 12,000 km^2, or two inspectors for an area larger than the state of Sergipe.

Methodological Procedures

This study comes from empirical research on pesticide inspections by IBAMA, in all of Brazil. The time frame was August 23, 2008 to December 31, 2019. In July 2008, a

new legal framework was enacted to reinforce the application of penalties by IBAMA's inspectors: Federal Decree 6514/08, which replaced implementing Decree 3179/99, under the Environmental Crimes Law. Our data were collected after this new legislation came into force. The database was the IBAMA's own Integrated System of Registration, Collection, and Inspection (SICAFI), available via the Access to Information Act, Brazil's freedom-of-information law.

The analysis considers infraction notices issued by IBAMA, based on Decree 6514/08, related to pesticides for agricultural use. Not included were notices related to pesticides for urban pest control, use in phytosanitary barriers, roadsides, reservoirs of hydropower plants, firebreaks, and others used in non-agricultural areas.

Initially, a table was generated with all the records containing the root of the keyword "*agrotóxico*" (pesticide). This is the term officially recognized for pesticides in general by Law 7802/89. We then selected all the infraction notices that included reference to Law 7802/89 or to its implementing Decree 4074/02, the specific legal statutes for pesticides, as well as infraction notices whose descriptive field contained terms used as synonyms for pesticides or pesticide-related terms: agrochemical, defensive, phytosanitary, pesticide, poison, and names of active ingredients (AIs). In addition, we selected those infraction notices containing any of the 66 codes established by the United Nations (UN) to identify specific hazardous pesticide products.[3] Most of the infraction notices for transporting pesticides do not contain a description of product names, but rather these identifying codes.

The notices were classified individually and then grouped into seven categories, according to the infraction described in each notice of violation and the statutory framework applied. The categories are: environmental administration, application, storage, commerce, disposal, production, and transport. The first category covers infractions against environmental administration,[4] concerning failure to submit the semi-annual pesticide report, submission of false information in official control systems, or non-registration of companies in IBAMA's Federal Technical Registry. The application category encompasses violations resulting from the irregular application, spraying or use of pesticides, including: causing pollution, non-compliance with embargos, damaging vegetation, and others related to the application of pesticides. The storage category includes infractions related to the irregular storage, keeping, and stockpiling of agrochemicals. The commerce category involves notifications for selling pesticides, including notifications for importing, supplying, exporting, repackaging for sale, not complying with suspensions on trade activities, or operating a pesticides sales point without authorization from the proper environmental agency. The notices from the disposal/destination group are related to the irregular disposal of agrochemicals or failure to dispose of used containers in an environmentally sound manner. The transportation category includes fines for transporting illegal products, performing transportation without authorization from the environmental authority, and

3 - Available at: http://200.144.30.103/siipp/public/busca_pp.aspx.

4 - Administrative offenses against the environmental administration are described in Subsection V of Decree 6514/08.

hindering the environmental inspection of transportation.

Qualitative data were obtained through semi-structured interviews in 2018 with 13 IBAMA environmental analysts and inspectors, and with the General Inspection Coordinator (CGFIS). The identities of the analysts were omitted to allow them greater freedom in expressing their opinions. The objective of the interviews was to grasp the perceptions of these institutional players, to help interpret our quantitative results. The selection of the interviewees was based on their experience in environmental inspection activities, notably in the area of pesticides.

Results and Discussion

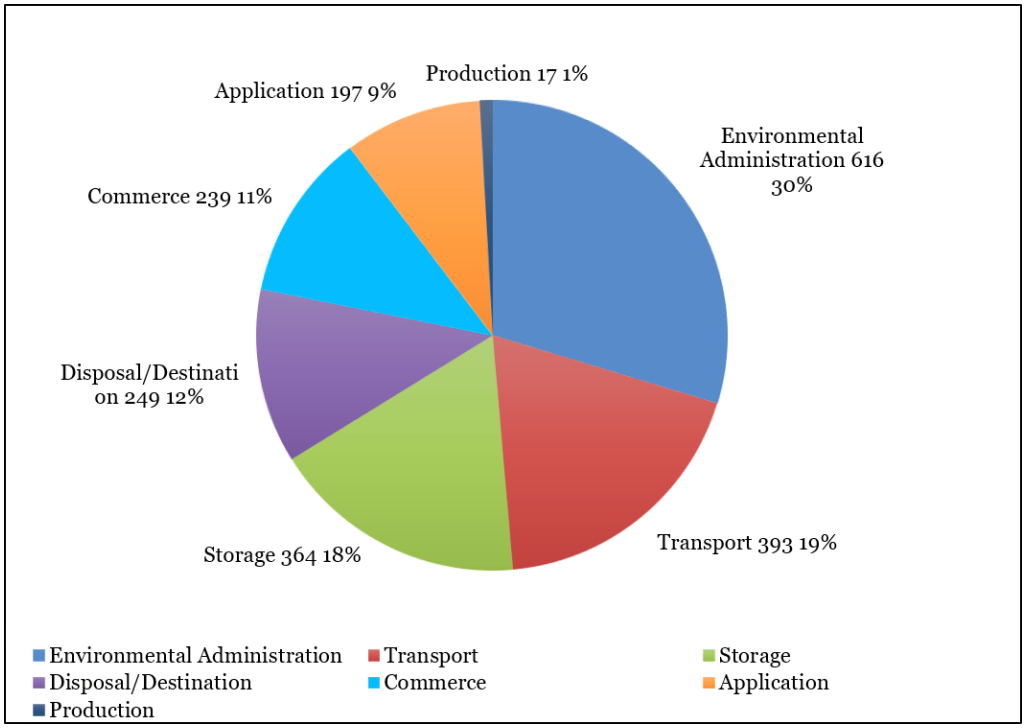
This section is divided into two parts. The first one identifies the types of pesticide-related infraction notices issued by IBAMA, and their evolution over time. The second part describes the geographical spread of the notices and the inspectors' perceptions about pesticide inspections in the country.

1. Types of notices and their distribution over time

From July 2008 to December 2019, IBAMA issued 2075 notices for environmental infractions involving pesticides, throughout Brazil. This represents approximately 1% of all the infractions notified by IBAMA in the period.

Violations related to environmental administration are frequently notified ex officio, i.e., from the office, with no need for an on-site inspection, and the verification relies basically on paperwork. This operational ease, along with the low cost of these measures, explains why more infractions come under this heading than any other: 30% of the total during the entire period. Infractions related to transport accounted for 19% of the total number of infractions, followed by storage-related offenses, 18%. Notifications involving disposal/destination were 12%, and those related to commerce, 11%. The least significant groups were notifications on pesticide application (9%) and production, with only 1% of the total (Figure 2).

Figure 2 - Categories of pesticide-related infractions, IBAMA (July 2008 to Dec. 2019)



Source: Authors, based on IBAMA (2021)

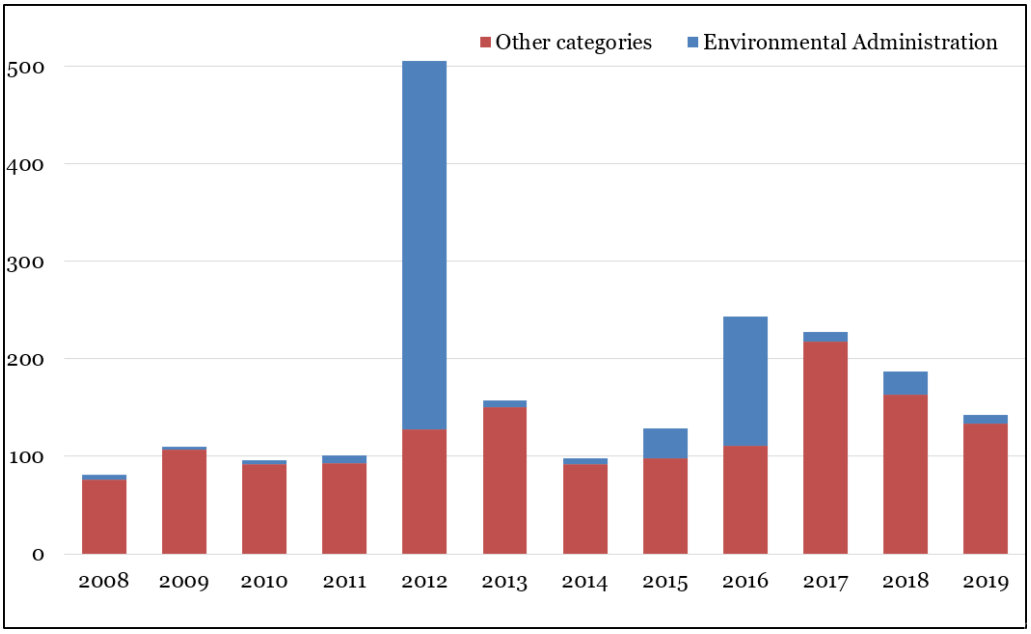
We observe here that 67% of IBAMA's pesticide inspections focused on infractions involving environmental administration (based on information about pesticides and not directly on the products themselves), irregular transport and storage. Practically no violations were found for pesticide production in the period (only 17 notices in 10 years). Although one of IBAMA's primary responsibilities is to inspect environmental compliance or irregularities in the production of pesticides (BRASIL, 2002), the low number of notifications in this category indicates that inspections have not targeted the industrial sector. This deficiency may have to do with the greater complexity of inspecting pesticide production. It is an extremely technical inspection, which requires more planning and preparation, proper material for sampling and collection of products, laboratory analysis to verify the correct composition of formulated products, and specialized technical staff, able to verify the environmental compliance of a production process. All this wherewithal demands budgetary resources, in-house supplies, investment in technical training and, above all, an institutional commitment.

The distribution over time of these notifications (Figure 3), indicates that in 2008 there was a relatively significant result (81 notifications), considering that only the infraction notices issued after July 23 were counted. In the period 2009-2019, the total number of notifications involving pesticides went from 110/year to 142/year, a 29% increase. Although there was not a continuous increase over the historical series, the data

indicate an upward trend in environmental inspections of pesticides, especially in the period 2009-2017. During that time, the total number of notifications went from 110 to 227, an increase of 106%. However, starting in 2017, there is a gradual decrease in the number of notifications, approximately 21% in 2018 and 60% in 2019. This decrease may indicate a regression in the environmental inspection of pesticides, suggesting the need to monitor the results for ensuing years.

The average number of notifications in the period 2009-2019 was 181 per year. We observe, however, that this average was influenced by a peak of 505 notifications in 2012. The atypical number of notifications in this year is due to a specific category of violation, environmental management. In 2012 there were 378 notifications in this category, approximately 75% of this year's total. Compared to other types of infractions, there were also many environmental administration notifications in 2016: 132 of them, 54% of that year's total. In both years, the environmental management category strongly influenced the total of notifications, suggesting the occurrence of specific inspection actions for this type of violation, in both 2012 and 2016.

Figure 3 – Evolution of pesticide related notifications, IBAMA (July 2008 - Dec. 2019)



Source: Authors, based on IBAMA (2021)

Excluding all the notifications issued bureaucratically in the environmental administration category, a total of 1459 notifications were identified in the other categories of infractions commonly seen in the field. These categories, seen in the graph above, display a more homogeneous distribution of notifications over the time series. We also perceive an upward trend in the number of notifications between 2014-2017. This increase pos-

sibly reflects a greater priority for pesticide inspections on IBAMA's institutional agenda.

For official B, who works in the COFIS, pesticide inspection operations have become better organized since 2016, with a quantitative and qualitative increase in inspection actions. According to the interviewee, this is because the inspection operations began to be run by COFIS and the Intelligence Coordination Office. Other institutions also became involved, such as the National Civil Aviation Agency (ANAC) and the Public Prosecutor's Office, who investigate aviation companies and smuggling. This is how inspection actions expanded to states such as Bahia, São Paulo, Paraná, and Mato Grosso do Sul, including simultaneous operations in several locations. In addition, pesticide issues gained ground in the institution's discourse from 2016 onwards, and were even an item on the opening agenda of the annual inspection planning event in 2017.[5] In May 2018, IBAMA held its First International Seminar on Environmental Inspection of Pesticides.[6]

2. Geographical distribution of the notifications

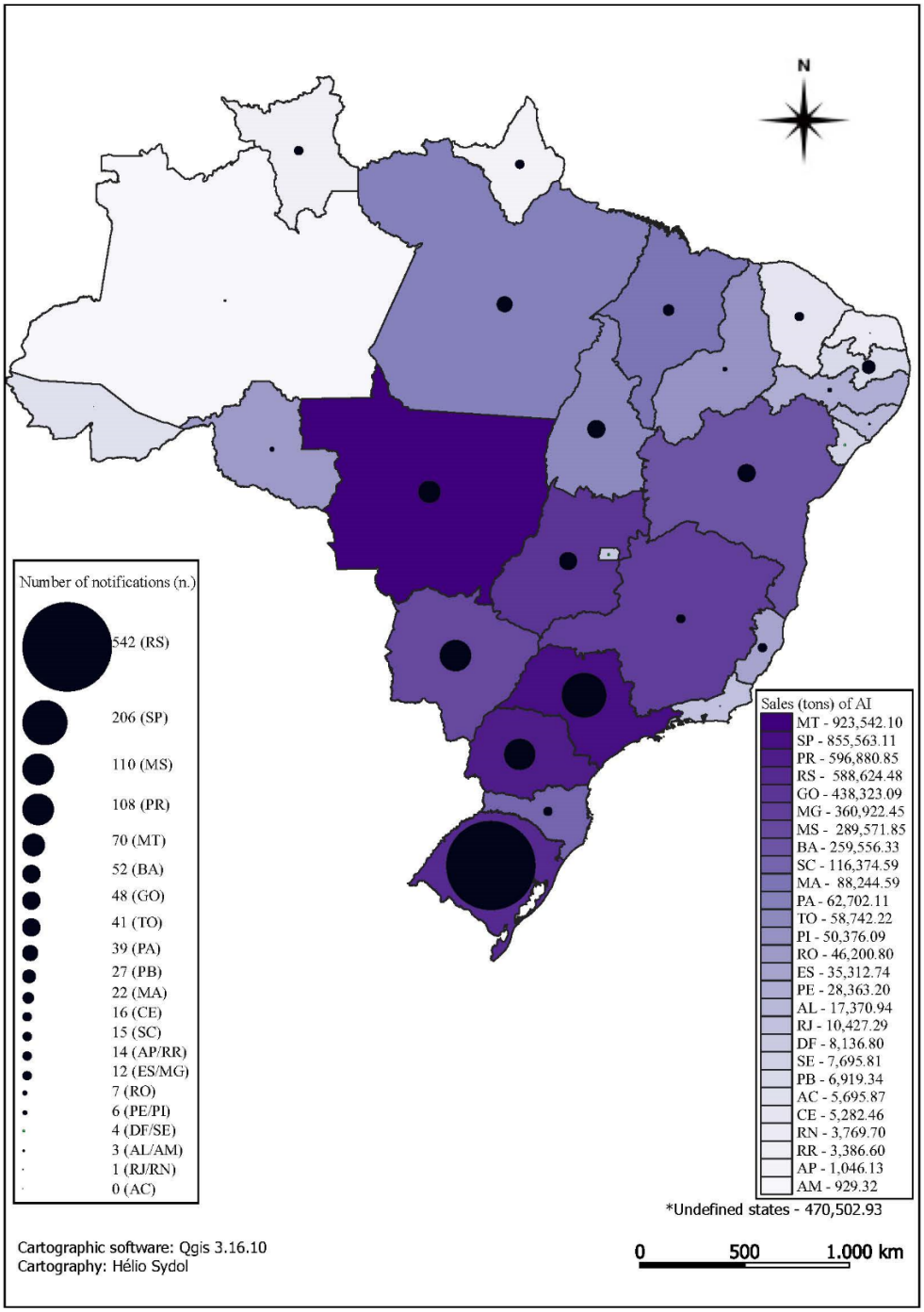
The geographical distribution of the notifications, excluding the environmental management category, from 2009 to 2019, shows no direct correlation with areas of higher pesticide consumption[7] (Figure 4). Rio Grande do Sul, where most of the notifications were issued (39%), was responsible for 11% of pesticide consumption in this period. Mato Grosso, which was the largest consumer of pesticides, with 17% of the national total, received only 5% of the notifications. Goiás and Minas Gerais consumed together 15% of pesticides, in the period, but had only 4% of the notifications. We observe that inspections were not, as a rule, proportionate to each state's consumption of pesticides. States with a high concentration of agricultural activity, such as Mato Grosso, Goiás and Minas Gerais, did not have a corresponding amount of pesticide inspections, given the low number of notifications. In the region known as MATOPIBA (Maranhão, Tocantins, Piauí and Bahia), there is also a low level of inspections, disproportionate to the advance of the agricultural frontier, notably since 2000, with the strong expansion of soy, corn, cotton, and coffee crops (IPEA, 2016).

5 - See the declaration by IBAMA's President at the time: http://repositorio.ipea.gov.br/bitstream/11058/7944/1/BRU_n16_Desafios.pdf. Accessed on Jan 21, 2019.

6 - Official note on the event: http://www.ibama.gov.br/notas/1459-ibama-realiza-seminario-internacional-sobre-fiscalizacao-de-agrotoxicos-em-porto-alegre. Accessed on Jan 21, 2019.

7 - The volume (tons) of pesticide sales, by state, was used as a proxy variable for pesticide consumption.

Figure 4 - Total sales of pesticides (tons of AI) and number of IBAMA notifications (pesticides), by state (2009-2019)



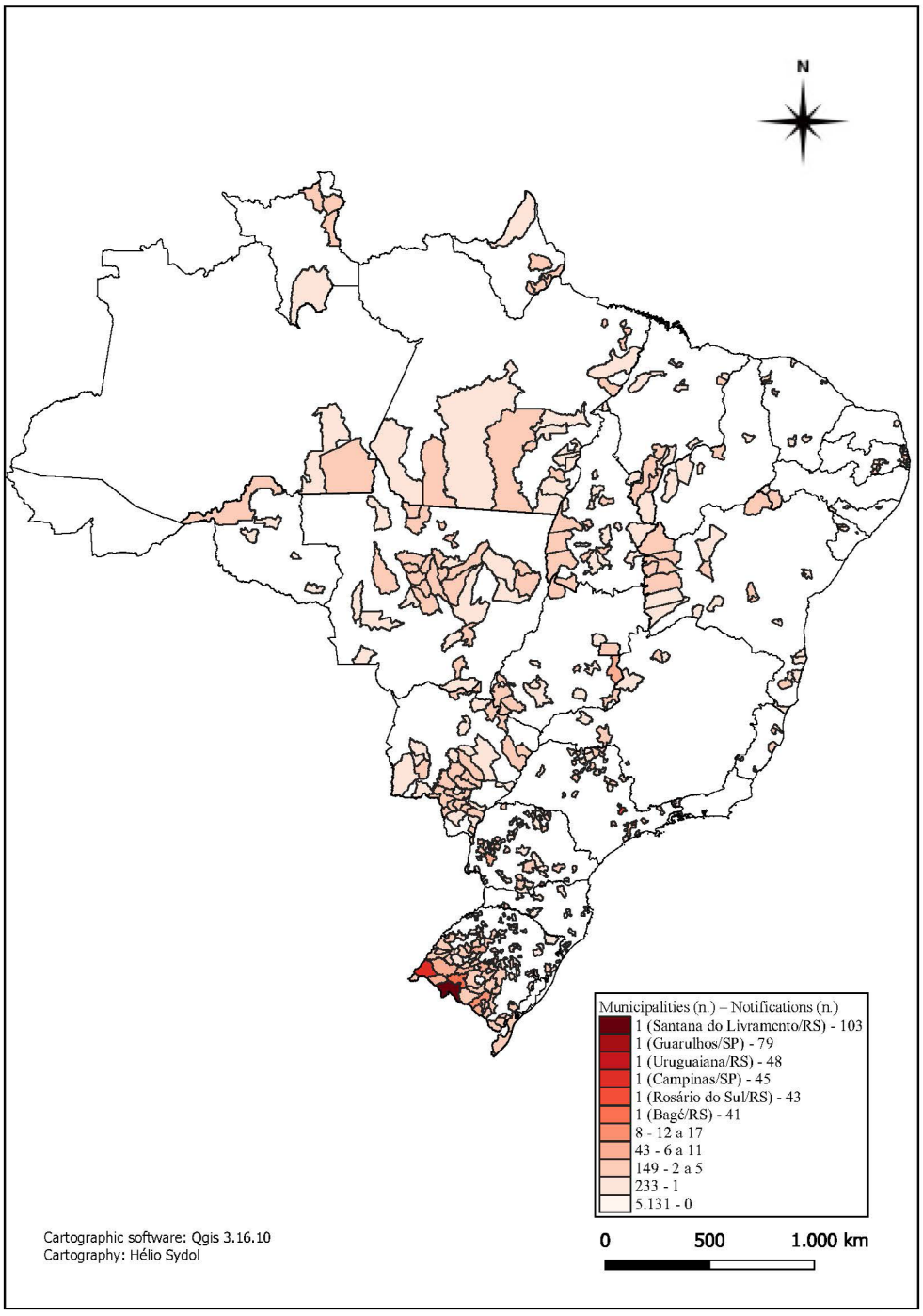
Source: Authors, based on IBAMA (2020[a], 2021)

As for the absence, or deficiency, of pesticide inspections observed in major agricultural states in the North, Center-West, and Northeast regions, the then General Inspection Coordinator clarified that the South and Southeast regions have a history of territorial occupation that predates the other regions and most of their land has already been converted to alternative uses.[8] Thus, the main environmental problems in these regions are mostly related to polluting and contaminating activities, by agricultural and/or industrial activities. This aspect is fundamental to understand the nature of inspections in these areas. In states where the Amazon biome predominates, in the North and Center-West, inspections focus primarily on fighting illegal deforestation. The same situation applies to the Northeast, where inspections focus mainly on deforestation and charcoal production, as well as illegal fishing in the coastal states.

The distribution of notifications by municipalities shows that pesticide inspections were concentrated in only six municipalities, four of them in Rio Grande do Sul (Santana do Livramento, Uruguaiana, Rosário do Sul and Bagé), with 16% of the total number of notifications, and two in São Paulo (Guarulhos and Campinas), with 8%. In each of 233 municipalities, there was only one occurrence. Most of the municipalities (92% of the country's total of 5,570) received no notices of violation for pesticides at all (Figure 5).

8 - Alternative land use is the replacement of native vegetation and successor formations by other land covers, such as agricultural and industrial activities, urban settlements, or other forms of human occupation (BRASIL, 2012).

Figure 5 - Incidence of notifications by IBAMA (pesticides), by municipality (July 2008-Dec. 2019)



Source: Authors, based on IBAMA (2021)

The concentration of notifications in two municipalities of São Paulo is explained by the fact that the only two airports with IBAMA facilities are located there.[9] IBAMA began operating openly in these airports in late 2012 to strengthen the inspection of imported/exported products subject to IBAMA's control (IBAMA, 2012; 2013). Since no permanent inspection units operate in other airports, it is impossible to compare results to know whether irregular imports are concentrated in these two locations, or simply not detected in other international airports.

It is noteworthy that IBAMA is present in major seaport cities such as Paranaguá (PR), Itajaí (SC), and Santos (SP), all of which move significant volumes of goods from other countries and are thus strategic for verification of irregular imports/exports or smuggling. We did not, however, detect any pesticide inspection activities in these municipalities.

Pesticide inspection is concentrated not only geographically, but also in a small number of inspectors. During the period analyzed, only 363 inspectors issued infraction notices related to pesticides, in all of Brazil. The average number of notifications per inspector, considering the total number of notifications, was approximately six. However, about 76% of the inspectors who issued infraction notices related to pesticides were below this average, 38% issued only one infraction notice, and another 38% issued two to five infraction notices in the entire period analyzed. On the other hand, only four inspectors (about 1%) issued 15.4% of the infraction notices, and a single inspector issued 155 infraction notices (7% of the total number of infraction notices). These data indicate that pesticide inspections carried out by IBAMA are highly dependent on the initiatives of individuals in certain locations, such as Rio Grande do Sul.

According to the then General Inspection Coordinator, this phenomenon occurs due to the technical complexity of this type of inspection:

> It is a subject that, although not new, is relatively new to inspection management. People who already know more about it devote more time to it. It demands specific expertise. So generally, someone with an academic background is more capable of drafting an infraction notice and an inspection report.

The lack of specific training to work in pesticide control was mentioned by several inspectors interviewed. According to C, Amapá has requested assistance from Rio Grande do Sul to embark on pesticide inspection, but the lack of training on the subject hinders their performance, since inspectors feel insecure about inspection procedures. In this same sense, civil servant I, from Tocantins, who has been working at IBAMA for nine years, stresses that:

> Tocantins lacks specialized personnel. We didn't have anyone prepared in this area. This year, we sent two colleagues to the seminar [1st Pesticide Inspection Seminar, offered by IBAMA in 2018], precisely

9 - Guarulhos and Viracopos Technical Units.

> so that, next year, we can carry out at least two operations focused on pesticides. No inspector wants to act without knowing what he is doing. ... This has always been a problem.

Environmental analyst J, who has also worked for nine years at IBAMA, in Mato Grosso, stated:

> In Mato Grosso, IBAMA has always prioritized actions to fight deforestation in the Amazon Forest region, illegal logging, and indigenous lands. Inspection of pesticides is an activity that has not yet been prioritized by the inspection sector, mainly due to the vast size of the state and the limited number of inspectors. Other areas are also hampered by the lack of personnel to work in them. Another factor is the shortage of specialized personnel for pesticide inspection.

Environmental analyst L, a 12-year veteran of IBAMA stationed in Goiás, explains why this state carried out so few pesticide inspections in the period:

> There is a lack of expertise and of people to deal with the subject. ... The culture here has always been "don't touch what you don't understand," and they thought the Ministry of Agriculture and Livestock (MAPA) was responsible. ... Pesticides became a focus due to smuggling.

The information provided by employees we interviewed was corroborated by the General Inspection Coordinator, according to whom IBAMA places a very heavy workload on a small number of inspectors. In addition to this factor, pesticide inspection, as a specialized field, is still poorly distributed. Some states have achieved a learning process in the area, by coordinating with other institutions to meet demands arising from regional characteristics:

> Some states have performed better precisely because they have more relations with other institutions, such as ANAC, MAPA, Department of Agriculture, public prosecutors and especially within the Pesticide Forum. ... This degree of coordination allows some states to prioritize these actions, such as Rio Grande do Sul, for example. This state is one of the main entry routes from Uruguay, Paraguay, and Argentina, so they have to pay more attention to this [pesticides].

This observation explains the high concentration of notifications in Rio Grande do Sul's four municipalities located along the border with Uruguay.

The geographical concentration of notifications indicates that the environmental inspection of pesticides is limited to certain spaces, under a rationale that does not prioritize or target consumer centers, based on rates of pesticide use. What, then, is the rationale?

For the environmental analyst F, who has worked at IBAMA for 15 years, in Rio Grande do Sul, this state leads in pesticide inspections due to priorities set by the local

office, rather than any orientation from IBAMA headquarters. F also highlights the local coordination with other institutions, such as the Federal Police Department, and the exchange of information, as key factors for the outcomes of pesticide inspection in this state.

As an environmental analyst at IBAMA for 15 years, G, also from Rio Grande do Sul, has extensive experience in pesticide inspection. He highlights the importance of individual initiatives in the state's leadership, which has spread their inspection model to other states. According to G, he and two other public servants decided to pursue this pesticide agenda in the Rio Grande do Sul IBAMA, and their participation in the Rio Grande do Sul Anti-Pesticide Forum[10] has been fundamental, as a platform to exchange information that has fed the decision-making process.

As G describes the process of taking on the theme in the state of Rio Grande do Sul, he confirms the opinion of interviewee F, that inspecting pesticides was a local decision. He also tells how the theme entered IBAMA's agenda in a bottom-up decision-making process, and has spread to other states:

> It was a political decision, an option to work on the issue. As we were learning in the process, understanding the pesticide problem and why things happen the way they do, we broadened our approach. We took the issue to Brasília, created a Working Group, the Seminar, the Standard Operating Procedures, and the National Inspection Plan. Strategically, we got other states involved, both by bringing interested officials to Rio Grande do Sul and by sending our teams.

That bottom-up decision-making process was also highlighted by the General Operations Coordinator:

> Although in the last two years some actions were coordinated via IBAMA headquarters, they were conceptualized in a few states. The head office, later on, disseminated this knowledge. ... Some colleagues, given their academic backgrounds as agronomists, chemists, etc., stimulated this discussion. Rio Grande do Sul idealized the operational model and the headquarters has disseminated it in other states of the Federation.

Nonetheless, that process of knowledge dissemination was discontinued. Significant events, such as the International Seminar on Pesticide Inspection, held in 2018, had no follow-up.

Conclusion

This study was carried out to evaluate IBAMA's pesticide inspections, based on types of notifications and their temporal and geographical distribution. Although there

10 - A coordination forum where several public institutions, coordinated by the State Public Prosecutor's Office, debate issues involving pesticides.

is an upward trend in the number of notifications throughout the period under study, we found a concentration of inspections on environmental administration, involving documentation, bureaucratic procedures and obligations related to product registrations. Such inspections have little clear or direct impact on dissuading unlawful acts committed while applying pesticides in the environment.

The geographical distribution of pesticide-related offenses shows that IBAMA's inspection efforts have little to do with regions where pesticide use is most intense. Inspection activity has voids in states with strong agricultural vocations, such as Goiás, Mato Grosso and Minas Gerais. There is also no movement to keep up with the advance of the agricultural frontier into northern and northeastern Brazil. Even in the states with the highest incidence of notifications (Rio Grande do Sul and São Paulo), inspections are highly concentrated in specific municipalities. These aspects reveal a work approach based not on strategic planning, on a national scale, but on local and individual initiatives.

IBAMA's approach to pesticide inspections is clearly influenced by: local, individual initiatives, a shortage of inspectors, inadequate specific training on the subject and prioritization of other environmental concerns, such as illegal deforestation. Considering the increase in pesticide use and the risks this poses to the environment and to society, criteria must be established to prioritize human and financial resources for more coordinated and strategic environmental inspection activities.

In view of scarce resources and inadequate institutional capacity to address various environmental problems in a satisfactory manner, it is essential that technical criteria be adopted to guide pesticide inspections. This means improving and making effective use of available databases, as well as evaluating past inspection actions. It is also essential to promote and to institutionalize the training of inspectors specifically to handle pesticides, as well as to share all the knowledge acquired through individual initiatives.

The monitoring of inspection operations is part of a strategy to control improper behaviors by regulated persons, and its effectiveness depends essentially on the ability to understand the dynamics of the offenders' actions and the best deterrent mechanisms. Such mechanisms are more effective when they can be properly communicated to society, through disclosure of the results of notifications. Those results serve as examples not only to promote deterrence, but also to legitimize the exercise of the state's power for collective, as opposed to individual, interests. Without such a managerial approach, the logic of IBAMA's actions will continue to be random and guided by individual, localized initiatives, with no proper institutionalization of the state's enforcement role.

Nor can we forget that not only the state's actions, but its omissions as well, arise from public authorities' decisions, as they define environmental policies. The proper functioning of an environmental inspection system is only possible with the equipping and strengthening of the state inspection authority. Adequate human resources and training, along with the modernization of information systems and operational processes, are all basic conditions for effective state action to preserve the environment.

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Submitted on: 11/01/2021

Accepted on: 29/10/2022

2023;26:e02012

AMBIENTE & SOCIEDADE 25 anos 25 años 25 years

SciELO

A Fiscalização Ambiental De Agrotóxicos No Brasil

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Victor Manoel Pelaez Alvarez

Resumo: Este artigo tem o objetivo de avaliar a experiência da fiscalização de agrotóxicos, realizada pelo Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA), em função dos tipos de autuação das infrações, sua evolução temporal e distribuição no território brasileiro. Os dados foram coletados a partir de consultas ao Sistema Integrado de Cadastro, Arrecadação e Fiscalização do IBAMA. Identificou-se um crescimento da ordem de 100% das autuações ao longo do período 2009-2017, porém um decréscimo de 21% e 60% nos anos 2018 e 2019, respectivamente. No que tange à distribuição espacial das autuações do IBAMA relacionadas a uso de agrotóxicos, os resultados evidenciaram que o direcionamento da fiscalização ambiental não foi compatível com os locais que concentram o consumo de agrotóxicos. Estes aspectos revelam uma lógica de atuação baseada não em um planejamento estratégico, em âmbito nacional, mas em iniciativas locais dos fiscais ambientais.

Palavras-chave: Políticas públicas; Regulação ambiental; Fiscalização ambiental; Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA); Agrotóxicos.

São Paulo. Vol. 26, 2023

Artigo Original

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SciELO

La Inspeccion Ambiental De Pesticidas En Brasil

Rizza Regina Oliveira Rocha
Victor Manoel Pelaez Alvarez

São Paulo. Vol. 26, 2023
Artículo Original

Resumen: Este artículo tiene el objetivo de evaluar la experiéncia de Instituto Brasileño de Medio Ambiente y Recursos Naturales Renovables (IBAMA) en la inspección de pesticidas en Brasil, en términos de los tipos de infracción, su evolución temporal y su distribución en el territorio. Los datos fueron colectados en el Sistema Integrado de Registro, Captación y Inspección de IBAMA. Fue identificado un incremento de 100% en las infracciones en el periodo 2009-2017, pero una disminución del 21% y 60% en 2018 y 2019, respectivamente. Lo que concierne a la distribución espacial de las infracciones, hay evidencias de que las inspecciones no son compatibles con los locales de mayor consumo de pesticidas. Esos aspectos revelan una lógica de actuación basada, no en un planeamiento estratégico en ámbito nacional, mas en iniciativas individuales de los inspectores ambientales.

Palabras-clave: Políticas públicas; Regulación ambiental; Inspección ambiental; Instituto Brasileño de Medio Ambiente y Recursos Naturales Renovables (IBAMA); Pesticidas.