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Environmental Licensing as an Instrument for the Environmental Management of Brazilian Public Ports

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Abstract: Port environmental management initiatives have not yet been properly implemented in Brazilian public ports, and when they exist, they are still very fragmented and are not based on techniques of planning or environmental management, but instead are only intended to answer the minimum requirements of the legal licensing process for construction and port operation. The purpose of this article was to analyze if environmental licensing can be considered an environmental management tool for Brazilian public ports. For this, exploratory research with a qualitative focus was carried out in the 37 Brazilian public ports, regarding the current situation of environmental licensing. It was concluded that the environmental licensing of public ports in Brazil is still a long process and associated with a lot of unpredictability, where some ports, after many years, do not even have the proper operating licenses and the environmental management of most public ports is still insufficient or even non-existent. In this context, environmental licensing can be considered a management tool; however, it cannot be replaced by the planning and constant improvement of environmental compliance—both those provided for by law and other environmental regulatory mechanisms—at a national and international level.

Keywords: environmental licensing; public ports; environmental management; environmental impact; environmental compliance

1. Introduction

Ports are fundamental structures for the good functioning of the Brazilian economy. These structures are responsible for the flow of more than 95% of Brazil's exports and more than 90% of imports [1].

The construction of a port can be considered as an important vector of the socio-economic development of a region—or even a country—which does not exempt it from an assessment of impacts on the environment. Therefore, several measures must be taken to reduce or minimize environmental impacts.

Unfortunately, in most Brazilian public ports, these measures to minimize environmental impacts have not been adopted since the design of the project, and some of the ports were implemented and started to operate without proper environmental licenses.

Port authorities around the world are searching for the "greening" of port management in order to safeguard their "license to operate" and increase its economic and environmental competitiveness [2].

Environmental licensing is an instrument capable of guaranteeing to entrepreneurs the public recognition that their activities are being carried out in accordance with the minimum required by local environmental legislation [3]. However, licensing alone does not serve as an indication of the environmental sustainability of the activity. It was established late compared to the international scenario that the port environmental management in Brazil is mainly based on the environmental licensing processes.

The constraints of these licensing processes reflect how management is not based on environmental planning, but rather on mitigating existing impacts. In addition, environmental management occurs in a fragmented and unbalanced way with port development, and national policies are needed to articulate port operation processes with environmental sustainability [4].

Environmental management is being increasingly implemented as an essential component of the business plan of any operation that aims to be sustainable, efficient, and compatible with the legislation. This is particularly evident in port activities and operations related to the logistics chain [5].

Over time, it is observed that environmental issues have been emphasized in port management, and that the main ports in the world have started to invest in the development of sustainable actions with the objective of becoming a green port [6].

Currently, these investments go beyond the internal operations of the port; they also started to use new tools, such as synchromodal logistics, which have recently emerged to improve flexibility in supply chains, cooperation between interested parties, and the use of resources in order to provide a sustainable—and at the same time, efficient—supply chain that reduces its environmental impact and optimizes the use of resources [7].

As it is a large extension involving legal and voluntary instruments in an interdisciplinary way, there is no demarcation of a border for its performance for environmental management. Since environmental licensing is a procedure for controlling environmental degradation, it is part of this dynamic and highly relevant set. However, is only environmental licensing able to account for the environmental sustainability of an enterprise as complex as a port?

As a management tool, licensing is legally required for enterprises that use natural resources and are potentially or effectively polluting. From this perspective, environmental licensing can be considered a management tool; however, it cannot be replaced by the planning and constant improvement of environmental compliance—both those provided for by law and other environmental regulatory mechanisms—at a national and international level.

However, in Brazil, this environmental port management process based on the licensing of operations is very fragmented and incipient and is considered insufficient and far from ideal in global terms.

In order to become more competitive, the Brazilian port system must adapt to the new global standards, complying with international norms and standards of quality, economic and social sustainability, and the preservation of the environment, which go far beyond the environmental licensing process.

The purpose of this article was to analyze if environmental licensing can be considered an environmental management tool for Brazilian public ports. For this, exploratory research with a qualitative focus was carried out in the 37 Brazilian public ports, regarding the current situation of environmental licensing.

We present the state of the art of environmental management in Brazilian public ports, whose main tool is environmental licensing.

In the second section, the research reveals an overview of the Brazilian port system and analyzes the current situation of environmental licensing of the 37 existing public ports.

Next, Section 3 discusses the many critical points that are present throughout the licensing process and starts to present some considerations, highlighting the main points that need special attention to overcome the different licensing bottlenecks.

In the fourth section, we present the state of the art of Brazilian port environmental management, and how the planning and execution of the port works with a focus on how environmental sustainability should be.

Finally, in the fifth and final section, we present considerations about the environmental licensing scenario, where we highlight the critical points of the process and how the issue of environmental management of Brazilian public ports should be addressed.

2. The Brazilian Port System

The National Secretariat of Ports and Water Transport (SNPTA), linked to the Ministry of Infrastructure, is responsible for the formulation of policies and guidelines for the development and promotion of the port sector on maritime, river, and lake port facilities, and by the execution and evaluation of measures, programs, and projects to support the development of the infrastructure and superstructure of ports [8].

In addition, it is also the responsibility of the SNPTA to draw up general concession plans, approve plans for the development and zoning of sea ports, river ports, and lake ports, establish guidelines for the representation of the country in international organizations and conventions, and set targets and business performance commitments, promoting the modernization, efficiency, competitiveness, and quality of port activities [8].

With the responsibility of implementing the policies formulated by the Ministry of Infrastructure and the SNPTA, in addition to mediating the interests of users and shipping companies, in order to preserve the public interest, the National Agency for Waterway Transportation was created in 2001 (ANTAQ), established by Law No. 10.233 of 5 June, 2001. According to its statute, "it is an integral part of the indirect federal administration, subject to a special autarchic regime, with legal personality of public law, administrative independence, financial and functional autonomy, with a fixed term of office of its leaders" [9].

The Brazilian port system consists of the most diverse types of facilities and port complexes in relation to its control and management model. There are ports that are administered directly by the federal government or state, or municipal agencies and others that are still controlled by the private sector.

This model is governed by Law No. 12,815 of 5 June, 2013, which regulates the exploitation by the Union, providing that this activity may be exercised indirectly, with the management being granted, delegated, or leased to third parties—among them are the state and municipal governments, the municipalities linked to any of the three levels of power, and private initiative [10].

Law No. 12,815 classifies the Brazilian port sector in private port facilities, small public port facilities, and organized ports [10].

The private port, authorized by the National Waterway Transportation Agency (ANTAQ) until November, 2017, totaled 193 and were divided into three subtypes:

- Private Use Terminals (TUP): in total, there were 161 port facilities operated by authorization and located outside the organized port area;
- Freight Transhipment Station (ETC): there were 30 port facilities operated by authorization, located outside the port area and installed for the transhipment of goods in inland or coastal shipping vessels;
- Port Tourism Facility (IPT): two port facilities were operated by lease or authorization and used for embarkation, disembarkation, and the transit of passengers and crew on tourism trips.

Organized ports are defined by Law 12,815/2013 as a "public good, built and equipped to meet the navigation needs, movement of passengers or the handling and storage of goods, whose traffic and port operations are under jurisdiction of port authority" [10].

In total, the number of organized ports is 37 (Figure 1). Of these, 19 ports are public, directly administered by the Union through the Docks Companies: namely, Companhia Docas do Pará (CDP), Companhia Docas do Ceará (CDC), Companhia Docas do Rio Grande do Norte (CODERN), Companhia das Docas do Estado da Bahia (CODEBA), Companhia Docas do Espírito Santo (CODESA), Companhia Docas do Rio de Janeiro (CDRJ), and Companhia Docas do Estado de São Paulo (CODESP). The other 18 ports are administered by states, municipalities, or public consortia through delegation agreements.

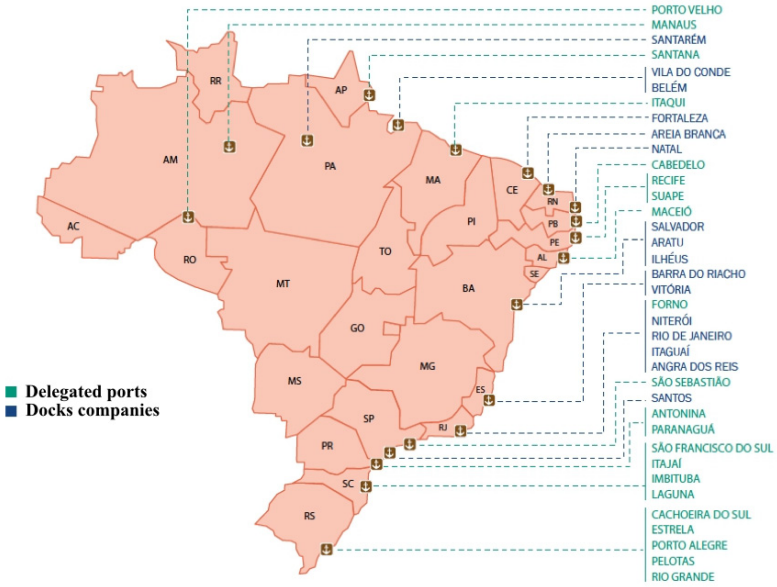

Figure 1. Location of Brazilian public port adapted from National Secretariat of Ports SEP [11].

According to the data from ANTAQ's statistical yearbook, in 2017, the Brazilian port sector handled 1.086 billion tons of cargo, with private terminals handling 721.6 million tons, which generated a growth of 9.3% compared to the previous year, when 660 million tons were moved. Public ports were responsible for the handling of 364.5 million tons, an increase of 6.3% over 2016, when 342.8 million tons moved [12].

3. The Environmental Licensing of Brazilian Ports

According to Law No. 10,165, 27 December, 2000, which amended Law No. 6,938 in Annex VIII, ports are considered activities with high pollution potential and a high degree of use of natural resources [13], and, therefore, require environmental licensing for its proper functioning.

Law No. 6,938, dated 31 August, 1981, created the National Environment System (SISNAMA) and the National Environmental Policy (PNMA), which establishes the licensing and review of activities as one of its instruments and, either effectively or potentially, establishes the licensing of potentially polluting activities as an instrument for implementing the PNMA and the Environmental Impact Assessment as an element of protection and the control of environmental degradation.

The ports implanted before the establishment of the PNMA must comply with Article 34 of Decree No. 4,340/2002 [14], which states: "Developments prior to the issuance of this Decree and in operation without the respective environmental licenses shall require, within a period of twelve months from publication of this Decree, the regularization with the competent environmental agency by means of corrective or corrective operation license".

It is verified that, up to the year 2011, of the 37 organized ports, only 19 had their operating license issued [15]: that is, after 9 years of the issuance of Decree No. 4,340/2002, almost half of the ports did not have their environmental licensing regularized and continued to operate without this licensing.

The advances in meeting the new environmental requirements in the scope of port activities are the result, among other factors, of the requirements presented in the current legislation. To be perceived and effectively consolidated in the ports, this progress depends on the participation and adequacy of the port operators that carry out their activities inside the port facilities [16].

The main environmental laws applicable throughout the country to Brazilian ports refer to (i) environmental licensing, (ii) solid waste, and (iii) emissions [17].

In this context, environmental licensing is the main instrument of the National Environment Policy (PNMA) established by Federal Law No. 6,938, dated 31 August, 1981.

The types of environmental licenses provided for Resolution No. 237/97 of the National Environmental Council (CONAMA) [18] are:

1. Preliminary License (LP)—granted at the preliminary planning phase of the project or activity, approving its location and design, certifying its environmental feasibility and establishing the basic requirements and conditions to be met in the next stages of its implementation;
2. Installation License (LI)—authorizes the installation of the enterprise or activity in accordance with the specifications contained in the approved plans, programs, and projects, including environmental control measures and other constraints, which are a determining factor;
3. Operation License (LO)—authorizes the operation of the activity or enterprise after verifying the effective compliance with what is stated in the previous licenses, with the environmental control measures and conditioners determined for the operation.

In 2011, through an Interministerial Ordinance by Ministry of Environment and the National Secretariat of Ports—MMA/SEP/PR No. 425, dated 26 October, the Federal Government established the Federal Program of Support for the Regularization and Environmental Port Management (PRGAP) of ports and maritime port terminals, including granted to the Docks Companies, linked at that time to the Secretariat of Ports of the Presidency. By the ordinance, the ports without an environmental license would have a certain period (720 days), from the signing of the term of adhesion to the program, to present an Environmental Control Report in order to regularize its environmental licensing.

The main objective of this program was to make the port already in operation assume the measures of mitigation and control of the environmental impacts of its activities through the adoption of environmental procedures and programs and the consequent obtaining of the operation license.

Ports that adhered to PRGAP (Port Authority who signed the registration agreement with the Secretariat of Ports) are: Vitória, Natal, Areia Branca, Maceio, Santos, Salvador, Ilheus, Aratu, Rio de Janeiro, and Itaguaí, who are in the program to promote the renewal of its operating license.

Among the ports that joined the PRGAP, the ports of Maceió and Ilhéus stood out; they obtained the operating license on 5 March, 2018 and 13 April, 2018, respectively.

Therefore, the environmental licensing is intended not only for new projects, beginning usually with the LP and LI before the installation of the project, but also to existing enterprises and installed without the environmental licensing procedure. In the latter case, the entrepreneur must obtain or regularize the operating license.

The licensing of existing activities that are already in operation aims to regularize these activities when assessing the existing environmental impacts, risks, and liabilities, and plans and programs are prepared for their control, prevention, mitigation, and compensation. The regularization also contemplates the evaluation of the effectiveness of the environmental management mechanisms through the continuous monitoring of environmental parameters and indicators. In the regularization of existing activities, it is usually only the Operating License (LO) and the dispensed LP and LI [17].

Currently, ANTAQ does not keep any public list that demonstrates the state of the environmental licensing of Brazilian public ports. A latest version was published in 2013 by ANTAQ on its website but is no longer available. In 2014, Silva presented a copy of this list as an annex of the master's dissertation.

Based on this last update of Silva in 2014 [19], an update is presented (Table 1) with the information publicly available in environmental agencies, dock companies, and port authorities.

It is verified that up to May, 2019, of the 37 ports organized in Brazil, 24 had a valid operating license or one in the process of renewal—of which, seven did not have an operating license, but were included in PRGAP. The other 13 ports did not have LO and had not joined PRGAP.

Table 1. Status of environmental licensing of Brazilian ports.

Location	Port	Situation	Environmental Licensing Agency
AL	Port of Maceió (CODERN)		IMA—Institute of Environment of the State of Alagoas
AM	Port of Manaus		IPAAM—Institute of Environmental Protection of the State of Amazonas
AP	Port of Macapá (Companhia Docas de Santana)		SEMA—State Secretary for the Environment
BA	Porto de Salvador (CODEBA)		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources
BA	Porto de Aratu (CODEBA)		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources
BA	Porto de Ilhéus (CODEBA)		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources
CE	Porto de Fortaleza (CDC)		SEMACE—State Superintendence of the Environment
ES	Porto de Vitória (CODESA)		IEMA—State Institute of Environment and Water Resources
ES	Porto de Barra do Riacho (CODESA)		IEMA—State Institute of Environment and Water Resources
MA	Porto de Itaqui (EMAP)		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources
PA	Port of Santarém (CDP)		SEMA—State Secretary for the Environment
PA	Port of Vila do Conde (CDP)		SEMA—State Secretary for the Environment
PA	Port of Belém (CDP)		SEMA—State Secretary for the Environment
PB	Port of Cabedelo (Docks Company of Paraíba)		SUDEMA—Superintendence of Administration of the Environment
PE	Port of Recife		CPRH—State Agency for the Environment and Water Resources
PE	Port of Suape		CPRH—State Agency for the Environment and Water Resources
PR	Port of Paranaguá (APPA)		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources
PR	Port of Antonina (APPA)		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources
RJ	Port of Niterói (CDRJ)		INEA—State Institute of Environment
RJ	Port of Rio de Janeiro (CDRJ)		INEA—State Institute of Environment
RJ	Port of Itaguaí (CDRJ)		INEA—State Institute of Environment
RJ	Port of Angra dos Reis (CDRJ)		INEA—State Institute of Environment
RJ	Port of Forno		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources
RN	Port of Areia Branca (CODERN)		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources
RN	Port of Natal (CODERN)		IDEMA—Institute for Sustainable Development and Environment
RO	Port of Porto Velho (SOPH)		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources
RS	Port of Estrela		FEPAM—State Foundation for Environmental Protection
RS	Port of Porto Alegre (SUPRG)		FEPAM—State Foundation for Environmental Protection
RS	Port of Pelotas (SUPRG)		FEPAM—State Foundation for Environmental Protection
RS	Port of Cachoeira do Sul (SUPRG)		FEPAM—State Foundation for Environmental Protection
RS	Port of Rio Grande (SUPRG)		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources

Table 1. *Cont.*

Location	Port	Situation	Environmental Licensing Agency
SC	Port of Itajaí		FATMA—Foundation of the Environment
SC	Port of São Francisco do Sul		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources
SC	Port of Imbituba (CDI)		FATMA—Foundation of the Environment
SC	Port of Laguna		FATMA—Foundation of the Environment
SP	Port of São Sebastião (Doks Company of São Sebastião)		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources
SP	Port of Santos (CODESP)		IBAMA—Brazilian Institute of Environment and Renewable Natural Resources

Sources: SILVA [19], adapted and updated by the author May, 2019. Green: Has LO valid or in the process of renewal with the competent environmental agency; Yellow: Does not have LO, but is contemplated in the Federal Program to Support Regularization and Port Environmental Management—PRGAP; Red: Does not have LO.

With this update, it is concluded that in 2019, 35% of public ports were still pending in relation to the environmental licensing required for them to operate.

Since 1981, according to Federal Law No. 6,938/81, environmental licensing has been mandatory throughout the national territory, and the effective or potentially polluting activities cannot function without the proper licensing. Since then, companies that operate without the environmental license are subject to the penalties provided by law, including punishments related to the Environmental Crimes Law, instituted in 1998, such as warnings, fines, embargoes, and temporary or permanent stoppage of activities. Therefore, some of these ports that operate without a valid operating license could have paralyzed its activities with consequential high economic losses.

An entrepreneur commits an environmental crime, as provided for in Article 60 of the Law on Environmental Crimes (Law No. 9605 of 1998): if work starts without a proper installation license or operations begin before the respective operating license, they will be subject to the penalties provided in case of the absence of licensing. In order to allow the regularization of enterprises, the instrument called Term of Commitment was established by Article 79 of the Law on Environmental Crimes (introduced by Provisional Measure—MP No. 2,163-41, of 23 August, 2001). The Court of Auditors of the Union points out that it is important to note that the Term of Commitment is not intended to accept the irregular undertaking. On the contrary, it serves exclusively to allow the natural or legal persons responsible for irregular undertakings to promote the necessary corrections of their activities by complying with the requirements imposed by the competent environmental authorities [20].

The ports that are in the process of renewal of the operating license and have already entered the application for renewal at the competent environmental agency must sign a compromise agreement and meet certain requirements while the renewal process of their license is in progress.

The competence for the environmental licensing of port facilities is defined by Decree No. 8,437, dated 22 April, 2015 [21], which regulates Complementary Law No. 140/2011. Under the terms of the Decree (Article 3 (IV) and (V)), the Union has jurisdiction: organized ports, except for port facilities handling cargo of less than 450,000 TEU/year (number of containers equivalent to 20 feet), or 15,000,000 tonnes/year.

The processes prior to the Decree shall be processed before the originating bodies until the end of the operation license, of which renewal shall be incumbent upon the competent federal entity in accordance with the Decree. If the request for the renewal of the operating license has been filed with the originating environmental agency before the publication of the Decree, the renewal will be the responsibility of said organ.

An example of the change of competence in environmental licensing is the port of Itaqui in Maranhão, which had its operating license issued by the State Secretariat for the Environment and Natural Resources (SEMA) and was valid until 16 January, 2019. However, Empresa Maranhense de Port Administration (EMAP), in advance of the maturity of the same, entered the request for the renewal

of the LO with Brazilian Institute of the Environment and Renewable Natural Resources—IBAMA on 23 July, 2018, for which it awaits due process.

Critical Points of Port Environmental Licensing

Lourenço and Asmus [22] affirm that environmental licensing can be considered an important management tool, but one of the greatest difficulties in the approval of this is in compliance with the conditions that make up the operating license, since, as a rule, they present a number of high and often complex demands. Therefore, the difficulty of the post-licensing phase is linked to pre-licensing issues. However, there is a lack of guidelines for environmental licensing, especially in terms of reference and the delimitation of competencies.

The Secretariat for Strategic Affairs of the Presidency of the Republic (SAE/PR) in a document prepared in June, 2009 [23] states that environmental licensing has become one of the country's most controversial and least understood issue. Everything is criticized in the licensing process: unwarranted delay, excessive bureaucratic demands, poorly reasoned decisions, developmental insensitivity of entrepreneurs, and ideological contamination of the process. What has not yet been clearly understood—or, at least, not expressed accurately—is the root of the problem.

The document also mentions that one of the causes of the problem is "anomie"—that is, the absence of law. Environmental licensing is the realm of administrative discretion. Since the mid-1970s, the country has coexisted with scarce legislation that has long since become outdated. In the absence of clear norms that define the competencies to license, monitor, and punish, as well as the stages of the licensing process, the environmental agencies act in an ungoverned way in an environment of wide insecurity.

In October, 2017, the Federal Audit Court (TCU) organized an event to discuss socio-environmental licensing in infrastructure projects and generated the document called Public Dialogue: Social and Environmental Licensing in Infrastructure Projects [24]. For two days, different public and private entities, and entities directly or indirectly involved in environmental licensing, were gathered in Brasília at the seat of the Court to give presentations and share their experiences.

The representatives of the port sector have objectively exposed the problems of the sector and the proposed solutions. According to the Brazilian Association of Port Terminals (ABTP) and Consultancy, Planning, and Environmental Studies (CPEA), the current socio-environmental licensing process brings unpredictability, legal uncertainty, excessive processing time, high costs, competition between federated units, irrational/unfeasible requirements, loss of attractiveness of projects with greater impact, delay in the execution of works, and, consequently, damage to Brazilian society [24].

To address the problems identified, the CPEA recommended:

1. Incorporation of the environmental dimension into the sectoral logistics and port planning, reducing conflicts in the study of alternative locations;
2. Unification of port environmental licensing and rationalization of procedures and criteria for analysis;
3. Incorporation in the General Environmental Licensing Law of specific procedures for the port sector, especially for the Public Utility framework;
4. Development of communication mechanisms of the port sector and entrepreneurs with affected communities in order to reduce conflicts in the licensing process; and
5. Training of licensing teams and the Public Ministry on the methodology for assessing environmental impacts and their dissemination in the judicial environment.

The agencies involved in the environmental licensing process also undergo difficulties. IBAMA pointed out as one of its main problems the shortage of servers that work in the agency, since high turnover makes it difficult to issue licenses and standardize decisions, as well as the possibility of applying individual sentences to the technicians who carry out the analyses due to the Environmental

Crimes Law, which results in an excessively cautious and minimal risk posture that leads to a paralysis of the process.

In addition to what has already been mentioned, many of those involved in the procedure may further delay the final opinion on whether to grant a license. The environmental licensing manual for ports [3] provides that during the environmental licensing process, federal, state, and municipal bodies that are legally competent may be consulted regarding specific aspects that involve the viability of the enterprise. Examples include ANTAQ, the National Department of Transport Infrastructure (DNIT), the Patrimony of the Union (SPU), the Institute of National Historical and Artistic Heritage (IPHAN), etc. However, insofar as these bodies are not subject to the deadlines defined by Resolution No. 237/97, the licensor shall decide on the granting of environmental licensing independently in the absence of timely manifestations. However, what is known is that the technician, with the possibility of being incriminated individually and to safeguard himself to the maximum, will not give his final opinion before answering all queries sent to the other organs participating in the process.

According to Kitzmann and Asmus [25], the legal framework governing the port sector was built following international, federal, state, and municipal laws incorporated at various times, resulting in a "patchwork", and involved several government agencies in different areas with conflicting views on economic issues and social and environmental development. Since then, little has changed, and to aggravate the situation, the government agencies involved have a chronic shortage of skilled quantitative staff and a lack of infrastructure to meet demand. All this conspires to increase the complexity of environmental licensing.

For Kaiser et al. [26], Brazilian environmental policies are developed in a democratic and participatory manner, though with a high degree of bureaucracy and lack of integration among the various government agencies, which makes the approval of environmental certifications new projects.

The Brazilian Association of State Environmental Entities (ABEMA) [27] explains that there are many factors contributing to the current "collapse of the National Licensing System". Among them are the extensive and sometimes overlapping environmental legislation at the federal and state levels; the requirement of outdated and imprecise standards; the institutional fragility of Sisnama; and the increasing demand for regularization of the projects, along with the debatable quality of the environmental studies presented today by a large number of entrepreneurs.

4. Environmental Port Management in Brazilian Public Ports

Environmental management can be understood here as the guideline and administrative and operational activity, such as planning, direction, control, allocation of resources, and others, carried out with the objective of obtaining positive effects on the environment, either reducing or eliminating the damages or problems caused by human actions by preventing them from arising [28].

Ports are the most important gateway to world trade and, therefore, make a vital contribution to national economies, directly or indirectly, through the generation of employment at all levels. In this sense, ports, as an important actor for the economy, need to adapt and optimize their infrastructures more and more in order to meet the expected growth demands.

Port development and its operational activities have the potential to impact environmental and human resources. However, most of the time, the potential negative impact of ports on environmental resources depends on the magnitude of their activities, as well as the level of sensitivity of environmental resources.

In this context, due to its role of large-scale territorial transformations, port activities have given rise to numerous environmental conflicts [29].

Since its creation, ports have undergone numerous evolutionary processes, whether in terms of management, type of cargo, their infrastructure, or even in relation to the cities and regions that house them [4]. The same can be observed regarding the management of the procedures, which has now culminated in some actions focused on the environmental impacts caused by these processes.

Over time, it is observed that environmental issues have been highlighted in the port management, and that the main ports of the world have begun to invest in the development of sustainable actions with the aim of becoming a green port [6]. Port environmental management is composed of a set of management and operational policies, programs, and practices that aim to improve environmental performance, reduce costs, and, consequently, increase profitability and improve image vis-à-vis customers and society. Therefore, for the managers of the ports, the creation of economic value and the balance between the economic, social, and environmental variables become a complex task [30].

However, these port environmental management processes are still very fragmented and well below the ideal in global terms. Despite its enormous economic importance, it is essential to take into consideration the aspects of environmental quality maintenance also, considering that every process needs to be fed back to ensure its continuity [31].

In order to become more competitive, the Brazilian public port system must adapt to the new world model, complying with international standards of quality, economic and social sustainability, and the preservation of the environment.

According to Barros et al. [32], the new demands of the markets have been suggesting that the organizations adopt policies of environmental, safety, and occupational health management in order to create more sustainable scenarios within the framework of social responsibility.

For all its breadth and importance, and to be a competitive advantage in many sectors of the economy, environmental management is still little used in the Brazilian port system [25].

To Soares [33], both in the Port Modernization Law and in the Port Environmental Agenda, a port environmental management model to be managed in ports was not established. Although the more specific guidelines are scattered in laws, regulations, and ordinances, only the basic ones are foreseen: solid waste, liquid and effluent management, ballast water, dredging, individual contingency plans of area, and mutual aid. Thus, the author concludes that the implementation of port environmental management was referred to the licensing by environmental agencies, and this is not the best way to cover the cumulative impacts of a port.

As a management tool, licensing is legally required for potentially resource-consuming or effectively polluting natural resource enterprises and, therefore, there is a need for an environmental license for port operators [16].

Even with the relevance of ports for the economic and social development of countries, environmental issues deserve attention of managers, as it is a fact that port activities cause environmental impacts, such as: continuous bedding, dredging to deepen the channels, fauna and flora, emissions of gases in the atmosphere, and the generation of solid waste, among others [30].

The reference framework for the insertion of the environmental variable in the Brazilian port sector was the approval of the Port Environmental Agenda through Resolution No. 6 of the Interministerial Commission for the Resources of the Sea (CIRM), on 2 December, 1998, in which the following procedures implemented port environmental management:

1. Compliance with international conventions, environmental policies, plans, and standards;
2. Insertion of the environmental dimension in the Brazilian port modernization process;
3. Implementation of environmental control and monitoring and contingency plans for accidents.

At the beginning of time, the ports were formed of favorable environments found in nature, with calm waters and the depth necessary to anchor the vessels where the ships made the landing and shipment of people and goods. Under the initial conditions, there were not as many environmental impacts as is contextualized now. The great challenge for the activities practiced in the port areas was to promote their development in harmony with the environment. The activities must have a logic of planning and implementation of their structures, which effectively control the parameters of adaptation to the local natural aspects with protection and environmental management [34].

According to Kitzmann [35], "environmental management is a great transition strategy! It will not change course alone, it will only guarantee more time and a better quality of life, so that we

can create the true conditions of life". The implementation of port environmental management is linked to environmental education initiatives, both by private entities and by the federal government. For Mossini [36], "the environmental area of ports, especially as well as their terminals, presents an extension and complexity that demands the performance of an interdisciplinary team of professionals dedicated to this sector".

The definition of port environmental management can be seen in two respects:

1. Public environmental management, where public power is the mediation of utility conflicts and access to use through environmental management policies and instruments; and
2. The private environmental management, which establishes the equipment, technologies, and procedures aimed at mitigating and reducing pollution and environmental impacts caused by port initiatives.

Adequate port environmental management should begin with the implementation and constant improvement of environmental compliance—both those provided for by law and those foreseen in other national and international environmental regulatory mechanisms—or through the observance of international conventions, policies, plans, and standard environmental impacts: the insertion of the environmental dimension into the Brazilian process of port modernization and the implementation of environmental control and monitoring and contingency plans for accidents.

Therefore, environmental management must begin with minimum compliance with existing legal requirements and be expanded voluntarily and progressively.

For environmental management, it is necessary to implement a database to be developed and updated over time containing environmental indicators, whose function is to measure the quality of the environment, including health and health and safety issue workers. As environmental management progresses, environmental performance indicators improve, and the cost of management is reduced [17].

The SNPTA realized that the environmental management of most Brazilian ports was insufficient, or even non-existent, with cases in which a single person answered questions ranging from legal compliance and the allocation of resources to institutional articulation, and that ports, for the most part, were not adequately structured to manage the process of environmental regularization or, when they had the license to operate, they were having difficulty meeting their conditions.

Thus, in April, 2009, SNPTA published Ordinance No. 104/2009 of SEP [37], which instituted the procedures for the creation and structuring of the Sector of Environmental Management and Safety and Health at Work in the Ports of Maritime Terminals, with the objective of carrying out studies and effective actions related to environmental management—mainly environmental licensing—as well as those relating to health at work.

Among the main provisions of the aforementioned ordinance [37] is Article 5, which defines that the Integrated Management System for Environment, Safety, and Health (SGI), to be implemented and maintained by the Environmental Management and Occupational Health and Safety Sector (SGA), will be guided by the policies and strategies of the Organized Port, and discusses documentation and procedures, and should contemplate, at a minimum:

> "I—documentation and dissemination of the port's environmental policy and commitment to continuous improvement and pollution prevention,
>
> II—compliance procedures with the requirements of the International Organization for Standardization (ISO) certification systems on the environment and the Occupational Safety and Health Administration (OSHA) on occupational health and safety;
>
> III—computerization of the system with a view to guaranteeing the registration, updating, storage and retrieval of information and data related to the environment, safety and health;
>
> IV—qualitative and quantitative evaluation of environmental performance practices, procedures and processes, in accordance with management objectives and targets;
>
> V—forecasting and programming of financial resources, logistics and people to manage the SGI;

VI—SGI internal and external environmental audits, carried out jointly with the Port Audit Sector;
VII—multidisciplinary training;
VIII—procedures for review and improvement of port environmental management."

In spite of all these efforts and the maximum period of 120 days defined by Administrative Rule No. 104/2009, the ports could adopt administrative and legal measures to redefine their organizational structure in order to institute the Sector of Environmental Management and Safety and Health at Work (SGA).

In 2014, the percentage of ports that declared they had been executed was 42%, and such a result may have been influenced by the fact that environmental management is still a challenge, a theme assumed ports. Despite the progress made in the formation of environmental management teams, the port authorities still need to expand their teams, increase their specific budget, and invest in the training of their professionals [38].

This makes it evident that as long as there is no inclusion of environmental management in the port priorities, the establishment of permanent dialogue with stakeholders and the allocation of financial resources, and the technical capacity to carry out effective environmental management, we will not go to a resolution of the problems in search of one of the desired environmental qualities capable of reducing the negative impacts of port activities on the environment, improving risk management.

The impacts arising from the implementation of the port infrastructure must be fully delineated by the respective environmental study so that they can be controlled by the appropriate instruments within the environmental management of the activity. The greatest environmental impacts arise from improperly performed port operations, such as the waste cargo that is lost in operation. Thus, the port operation must surround itself with good environmental practices, establishing procedures that minimize or eliminate the resulting impacts [39].

In Brazil, unfortunately, the environmental management actions are most often left out in the port planning. Law No. 12,815/2013, created 20 years after the old law of Ports (No. 8,630/1993) continues to relegate environmental management in Brazilian public ports and contemplates only some environmental elements, but still in a restricted and synthetic way:

1. Emission, by the licensing body, of the term of reference for environmental studies with a view to licensing as a requirement for the port facility;
2. Environmental monitoring as one of the activities of the National Dredging Program;
3. Competence of the port administration to ensure the carrying out of activities with respect to the environment.

Because it is a large extension involving legal and voluntary instruments in an interdisciplinary way, in environmental management, there is no demarcation of a border for its performance. Since it is a procedure to control environmental degradation, environmental licensing is part of this dynamic and highly socio-environmental group.

When considering that the Brazilian environmental policy is basically based on command and control instruments (the main one being environmental licensing) and that the implementation of an environmental management system—EMS is not complied with by the vast majority of port authorities, it is clear that there is still something wrong and much to be done in relation to the environmental sustainability of public ports.

Port authorities need to understand that environmental management must be considered as part of the internal planning process and inserted into the business plan so that, from there, they can invest in sustainability rather than believe that this is an unnecessary expense.

Planning and Execution of Port Works

Although a country's port activity can have positive impacts on the local or regional economy, it is, at the same time, capable of generating negative impacts on the environment in which it operates;

however, these environmental impacts can often be minimized or mitigated to rely heavily on prior planning during the design, location, construction, and port operation phases.

For port work projects, the Ports Secretariat, through ordinance No. 525, dated 18 November [38], defined the minimum criteria for the preparation of Technical, Economic, and Environmental Feasibility Studies (EVTEA), which should include analyses and evaluations from the technical, legal, economic, and environmental point of view that promote the selection and recommendation of alternatives for the design of projects, and, at the same time, to verify that projects, legislation, costs, and investments are executable and compatible with the objectives defined by Government.

The initial phase of a new enterprise—that is, planning—is one of the fundamental phases for its implementation. At this stage, the proponent must present the previous studies of economic and environmental technical feasibility.

The steps of a process of implantation and obtaining the due environmental licenses of a port are presented in Figure 2.

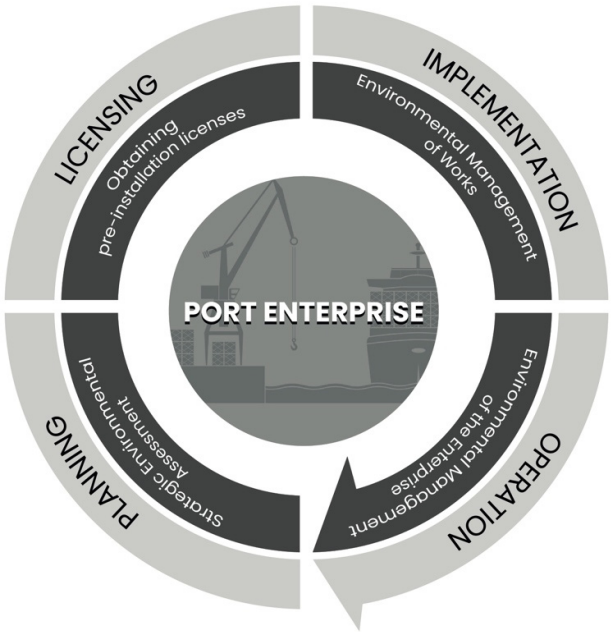

Figure 2. Proposed process for implementation, licensing, and operation of a port data base on Federal Audit Court—TCU [24] adapted.

In this initial stage of planning, the Strategic Environmental Assessment (SEA) can emerge as an important instrument and as a way of evaluating the environmental impacts of strategic actions (policies, plans, and governmental programs), which allows the consideration of environmental issues within the planning process and decision making more effective than the Environmental Impact Assessment (EIA), making these actions stronger environmentally.

The SEA is a tool for assessing impacts of a strategic nature, which aims to facilitate environmental integration and the assessment of opportunities and risks of action strategies in the context of sustainable development. Action strategies are strongly associated with policy formulation and are developed in the context of planning and programming processes [40].

According to Bim [41], SEA is known under a variety of US names, and as Environmental Assessment of Plans and Programs, or Strategic Environmental Assessment (SEA) in European Community legislation. In Brazil, the SEA has no specific denomination and much less legal framework. In Portugal [42], the new Law of Environmental Framework (Law 19/2014) predicted the SEA together with the project EIA: "The programs, plans and projects, public or private, that may affect the environment, territory or the quality of life of citizens, are subject to an environmental assessment prior to its approval, in order to ensure the sustainability of the development options".

In 2002, the Ministry of the Environment [43] defined the SEA as: "an environmental policy instrument whose purpose is to help decision makers in advance in the process of identifying and evaluating impacts and effects, maximizing the positive ones and minimizing the negative ones, that a given strategic decision (regarding the implementation of a policy, a plan, or a program) could unleash on the environment and the sustainability of the use of natural resources, whatever the planning instance".

However, in Brazil, the SEA has been causing concern among entrepreneurs for some time. This is because, although this instrument is not legally required for the environmental licensing of potentially polluting activities, its absence has been seen by some environmental agencies as an obstacle to the issuance of environmental licenses [44].

According to Sanchez [45], in the early 2000s, SEA initiatives multiplied in Brazil. The exploration of oil and gas in the Southern coast of Bahia, the implementation of a mining and steel pole on the banks of the Pantanal, and a plan to exploit the remaining hydroelectric potential in Minas Gerais are examples of such initiatives. A common feature was the "voluntary" nature of its elaboration, in the sense that these initiatives were not presented in response to any legal requirement or the requirement of a financial institution—such as the environmental impact study required for the licensing of works or activities potentially causing significant environmental degradation—but as planning initiatives.

After this first part of planning and after the feasibility studies of the enterprise, the process of environmental licensing begins. At this stage, the proponent will have access to the Term of Reference, which is an instruction developed by the licensing body that determines the content and depth of the Environmental Impact Study (EIS), specifying the elements and information essential for the project licensing decision.

The National Policy of the Environment (PNMA), Law No. 6,938/81, with the new wording given by Law No. 7,804/89, establishes that the construction, installation, expansion, and operation of establishments and activities that use environmental resources considered effective and potentially polluting, as well as those capable in any way of causing environmental degradation, will depend on the previous licensing of a competent state body that is part of the National Environmental System (SISNAMA) and the Brazilian Institute of the Environment (IBAMA) in a supplementary manner, without prejudice to other licenses required.

Thus, environmental licensing as a PNMA instrument refers to the location, installation, expansion, and operation of the activity to be licensed. In order to obtain the environmental license, in addition to complying with established standards, the environmental impacts arising from the implementation of an enterprise or activity must be prevented, corrected, mitigated, eventually eliminated, or compensated in order to guarantee the quality and sustainability of the environmental resources of the region under the influence of the activity in question. It should be emphasized that in any of its stages, the environmental licensing process will be fully funded by the entrepreneur, who shall reimburse the licensing body for all costs that have been incurred [2].

According to Porto and Teixeira [46], are subject to environmental licensing, marinas and ports; terminals of bulk ore, oil, and chemical products; deposits of hazardous chemicals and products; dredging and overthrows in bodies of water, and any new work inside the port.

5. Conclusions

This study is an original attempt to provide an exploratory and critical analysis of the use of environmental licensing as a main tool for the environmental management of Brazilian public ports.

Our research has revealed that environmental licensing can be considered an important management tool, but one of the greatest difficulties in the approval of this is in compliance with the constraints that make up the operating license, since, as a rule, they present a high number of requirements that are often complex. Therefore, the difficulty of the post-licensing phase is linked to pre-licensing issues. However, there is a lack of guidelines for environmental licensing, especially in the terms of reference and the delimitation of competencies

The current process of environmental licensing of public ports in Brazil is still a long process and associated with a lot of unpredictability. However, as all Brazilian public ports have already been implemented, they must deal with the regularization of the environmental licensing of existing activities, and, usually, only the Operational License.

There are many critical points throughout the licensing process, but there is still a lack of strict enforcement and punishment for those who do not comply with the law and operate in an irregular and even irresponsible manner.

The current legislation requires that ports have a range of authorizations and licenses issued by different bodies and entities in the different spheres of public power. However, overlapping laws—and sometimes a lack of them or lack of detail on environmental licensing—result in different interpretations within each licensing agent, which causes delays in the licensing process, leading to numerous legal actions and a generation of legal uncertainty.

Brazilian institutions need to move forward in the various aspects of port environmental licensing in order to ensure legal certainty for the entities involved, such as efficiency, cutting the red tape and understanding the processes, and legal transparency. No less important is the need to promote the existence of a regulatory environment that is favourable to the entrepreneur to act responsibly, environmentally sustainable, and economically competitive.

Environmental licensing as a management tool is not enough to carry out adequate port environmental management, because once the operating license is issued, these ports tend only to meet the minimum requirements and do not seek to improve their activities in search of better sustainability of its operation.

We must work on the awareness and involvement of the port administration, and this requires continued investment in the training of the various actors involved in the process. Perhaps this process of conscientization passes through the competitiveness between the ports, since the world model has looked for services more sustainable for the environment.

There is a need for greater awareness on the part of port authorities about environmental challenges, compliance with legislation, and seeking to insert the variable of environmental management in their activities in order to promote the mediation of interests and conflicts between the various entities and actors involved in port activities, promoting the continuous improvement of the environmental quality of the port environment, as well as guaranteeing the environmental conformity of the activities developed in the port facilities, so that in a globalized world that seeks sustainable development, they can become more competitive.

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