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THE ECOLOGICAL ICMS AS A PAYMENT INSTRUMENT FOR ENVIRONMENTAL SERVICES

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ABSTRACT

The objective of this study was to analyze the current situation of the ICMS-E in the Brazilian states and to estimate the consequences of its non-applicability in the state of Paraíba. Through documentary and bibliographic research, the legal provisions that institute and regulate the ICMS-E in Brazilian states were raised, such as the criteria for redistribution and their respective percentage of participation. The population criterion was used to estimate the value of ICMS-E not passed on to the municipalities of Paraíba, since the legal criteria were not regulated due to the unconstitutionality of the state law. The estimated population of the 5 most populous municipalities in the state and the 5 municipalities with the smallest population were collected, to verify the impact of the non-applicability of the ICMS-E in both realities. In the data analysis, the Population Proportion method was used, where the relative frequency with which this category is observed in the population (p) was calculated according to Mann (2005). The results showed that 17 Brazilian states instituted the ICMS-E under various criteria for the redistribution of resources, among which environmental conservation units, public water sources and solid waste treatment stand out. In Paraíba, the losses related to the non-applicability of the ICMS-E in the analyzed period add up to approximately 845 million reais. Thus, the poorest 5 municipalities stopped receiving an average of 430 thousand reais / year. It is concluded, therefore, that the ICMS-E is an important tax mechanism for environmental management capable of stimulating the conservation of the environment.

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INTRODUCTION

Ecosystem services are defined by the Millennium Ecosystem Assessment (MEA, 2005) as the set of benefits obtained by humans from ecosystems, such as water cycle, nutrient cycling, energy transfers, gas regulation and climate regulation. In Brazil, the Bill no. 1667 (2007), still in progress at the federal level, defines environmental services as the functions offered naturally by ecosystems for the maintenance of environmental conditions suitable for life on the planet. According to the text of the bill, there are several environmental services provided naturally and for free by ecosystems for the maintenance of environmental conditions suitable for life on the planet, including, among others maintenance of biodiversity, landscapes and human cultural diversity, carbon fixation, oxygen production, air purification, control of human diseases, moderation of extreme weather conditions, maintenance of the hydrological cycle, cycling of waste and nutrients, maintenance of soil fertility, erosion control, seed dispersal, pollination of vegetation,

biological and pest control, etc. For Altmann, Souza, Stanton, et al. (2015) ecosystem services derive from both the processes that occur in ecosystems (the ecosystem functions) and their constituents (organisms and organic and inorganic substances). Such services are classified in the MEA (2005) as: provisioning services - including food, water, timber, and fiber; regulating services - affecting climates, flooding, disease, waste, and water quality; cultural services - providing recreational, aesthetic, and spiritual benefits; and supporting services - such as soil formation, photosynthesis, and nutrient cycling. Guedes and Seehusen (2012), differentiate the term ecosystem services - expressed in the MEA (2005) - from the term environmental service, generally used as a synonym. They state that the first term has a more specific character and is associated with more preserved natural environments and with their ecosystem functions more intact. The second term has a more generic character, serving to define both the benefits derived from natural ecosystems and from environments altered by human action. In addition to being provided for in Bill No. 1667 (2007), environmental services are provided for in the New Brazilian Forest Code, approved in 2012 by Federal Law No. 12651, as well as in the Constitution (1988), where

they are called essential ecological processes. Also, the Bill 792 (2007), proposing the creation of the National Policy for Environmental Services (PNSA) has been in Congress since 2007 (Godecke, Hupffer, & Chaves 2014). In the New Brazilian Forest Code, the theme of environmental services is contemplated within the proposal of Payment for Environmental Services (PES) as a way to encourage the preservation and recovery of the environment. As an economic instrument for environmental protection, PES is based on the Neoclassical Economic Theory. This economic theory postulates that market failures are expressed in positive or negative externalities, arising from the economic process. The PES is used to correct market failures with regard to positive externalities. In other words, just as the Brazilian legislation establishes through article 4, item VII, of the National Environmental Policy (PNMA - Law No. 6.938/81), the polluter pays principle (based on the negative externalities of the production process), PES is based on the protector-recipient principle, based on positive externalities. The economic valuation of environmental goods and services is divided into use values and non-use values of such goods and services. Use values can be of direct or indirect use. An example of direct use is the supply of wood, and of indirect use, carbon sequestration. Non-use values are existence values and legacy values (biodiversity, habitat, cultural values) (Guedes & Seehusen, 2012).

In the scope of indirect use economic values, such as flood protection, effluent treatment, Carbon sequestration or even pollination of plant species, PES reveals itself as an important tool for the preservation of natural ecosystems, and can be implemented, for example, through the Ecological ICMS (ICMS-E). Therefore, the ICMS-E is a compensatory policy that represents a government incentive for the maintenance of environmental preservation areas. The resource derives from the Tax on Circulation of Goods and Services (ICMS), established by articles 155 and 158 of the Federal Constitution (1988). Given the above, the research question is: what is the current scenario of ICMS-E in Brazil and what are the financial impacts on Paraíba's municipalities due to its non-applicability? Thus, this study aims to analyze the current situation of ICMS-E in Brazilian states and to estimate the values that should be transferred to Paraíba's municipalities. Thus, this research is justified by the importance of stimulating the implementation of public policies aimed at environmental preservation, besides being a pioneering work in the analysis of financial losses related to the non-applicability of ICMS-E in the state of Paraíba. The article is divided into four sections, besides this introduction. The first presents the theoretical background on Payment for Environmental Services and ICMS-E. The second section presents the research methodology. Then, the third section presents and analyzes the results of this study. And finally, the final considerations are made.

MATERIALS AND METHODS

The present study is a theoretical discussion based on Brazilian environmental legislation and on state legislations concerning the ICMS-E. It is a bibliographical study that gathered information and data necessary for grounding on the subject, as well as a documental research for the survey of data of descriptive nature, since its purpose is to describe the ICMS-E values not passed on to Paraíba's municipalities (Gil, 2008). For this study, the main state environmental laws were searched for the provisions that institute and regulate the ICMS-E as an instrument of incentive to environmental protection. A table was made with the criteria used in law by each Unit of the Federation adhering to the ICMS-E for the redistribution of the resource, and the participation percentages for each criterion. The total ICMS revenue equals the revenue realized, that is, the total value collected by the state of Paraíba with the ICMS tax, disregarding the headings "ICMS - Fines and Interest", "ICMS - Active Debt", "ICMS - Active Debt - Fines and Interest" and "Additional ICMS - FUNCEP - Principal", because we wanted to show only the principal value that would be passed on to the municipalities. The portions that belong to the municipalities were found by applying the 25% rate on the total ICMS revenue, as

determined by the State Constitution. Since the criteria for participation of municipalities, as well as the instruments for certification of compliance with environmental preservation practices were not regulated due to the decree of unconstitutionality of the law, the only way to estimate the value not passed on of ICMS-E to municipalities is by the population criterion, according to art. 2, § 1, of law 9,600 (2011). According to the legal provision, if no municipality fits the ecological criteria, the resources would be distributed proportionally to the population of each municipality. Therefore, we collected the estimated population of the five most populous municipalities of Paraíba, to express the large amounts that were not transferred, and the five municipalities with the lowest GDP of the state of Paraíba, to express the importance of these resources for the financial structure of these municipalities. Thus, a qualitative and quantitative approach was used, through the survey and analysis of secondary data, obtained from the Transparency Portal of the state of Paraíba and the database of the Brazilian Institute of Geography and Statistics (IBGE). For this, the Population Proportion method was used, where the relative frequency with which this category is observed in the population (p) was calculated according to Mann (2005) by:

$$p = \frac{x}{N} \quad (1)$$

From the information gathered, tables were prepared for the period 2012 to 2019.

RESULTS AND DISCUSSION

The redistribution of the ICMS-E values made by the States of the Federation to their respective municipalities follows criteria that establish the legal destination of the resource according to what is established in each specific state legislation. Table 1 shows the states that have instituted ICMS-E, their respective laws, the criteria adopted for the distribution of resources and the participation percentages for each criterion:

Considering the largest state economies among those cited in Table 1, such as São Paulo, Rio de Janeiro, and Minas Gerais, one has an idea of the effects of the ICMS-E in the economic and environmental sphere in terms of transfer of values and environmental preservation. In the state of São Paulo, according to the Secretariat of Infrastructure and Environment (SIMA) (2019), in the year 2013, the Vale do Ribeira region alone - composed of ten municipalities - exceeded 42 million ICMS-E passed on by the state. The region has large Conservation Units, and as it is less industrialized and more agricultural, it has low added value and, consequently, reduced participation index (IPM). Thus, the protected area indexes make all the difference in the collection of the region. The ten municipalities in this region have an average of 45.2% of territories with areas protected by the ICMS-E. In the state of São Paulo as a whole, 186 municipalities are eligible to receive ICMS-E, and in 2019, R\$ 150,052,977.24 was passed on (SIMA, 2019).

The State of Rio de Janeiro has a total of 319 Conservation Units (federal, state, and municipal), whose combined areas correspond to 1,770,871 hectares (Conti; Irving; antunes, 2015). In the period between 2009 and 2014, the State of Rio de Janeiro collected the amount of R\$ 777,766,335.93 related to the ICMS Green. Considering the transfer by administrative region, the Metropolitan Region obtained the highest transfer, with the total amount of R\$ 205,163,246.00, followed by the Coastal Lowlands Region with R\$ 133,318,069.00 of transfer. The RegiãoMédioParaíba comes in third place with a total of R\$ 115,978,855.00. From the fourth to the eighth position the transfers ranged from R\$ 112 million to R\$ 30 million. Each region allocated the resource according to the peculiarities of their municipalities (Chueiri, Nascentes, Machado, & Silva, 2020). In the state of Minas Gerais, from the point of view of the Conservation Units, the results in relation to the increase in the surface of protected

areas encouraged by the ICMS Ecológico have been convincing. In 2007, R\$1,029,624,437.00 were allocated to the municipalities of Minas Gerais, which represents a considerable amount in their economies. Of this amount, R\$41,184,967 were transferred as Ecological ICMS. Lopes, Lanna&Camargos (1997) reported that the compensation for the Conservation Units represented one of the main effects of the Minas Gerais Ecological ICMS, since several municipalities had their quota substantially increased due to this criterion. According to JoãoPinheiro Foundation (2020), the gross ICMS transfer to municipalities in June 2020 was R\$ 1,134,764,896.74.

In Paraíba, the effects of the non-applicability of ICMS-E can be seen below in Table 2:

inflation for the period) of ICMS collection in the Northeast in the first five months of 2017. Of this amount, law no. 9. 600 (2011) determined that, of the 25% of the parcels belonging to the Municipalities, they would be distributed through ecological transfer, according to the following criteria: 70% in proportion to the added value, in operations related to the circulation of goods performed in their respective territories; 20% equitable for all Municipalities; 5% destined to the Municipalities that harbor, in all or part of their territory, one or more public and/or private environmental preservation units, instituted at the municipal, state and federal levels, considering the quality criteria to be defined and assessed by the state agency responsible for environmental management; 5% for municipalities that promote the treatment of at least 50% (fifty percent) of the volume of household waste collected from their urban

Table 1. State Legislations and the Redistribution Criteria of the ICMS-E in the states

State	Law/Year	Criteria	Participation
Paraná	Complementary Law n° 59/1991	Environmental conservation units	2,5%
São Paulo	Law n° 8.510/1993	Public water supply springs	2,5%
		Environmental conservation units	0,5%
		Water reservoirs for power generation	0,5%
Minas Gerais	Law n° 12.040/1995	Environmental conservation units	0,5%
		Garbage and/or sanitary sewage treatment system	0,5%
Rondônia	Complementary Law n° 147/1996	Environmental conservation units	5,0%
Amapá	Law n° 322/1996	Environmental conservation units	1,4%
Rio Grande do Sul	Law n° 11.038/1997	Environmental conservation units and areas flooded by dams	7,0%
Mato Grosso	Complementary Law n° 73/2000	Environmental conservation units and indigenous lands	5,0%
Mato Grosso do Sul	Complementary Law n° 77/1994, regulated by Law n° 2.193/2000 and Law 2.259/2001	Environmental conservation units, indigenous lands and public supply springs	5,0%
Pernambuco	Law n° 11.899/2000	Public supply sources	1,0%
		Composting plants or soil and fills	5,0%
Tocantins	Law n° 1.323/2002	Environmental conservation units and indigenous lands	2,0%
		Municipal environmental policy	1,5%
		Control and combat of wildfires	1,5%
		Soil conservation	1,5%
		Basic sanitation and water conservation	2,0%
Acre	Law n° 1.530/2004	Environmental conservation units	5,0%
Rio de Janeiro	Law n° 5.100/2007	Environmental conservation units	1,13%
		Water quality	0,75%
Ceará	Law n° 14.023/2007, regulated by State Decree n° 29.306/2008	Adequate collection and disposal of solid residues	0,62%
		Municipal Environmental Quality Index	2,0%
Piauí	Ordinary Law n° 5.813/2008	The existence of the environmental seal, developed by the state to meet the environmental criteria of the specific law.	5,0%
		Constitutional Amendment n° 40/2007, regulated by Complementary Law n° 90/2011 and Decree n° 8.147/2014.	Environmental conservation units and public supply springs
Goiás	Law n° 9.600/2011	Environmental conservation units	5,0%
Paraíba	Law n° 9.600/2011	Domestic waste collection and treatment	5,0%
Pará	Law n° 7.638/2012, regulated by Decree 775/2013 and SEMA 1.562/2013	Environmental conservation units and environmental management of municipalities	8,0%

Source: Adapted from Carneiro et al. (2018) and Sousa et al. (2011).

Table 2. Total ICMS, ICMS shares belonging to the Municipalities and their distribution according to ICMS-E

Year	Total ICMS Revenue by year - 100%	ICMS parcels belonging to the Municipalities - 25%.	Percentage that should be passed on to municipalities from ICMS-E: 5% + 5% = 10%.
2019	R\$ 3.338.916.768,98	R\$ 834.729.192,25	R\$ 83.472.919,22
2018	R\$ 5.342.258.525,84	R\$ 1.335.564.631,46	R\$ 133.556.463,15
2017	R\$ 4.920.425.030,43	R\$ 1.230.106.257,61	R\$ 123.010.625,76
2016	R\$ 4.573.644.648,40	R\$ 1.143.411.162,10	R\$ 114.341.116,21
2015	R\$ 4.350.042.623,05	R\$ 1.087.510.655,76	R\$ 108.751.065,58
2014	R\$ 4.246.314.260,75	R\$ 1.061.578.565,19	R\$ 106.157.856,52
2013	R\$ 3.761.794.197,31	R\$ 940.448.549,33	R\$ 94.044.854,93
2012	R\$ 3.237.438.081,20	R\$ 809.359.520,30	R\$ 80.935.952,03
TOTAL	R\$ 33.770.834.135,96	R\$ 8.442.708.533,99	R\$ 844.270.853,40

Source: Based on data extracted from the Transparency Portal of the State of Paraíba and IBGE.

The state of Paraíba collected from the year 2012 to 2019 approximately 34 billion reais of ICMS. According to the Banco do Nordeste's Technical Office for Economic Studies of the Northeast (Etene) (2017), with data from the Central Bank and Ministry of Finance, Paraíba even registered the highest real growth (discounting

perimeters (Paraíba, 2011). In Paraíba, the municipalities that have, in all or part of their territory, one or more public and/or private environmental preservation units, established at the municipal, state, and federal levels, and that promote the treatment of at least 50% of the volume of household waste collected from their urban perimeter

would receive 5% for each criterion adopted. Considering that the municipalities meet the two ecological criteria, the total value of the ICMS-E transferred would be approximately 845 million reais, an expressive amount that would help the municipal public finances and motivate the adoption of sustainable postures of environmental preservation. The exact amount that each municipality would receive could not be evidenced in this study because the criteria for municipal participation, as well as the instruments of certification of compliance with environmental preservation practices were not regulated. In this context, and considering art. 2, § 1, of law 9,600 (2011), in the event that no municipality fits, separately or cumulatively, the ecological criteria, the resources would be distributed in proportion to the population of each municipality. Thus, the five most populated cities of Paraíba, according to data from IBGE (2020), would receive since the enactment of the law the following amounts:

Table 3: Amount to be transferred of ICMS-E according to the population criteria defined in art. 2, § 1, of law 9,600

Cities	Estimated Population	Total Value
João Pessoa	817.511	R\$ 170.872.339,19
Campina Grande	411.807	R\$ 86.073.979,90
Santa Rita	137.349	R\$ 28.708.047,86
Patos	108.192	R\$ 22.613.787,61
Bayeux	97.203	R\$ 20.316.918,04

Source: Based on data extracted from the Transparency Portal of the State of Paraíba and IBGE.

The municipalities of Riacho de Santo Antônio, Curral Velho, Coxixola, Areia de Baraúnas and Parari, which have the lowest GDP in the state of Paraíba, according to data from IBGE (2020), would receive, according to the population criteria defined in art. 2, § 1, of law 9,600, the following values:

Table 4. Amount of ICMS-E transferred according to the population criteria defined in art. 2, § 1, of law 9,600

Cities	Estimated Population	Value
Riacho de Santo Antônio	1.974	R\$ 412.596,28
Curral Velho	2.512	R\$ 525.046,53
Coxixola	1.935	R\$ 404.444,68
Areia de Baraúnas	2.116	R\$ 442.276,46
Parari	1.758	R\$ 367.448,97

Source: Based on data extracted from the Transparency Portal of the State of Paraíba and IBGE.

Whether in a small or large municipality, the ICMS-E resources are an important tool in ensuring a future with development and environmental preservation, minimizing the environmental impacts generated by economic and urban growth. Moreover, ICMS-E is an important instrument for the execution of public policies, since many municipalities have as their only source of income the transfers from the federal and state governments. Unfortunately, the state of Paraíba has not had ICMS-E since the suspension of the effectiveness of law no. 9,600 by the Court Ruling issued in the injunction of the direct action of unconstitutionality by the Court of Justice of Paraíba, which represents a delay in the mechanisms of environmental regulation and sustainable development of the state. Thus, the lack of regulation of the ICMS-E reveals that the actions and practices taken by the government are not fully guided by environmental values that take into consideration sustainability, environmental preservation, and the guarantee of the planet's sustainable development.

CONCLUSION

The PES consists of the contribution of incentives and resources, of public and/or private origin, for those who ensure the production and supply of the service and/or product obtained directly or indirectly from nature. In Brazil, some states and municipalities have instituted in their environmental legislation PES projects for the purposes of compensation, protection and environmental preservation, obtaining

good results (Milaré, 2015). In this context, the objective of this work was to analyze the current situation of ICMS-E in Brazilian states and estimate the values that should be passed on to Paraíba's municipalities. Given the values and distribution criteria presented by the states, one can see the importance of instituting and instrumentalizing the ICMS-E as an environmental management tool, since the efficiency of compensatory policies is demonstrated to be higher than those of a merely punitive nature. In Paraíba, the absence of a legal device that regulates the ICMS-E delays the sustainable development of the state, to the extent that actions for the preservation and protection of the environment are not shared with the municipalities. The data collected revealed that approximately R\$ 845 million could have been transferred to the municipalities, stimulating them to adopt positions for the protection of ecosystem services and minimizing the market failure in not rewarding the providers of environmental benefits. Besides being an environmental regulation mechanism, the ICMS-E would be an important source of revenue for Paraíba's municipalities, especially for those with low tax collection capacity and that depend heavily on federal and state transfers. As demonstrated, the five municipalities with the lowest GDP in the state would receive an average of R\$ 430,000/year, a value that would also help balance the municipal public accounts. Therefore, the ICMS-E is a mechanism of Payment for Environmental Services where everyone wins - environment, state and society - but Paraíba loses by not having it in place.

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