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ENVIRONMENTAL PUBLIC EXPENSES: AN INTEGRATIVE LITERATURE REVIEW AND FUTURE RESEARCH AGENDA¹

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1. Introduction

Population growth allied to technological development has caused severe social and environmental impacts. In this sense, the environmental issue became central in international discussions, composing a prominent agenda on State action in face of the development of public policies oriented for sustainability. Therefore, considering that an ecologically balanced environment is a right that should be assured by the State, environmental management must be foreseen and displayed in a transparent manner in the public budget, enabling social control (CRUZ; MARQUES; FERREIRA, 2009).

Environmental public expenses (EPE) are important instruments for environmental management, which demands an assessment of the priority that they have received in the different government levels to evaluate the dynamics of such outlays, as well as the performance of environmental policies (TRIDAPALLI et al., 2011). Mickwitz (2006) shows that ignoring costs in a world based on resource limitation is incoherent; consequently, the author alerts the need to insert the economic dimension in theoretical models, and in assessment practices of environmental actions.

Nevertheless, besides recognizing the essentiality of public expenses assessment, in the very specific case of environment, studies that approach this subject are still recent, being this late development a consequence of the recent incorporation of environmental

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issues on political agenda and, at the same time, of the inherent characteristics of the field that make assessment a complex activity (MICKWITZ, 2006; ASSIS et al., 2012; KONISKY; WOODS, 2012).

From available studies, we notice a gap in the existing literature; there are no works that integrate and systematize the knowledge in this field. Therefore, the present article intends to discuss and systematize the studies about EPE, to integrate the knowledge already developed, also delimitating a set of future research propositions. Complementarily, specific research goals are defined: to codify and classify the selected studies, based in their characteristics; to analyse, summarize and organize the contribution of each study; and to identify the main theoretical gaps on this topic.

The analyses and results of this article will be important to foment a holistic and integrated vision of theoretical and practical aspects of the available knowledge on the financing of environmental agenda. The construction of this framework is fundamental to support improvements in performance of the contemporary environmental public policies, contributing to the construction of sustainable societies.

Therefore, the article is organized in four sections: the first comprises this introduction; the second explores the structured methodology to meet all defined objectives; the third part comprises the results obtained based in the integration of the analysed literature, classification and codification of the studies, as well as the research agenda proposed from the identified gaps. The final section presents the conclusions.

2. Method

This article uses a descriptive approach, applied through an integrative literature review. This type of review develops a comprehensive picture of existing research on a specific subject, contributing to theory advancement and enabling the applicability of results in socio-political actions (WHITTEMOR; KNAFL, 2005). Additionally, Jabbour (2013) and Liboni et al. (2017) affirm that the method is especially useful to integrate findings in research on emerging topics. The integrative review was executed from January to July 2015, using the steps suggested by Lages Junior & Godinho Filho (2010):

1. To conduct an advanced research in academic research bases, using the available articles on the topic selected;
2. To propose a classification and logic codification system of the selected articles;
3. To use the proposed classification system to generate a simplified comprehension of the existing knowledge on the subject;
4. To develop, from the suggested codification, a summary on the scientific production and the primary results of the articles that were identified and chosen;
5. To analyse the results obtained, evaluating the existence of theoretical gaps and opportunities for conducting future studies.

Initially a research was conducted at *Web of Science*, *Scopus*, *ISI Web of Knowledge* and *Google Scholar*. The key words chosen included “environmental public expenses”,

“environmental expenditures” and “environmental public budget”. Aiming to amplify the research effectiveness, other variations of those terms were considered, as well as expressions in Portuguese language. The reason for adding Portuguese expressions was to accomplish a wide search on the Brazilian publications in this field. It is important to highlight that no temporal range was delimited in the initial search, therefore the search included articles from 1988 to 2015.

The articles that were not completely available for download were excluded, along with others that did not have environmental expenses within the public dimension as the main theme. Thereby, 35 articles were selected for reading. In one additional filter other 05 articles were eliminated, because despite they were related to the key words, they did not focus effectively on the research scope. Thus, at the end of the search process we considered 30 articles for reading and developing the analysis.

Following this step, a classification and codification system was proposed (Table 1). This organization was based on Jabbour (2013) and Liboni et al. (2017). The system is alphanumeric; thereby the large areas of analysis were listed sequentially from 1 to 6, encompassing also a codification that varied from A to E according to the quantity of specific themes related to each of the six groups, so one study received more than one letter code.

The classificatory groups ranging from 1 to 3 incorporated general aspects: Group 1 (codes A-D) identifies the context of development (based on the classification proposed by the United Nations) and the countries covered by the research; Group 2 (codes A-D) refers to the article’s publication year, enabling a longitudinal analysis; Group 3 (codes A-E) associates the methodology, in terms of the approach and scope.

On the other hand, groups 4 to 6 incorporated specific features, consisting of: Group 4 (codes A-B), that evaluates if the researches considered private environmental expenses complementarily to the public scope; Group 5 (codes A-D), that categorizes the thematic focus of the studies; and Group 6 (codes A-E), that categorizes the different governmental sphere considered.

Concerning Group 5, studies framed on “expenses description” are those that perform a descriptive analysis of the disbursement, as well as the intersection with other variables from other countries. The second classification, “expenses performance”, is centred on the efficiency, efficacy and effectiveness of EPE – being the three considered essential for assessing public action regarding resources allocation (ARRETCHE *apud* RICO, 2011). The third, “public accounting”, encompasses researches that analyse aspects related to environmental public accounting. The last one, “public policy”, gathers articles which the scope is the expense as an instrument of environmental public policy.

A synthesis was developed with the main contributions of each article, which was structured conjointly with the descriptive analysis of the classificatory model to develop the discussions presented in the next section.

Table 1 - Classification and codification system

Classification	Detailing	Codification
1	National Context	A - Developed country
		B - Developing country
		C - Multiple countries
		D - Does not apply
2	Year	A - 1980 to 1990
		B - 1991 to 2000
		C - 2001 to 2010
		D - 2011 to 2015
3	Method	A - Quantitative
		B - Qualitative
		C - Qualitative/Quantitative
		D - Conceptual
		E - Case
4	Sector	A - Only public
		B - Public and private
5	Research Focus	A - Expenses description
		B - Expenses performance
		C - Environmental accounting
		D - Public policy
6	Sphere	A - Federal environmental public expenses
		B - State environmental public expenses
		C - Municipal environmental public expenses
		D - Environmental public expenses in different spheres
		E - Does not apply

Source: Elaborated by the authors.

3. Results and analysis

This section was structured in three parts. Initially the systematized conceptual framework about EPE is presented. Subsequently, the results of the descriptive analysis are exposed. The third part summarizes the discussions to propose a future research agenda.

3.1 Conceptual Aspects

For the discussion about public expenses, it is relevant to understand the concepts of environmental management and public policy. According to Gupta, Miranda & Parry

(1995), there is a focus on evaluating costs associated with negative environmental externalities and to define instruments capable of equalizing marginal social benefits from public actuation for sustainability. Environmental management consists on operationalized actions to maintain and recover environmental quality (BUENO, OLIANA, BORINELLI, 2013).

Inside the group of instruments available to guide these environmental actions, stands out the ones of economic approach, as public expenses, defined by Swanson & Lundethors (2003) as expenditures made by public institutions to finance the management of natural resources, combating environmental degradation. For Brunet, Berté & Borges (2012), this instrument reflects political decisions, based on the legal framework and procedures specific to controllership contexts in a country.

According to Fulai (1997), this budget allows to analyse “how” and “where” are collected and allocated resources for EPE. Tridapalli et al (2011) emphasize that the evaluation of EPE confirms the priority given to this area. This follow-up is important since Carneiro (2008) states this category of expenses is fundamental for nations to deal with the complex contemporary environmental landscape.

Nonetheless, despite this scenario, the environment constitutes a neglected function (PEARCE; PALMER, 2001), as it does not comprise an overriding theme in the public budget (FULAI, 1997), which is dominated by classical components under state provision, such as health and education. Aguado & Echebarria (2004) highlight the impotence of organs related to the subject due to divergent interests and forces. Caceres (2014) reassert this idea, by expressing that, in Argentina, the destination of EPE depends on the dynamics of the party-political game, reporting a low participation of civil society in these decisions.

Furthermore, Guimarães, Carneiro & Dowell (1992), certify a disintegrated formulation of environmental public policies as well as a misalignment between legal functions and its execution among government levels. Environmental policy is affected by several factors, and governmental performance oftentimes can nullify the efforts in this area. Prates & Serra (2009) explain that the government carries out expenses that can lead to environmental losses and, at the same time, allocates resources to mitigate these effects, which demonstrates a lack of alignment between the proposals. This inefficiency also originates from the absence of a policy that determines minimum budget for environmental function (WAKIM et al., 2013).

Despite the importance of analysing EPE allocation, one of the main barriers is the structure of accounting statements that limits the access to information (GUIMARAES; CARNEIRO; DOWELL, 1992). Bueno, Oliana & Borinelli (2013) noticed a scarcity of reliable environmental indicators. Consequently, few studies quantified EPE through an approach of performance assessment, e.g., cost-efficiency approach (VINCENT et al., 2002).

Carneiro, De Moura & Neto (2013) acknowledge the government's role of provisioning adequate information on public accounts. In the 80's, Leipert & Simonis (1988) assert that conventional accounting systems did not assist the assessment of environmental damages scope. In this context, environmental accounting represents one evolution in the

financial approach, seeking for efficiency, impacts and risk reduction, as well as decrease in environmental protection costs (JASCH, 2003). To Cruz, Marques & Ferreira (2009), in Brazil, there is little financial information in reference of pro-environmental actions, concluding that there is an inability of public accounting in approaching the subject.

Despite the gaps, the researches presented some discussions and conclusions about EPE analyses. According to Marinoni (2012), due to positive returns of environmental projects, global expenses in this field achieved a high level and tend to evolve incrementally. Halkos & Paizanos (2013) corroborate this idea, affirming that EPE have been increasing recently in diverse countries, largely, owing to the recovery from the effects of 2008 economic crisis. However, in developing countries, as detailed by Young (2005), the absence of financial resources is a great limitation for environmental conservation.

For Dantas et al. (2014), although resource allocation may vary between countries, environmental impacts are cross-border, which demands cooperation among nations to deal with the subject with proper depth. Concerning the private sector, Young & Roncisvalle (2002) recognize a tendency for more environmental awareness, particularly between agents with international interests or responsibilities, despite expenses incurred by this sector are still significantly lower than in the public sector. Palacin, Pro & Grass (2005) bring up the demand for public-private partnerships for simpler and effective environmental actions.

In terms of responsibilities division in the public sector, Kumar & Managi (2009) discuss about the fickleness of EPE between different governmental levels – characteristic that is noticed in other analysed studies (see CARNEIRO; DE MOURA; NETO, 2013; DANTAS et al., 2014) – and affirm that the local government, if not compensated, assigns little of its budget to EPE, highlighting the importance of fiscal transparency to supply this provision due to cross-border benefits. Nevertheless, the increase in the attributions of municipalities was not duly accompanied by growth in resources collection, becoming necessary to search for new alternatives for local public policies effectiveness (WISSMANN et al., 2014).

Tridapalli et al. (2011) emphasize the relevance of studies developed nationally and internationally, focused in analysing EPE, but highlight the need to advance in quantitative and qualitative research aiming to investigate relationships between variables, as well as comparisons among different localities and time periods. Oyola (2006) recommends that studies with the objective to verify the increments' effect in the global budget should analyse resources distribution longitudinally.

Despite the relevance of comparative analysis, Carneiro (2008) highlights that resources distribution varies depending on the physical and economic structure of the country or region, being important to consider such aspects in the analysis. Guandalini, Borinelli & Godoy (2013) reaffirm this position since EPE analysis can be limited when made singly; therefore, it is fundamental to evaluate each locality, its priorities, policies and means to face the complexity of environmental issues.

Guimarães, Carneiro & Dowell's (1992) substantiation can be identified among most of the analysed studies that verified empirically the allocation of EPE: these do not reflect the strong presence of the environmentalist speech disseminated inside the

government and neither the demands of civil society. To Borinelli et al. (2011) there is an intense claim for an adequate budget due to weaknesses of environmental policy, as well as the demand for more trustable accounting information systems.

As stated by Barry & Convery (2002), the data obtained through descriptive analyses of public budgets are not of normative value for public policies development, but assessments that do not consider efficiency can lead to unnecessary increase in EPE. Soukopová & Bakoš (2013) observe that to analyse efficiency, the same needs to be faced from different points of view: how it is understood, what to include in this concept, which factors can influence it and in which extension. Despite this importance, Soukopová & Bakoš (2010) identified that assessing efficiency of municipal EPE can be an extremely complex task because these are influenced by external factors, for example, political decisions and interest groups, that can be hardly quantified.

Table 2 synthesizes each of the studies that were considered in this article.

Table 2 - Summary of the studies

Study	Brief Summary
Aguado & Echebarría (2004)	Analyses of environmental budget expenditures per capita in Spain and examines the relation between the destination of public funds and the implementation of Agenda 21. Identifies a low destination of EPE.
Barry & Convery (2002)	Generates data on EPE in Ireland, in the public and private sectors in 1998, which represents less than 1% of the GDP. Discusses the relation among environmental expenses and sectors competitiveness.
Borinelli et al. (2011)	Conducts analyses on EPE in Paraná. Resources allocation decreased more than the total budget cut, in the period of 2002 to 2009. Need of higher and stable budgets for financing the environmental policies in Brazil.
Bueno, Olina & Borinelli (2013)	Investigates the quality of the environmental public policies, verifying the relation among the amount dedicated and what is demanded by environmental issues. Concludes that the EPE are influenced by other policies.
Cáceres (2014)	Analyses EPE from 2007 to 2012, in Argentina. Concludes that those decreased in 2011 due to economic and political issues and little relevance is given to environmental promotion and education activities.
Carneiro (2008)	Discusses the relation among climate change and federal public expenses with Environmental Management in Brazil from 2000 to 2006. Economic and physical structures determine the EPE and environmental impacts in Brazil.
Carneiro, De Moura & Neto (2013)	Verifies the municipal EPE allocation of Rondonia State. The authors evidenced temporal and quantitative irregularity in resources allocation.
Cruz, Marques & Ferreira (2009)	Analyses the information on environmental management susceptible to be pointed out in public accounting and budgetary reports. Concludes that the Brazilian public accounting presents a narrow approach on the environmental subject.
Dantas et al. (2014)	Analyses the Brazilian EPE from 2004 to 2011 and compare them with China and European Union. Brazilian expenses are incipient and, if compared to international levels, unrepresentative.
Fulai (1997)	Suggests a framework to support decision making, monitoring and assessment of EPE. Highlights the need of this orientation due to the low level of environmental investment in the countries.

Study	Brief Summary
Guandalini, Borinelli & Godoy (2013)	Analyses the EPE of Brazilian capitals from 2002 to 2010. Although capitals are responsible for an important share of environmental expenses, these have decreased and are concentrated in the richest regions of the country.
Guimarães, Carneiro & Dowell (1992)	It analyses EPE in São Paulo based on balance sheet of indirect and direct management bodies, from 1986 to 1990, and verifies a low level of resources. Indicates reviewing the Brazilian public accounting for better coordination and transparency.
Gupta, Miranda & Parry (1995)	Discusses the impact of expenses allocation on the environmental field. Reforms in the expenses policy and the evaluation of environmental impact of the capital expenses are instruments that generate guidance for sustainable development.
Halkos & Paizanos (2013)	Investigates the impact of EPE, in terms of pollutants emissions, in 77 countries among 1980 and 2000. Expenses negatively affect emissions per capita and policy impact varies according to the income level.
Jasch (2003)	Reviews accounting principles and procedures for environmental management. Exposes a basis to be followed by governments interested in promoting environmental accounting, on private and public sectors.
Kumar & Managi (2009)	Explores the role of compensation mechanisms in provisioning the environmental services responsible for cross-border benefits. Intergovernmental fiscal transfers constitute a viable incentive option to help with internalizing the indirect effects of providing environmental public goods.
Leipert & Simonis (1988)	Analyses how EPE are embedded in public accounting and suggests the integration of monetary and non-monetary data. Environmental damage is higher than expenses with environmental protection in Germany.
Marinoni et al. (2012)	Develops a cost-utility analysis to determine best options for a water quality project. The methodology generated an increase in the efficiency of environmental investments. It is indicated to support decision making in other projects to maximize the aggregated utility in environmental terms, maintaining the budget constraint.
Oyola (2006)	Analyses the evolution of EPE in Spain and in Andalucía from 1987 to 2004. Notices an increase on national environmental expenses and in Andalucía, although the amount is incipient, its growth follows the rise of national expenses.
Palacín, Pro & Gass (2005)	Poses a system of accounts for assessment of commercial and environmental effects of public expenses with mitigation of forest fires in Mediterranean. Suggests that given the extensive human use and the high volume of woody vegetation, the administration achieved success with its project.
Pearce & Palmer (2001)	Authors suggest that there is no evidence that EPE negatively impact both economic growth and competitiveness. Reliability and availability of environmental data is an obstacle for deeper political analyses.
Prates & Serra (2009)	Through panel data, among 2002 and 2004, the authors assessed the influence of EPE in the deforestation of Amazon region in Para, and concluded that they are less expressive. Authors question if the financial resources are being properly coordinated in the region.
Soukopová & Bakoš (2010)	Applies an assessment methodology of municipal EPE in Czech Republic, between 2001 and 2008. Analysing the efficiency of public expenses is a complex task due to the monetization of the variables and the influence of external variables in decision making.
Soukopová & Bakoš (2013)	Presents a methodology to monitor and assess expenses efficiency in environmental protection of municipalities involved in the Environment Ministry of Czech Republic. The results show the actual state of expenses and points out some possibilities for improvement.
Tridapalli et al. (2011)	Theoretical review on the ways to analyse EPE applied in national and international works, aiming to emphasize the relevance of advancements in this field.
Vincent et al. (2002)	Analyses EPE in Indonesia from 1994 to 1999. Shows a significant decrease during the period of economic crisis, being this reduction superior to what is observed in other social areas, as well as in other Asian countries.

Study	Brief Summary
Wakin et al. (2013)	Analysed the EPE of Brazilian federal bodies from 2002 to 2011. The results demonstrated an increase in EPE, but with a representative decrease since the expenses growth did not accompanied the increase in total expenses.
Wissmann et al. (2013)	Assessed the behaviour of inhabitant's number, waste generation per capita, current revenues and EPE, and the objective to reduce the environmental impact of waste generation and destination. EPE showed a higher increase than revenues.
Young & Roncisvalle (2002)	Research on the evolution of Brazilian environmental financing features among 1992 and 2001, identifying the resources flow in the different governmental levels, besides estimating the expenses with environmental proceedings executed by the private sector and investment funds.
Young (2005)	Analyses the financial mechanisms for conservation activity in Brazil. Results indicate restricted budgets due to macroeconomic constraints and positive signals of new economic instruments to finance these activities; however, initiatives in the country that coordinate them will need to define common goals and priorities.

Source: Elaborated by the authors.

3.2 Literature Analysis

As a second part of the results, Table 3 shows a general application of the classification and codification criteria for the selected articles. For each of the classificatory groups a descriptive analysis was developed to obtain deeper information on the literature review.

In Figure 1, "National Context", it is possible to verify that most studies, in total 24 articles (categories 1A and 1B), were structured for EPE comprehension inside the context of one country; and, among these, most are dedicated to developing countries scenario, situation fomented by the selection of 13 articles about Brazil. However, it is important to emphasize that these findings can be biased by the key words in Portuguese used in our search.

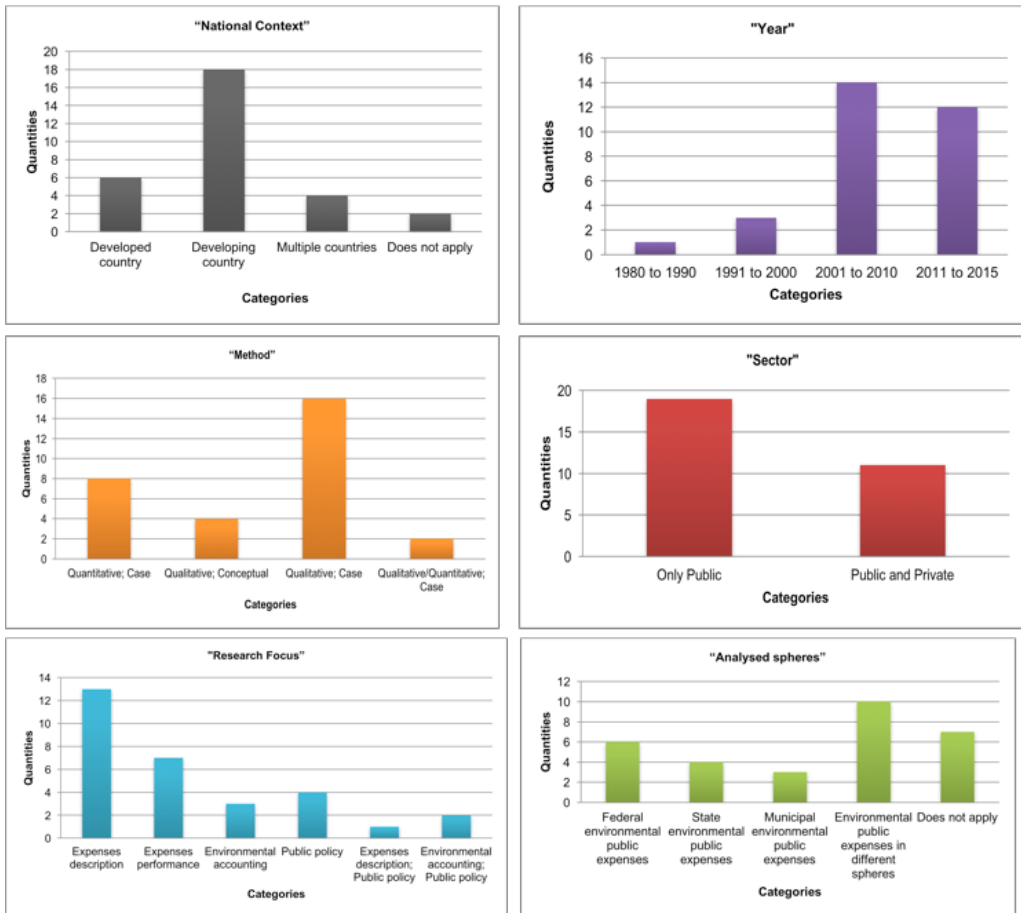
Regarding developed countries, the highlight is for Europe, specifically Spain that is studied in half of the articles in category 1A. Additionally, only 4 studies discuss the subject beyond a singular national reality. Moreover, 2 articles were not included, comprising theoretical researches. Results show a tendency of isolated studies, which do not consider cross-border effects of environmental issues, as highlighted by Dantas et al. (2014). Studies comparing multiple realities are important, as suggested by Tridapalli et al (2011), for providing information on the role of sharing competences, knowledge and other resources for environmental conservation.

Despite being high in number, as discussed by Young (2005), developing countries face severe budget constraints and this can limit their action in this area. Therefore, it is important to develop studies focused on efficiency of EPE in these realities to provide good measures (SOUKOPOVÁ; BAKOŠ, 2013) and information to support public policy design, limiting misleading budgeting (BARRY; CONVERY, 2002) due to superficial, not longitudinal and out of context analyses.

To deepen the analysis, Graph "Year" illustrates the studies' temporal features. It is possible to substantiate that the majority was published in a recent period, 26 of the considered articles were framed in categories 2C and 2D; being that only in 2013 and

2014, 6 researches were selected. This characteristic corroborates the arguments that environmental policies evaluation agenda is incipient, despite the efforts for advancements in the field (MICKWITZ, 2006; TRIDAPALLI et al., 2011; ASSIS et al., 2012; KONISKY; WOODS, 2012; DANTAS et al., 2014).

Figure 1 – Graphs of Literature Analysis. Source: Elaborated by the authors.



Graph "Method" reveals that more than half of the studies are qualitative and, among Brazilian studies, that constitute the mainstream assessed, only 2 applied a quantitative method. 16 articles were based in case description, while the minority dealt with conceptual construction. Therefore, a combinatory analysis allows concluding that qualitative studies on the analysis of EPE application in a determined reality prevail.

Based on this, as commented by Borinelli et al. (2011), Soukopová & Bakoš (2010), Tridapalli et al. (2011) and others, it is important to enhance quantitative approaches to better capture the challenges of budget allocation for an area that is highly influenced by

interests and political, economic, and cultural beliefs, and provide solid information for policy makers. Still, the limitation for applying such methodologies rests on the quality of data provided by public agents (LEIPERT; SIMONIS, 1988; CRUZ; MARQUES; FERREIRA, 2009; BUENO; OLIANA; BORINELLI, 2013), although it is their role to provide information to ensure social control (CARNEIRO; DE MOURA; NETO, 2013).

Within the evaluated sectors concerning financing of environmental agenda, results from Graph "Sector" enlighten that the majority had an exclusive focus on expenses effectuated by the public sphere. From 11 articles that included, somehow, the private sector, only 2 were oriented to the Brazilian context, corroborating the exposed demand from Dantas et al. (2014) for studies that consider all financing sources of environmental management in developing countries, such as Brazil.

Additionally, due to the complexity of the phenomena, partnerships among different sectors need to be considered, to support efficient expenditure allocation and competence sharing among social actors. Public-private partnerships suggested by Palacin, Pro & Grass (2005), are considered a way to integrate those spheres and the interests involved (YOUNG; RONCISVALLE, 2002), as well as an alternative for local governments with budget restrictions (WISSMANN et al., 2014). Therefore, our results show that subjects such as alliances and partnerships are being neglected by the recent literature on EPE.

Graph "Research Focus" reports the research focus that stood out. Thirteen studies dealt with a descriptive focus of EPE (category 5A), while 7 expand the analyses for beyond the invested amount, including evaluation of results arising from environmental actions' financing (category 5B). The third category, with 4 articles, is the one with researches that assessed EPE as instrument of public action (5D), followed by public accounting (5C). Besides this, 2 studies approached conjointly these two foci.

Mostly, the studies provide a superficial analysis of EPE, based on descriptive statistics, and this can lead to biased budget decisions and do not provide a solid basis for policy design. Therefore, it is important to consider deeper analyses, based on cross-sectional longitudinal data (OYOLA, 2006) which encompass different approaches and make possible to analyse each singularity of localities from both quantitative and qualitative point of view (GUANDALINI; BORINELLI; GODOY, 2013).

Soukopová & Bakoš (2013), however, highlight the importance of studying efficiency in EPE and well defining how to measure it and how these results can support developments in the field as well provide a practical tool for policy makers. Arretche (*apud* Rico, 2011) suggests focus on efficiency is given if the main objective is to assess the costs of achieving the goals of a given policy; efficacy, if the relationship among defined and achieved goals is to be assessed, and effectiveness when a comparison between the objectives and impacts in the reality under analysis is intended. Therefore, those several measures of efficiency, efficacy and effectiveness can generate in-depth analysis that fully support decision making regarding resource allocation, impacts on society (social, cultural, economic, environmental) and scope of environmental policies.

Ending the descriptive analyses, Graph "Analysed spheres" reveals that 10 articles discussed EPE in a holistic manner, transcending competences of one federative body. Despite the importance of evaluating this issue, 7 articles were not subject to classifica-

tion for being conceptual or for approaching essentially the comparison among countries. It also draws the attention that the category with lower participation (6C) is the one of municipalities, despite their relevance in promoting sustainability (SOUKOPOVÁ; BAKOŠ, 2013; WISSMANN et al., 2013).

The focus of analysis need to be redirected to the main actors in environmental protection (KUMAR; MANAGI, 2009), and combined with the previous analyses, could be an opportunity to present local governments with instruments to tackle complex issues such as air and water pollution, waste management, conservation, and so on, through partnerships and alliances with the public and private sector. The results of such studies can enhance frameworks, such as the one suggested by Fulai (1998), to support decision making, monitoring and assessment of EPE at local or state level.

3.3 Future Research Agenda

Through the descriptive analysis presented it is possible to identify gaps in the literature on EPE and to suggest paths for future research. Thus, in this section a research agenda is proposed.

In Group 1, the categories with lower frequency were “C” and “D”, that is, respectively, studies among different countries or without a context consideration. From this finding, a gap in studies that approach more than one national context was identified, shaping the **first research suggestion**: To conduct studies that consider different national contexts aiming to understand different approaches in dealing with EPE.

Group 2 allowed identifying that studies focused on analysing EPE are still recent. Despite the latest efforts, it is important to develop researches that consolidate knowledge in this field, encompassing historical perspectives. The **second research suggestion** is: To foment the expansion of this study field and the comprehension of this subject in an historical perspective, consolidating relevant concepts and aspects for progress in political science.

With respect to methodological aspects (Group 3), there is a low number of studies focused on conceptual comprehension and quantitative-descriptive approach. Thus, there is space for developing studies that discuss theoretical aspects on EPE allocation and assessment. In contraposition, there is a significant need of quantitative studies, much due to the lack of reliable indicators that allow deeper analyses.

Therefore, a **third research suggestion** is raised: To develop studies with a qualitative approach that encompass theoretical discussions on EPE as instruments for environmental public policy. Also, a **fourth research suggestion**: To perform studies that foment the construction of efficacy, efficiency and effectiveness indicators for environmental public policies, susceptible to comparison with the information already available on EPE.

In Group 4, the less frequent category is the one that combines the analysis of different financing sources for environmental investments in the countries. Thus, the **fifth research suggestion** is: To promote studies that discuss different financing sources for environmental management, recognizing the relevance of the private sector in supporting such initiatives along with the public sector.

Regarding Group 5, the categories less mentioned are Environmental Public Accounting and Environmental Public Policy. In this sense, there is a lack of studies that integrate public budgetary expenses and instruments for environmental public policy, and others that promote advancement in delineating informative accounting tools that encompasses the environmental concern. Thereby, the *sixth research suggestion* is: To develop studies that identify EPE as instruments for public action. The *seventh research suggestion*: To foment studies that propose accounting tools adequate to the information needs of civil society and public managers on EPE.

Finally, Group 6 emphasizes the need for studies that evaluate the local context, since most of them analyse macro environments. It is important to highlight that to undertake this studies, data and reliable indicators need to be produced by the bodies involved in municipal public budget allocation and execution.

Thus, the *eighth research suggestion* is: To conduct studies focused on the analysis of EPE in a local level, given the role of municipalities in applying environmental public policies.

These research recommendations aim to guide future studies, acting as a research agenda on EPE assessment. As it can be verified in the case of the eighth suggestion, most of these recommendations should be jointly executed to provide theoretical and practical advancements in this field.

Figure 2 - Research Agenda

Category to be prioritized in the Research Agenda →
 Category to be additionally considered in the Research Agenda - - - - -

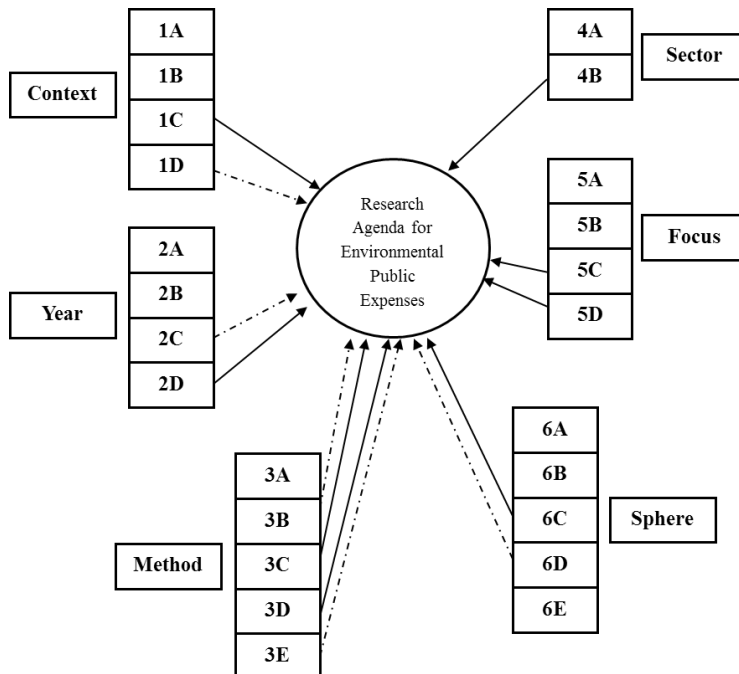


Table 3 - Classification and codification Source: Elaborated by the author

Study	Country	National Context	Year	Method	Sector	Research Focus	Sphere
Aguado & Echebarria (2004)	Spain	1A	2C	3A, 3E	4A	5A	6A
Barry & Convery (2002)	Ireland	1A	2C	3B, 3E	4B	5C	6A
Borinelli et al. (2011)	Brazil	1B	2D	3B, 3E	4A	5A	6B
Bueno, Ollana & Borinelli (2013)	Brazil	1B	2D	3B, 3D	4A	5A	6E
Cáceres (2014)	Argentina	1B	2D	3B, 3E	4A	5A	6C
Carneiro (2008)	Brazil	1B	2C	3A, 3E	4B	5D	6A
Carneiro, De Moura & Neto (2013)	Brazil	1B	2D	3B, 3E	4A	5A	6C
Cruz, Marques & Ferreira (2009)	Brazil	1B	2C	3B, 3D	4A	5C	6E
Dantas et al. (2014)	Brazil	1B	2D	3B, 3E	4A	5A	6D
Fulai (1997)	-	1D	2B	3B, 3D	4A	5C, 5D	6E
Guandalini, Borinelli & Godoy (2013)	Brazil	1B	2D	3A, 3E	4A	5A	5C
Guimarães, Carneiro & Dowell (1992)	Brazil	1B	2B	3B, 3E	4A	5A	6B
Gupta, Miranda & Parry (1995)	-	1C	2B	3B, 3E	4B	5D	6E
Halkos & Paizanos (2013)	-	1C	2D	3A, 3E	4B	5B	6E
Jasch (2003)	-	1D	2C	3B, 3D	4B	5C	6E
Kumar & Managi (2009)	India	1B	2C	3B, 3E	4A	5D	6D
Leipert & Simonis (1988)	Germany	1A	2A	3C, 3E	4B	5C	6A
Marinoni et al. (2012)	Australia	1A	2D	3A, 3E	4A	5B	6E
Oyola (2006)	Spain	1A	2C	3B, 3E	4A	5A	6D
Palacin, Pro & Gass (2005)	Spain	1A	2C	3A, 3E	4B	5B	6D
Pearce & Palmer (2001)	-	1C	2C	3B, 3E	4B	5A	6A
Prates & Serra (2009)	Brazil	1B	2C	3B, 3E	4A	5B	6B
Soukopová & Bakoš (2010)	Czech Republic	1B	2C	3A, 3E	4B	5B	6D
Soukopová & Bakoš (2013)	Czech Republic	1B	2D	3A, 3E	4B	5B	6D
Tridapalli et al. (2011)	-	1C	2D	3B, 3E	4A	5A, 5D	6D
Vincent et al. (2002)	Indonesia	1B	2C	3B, 3E	4A	5A	6A
Wakin et al. (2013)	Brazil	1B	2D	3B, 3E	4A	5A	6B
Wissmann et al. (2013)	Brazil	1B	2D	3C, 3E	4A	5B	6D
Young & Roncisvalle (2002)	Brazil	1B	2C	3B, 3E	4B	5A	6D
Young (2005)	Brazil	1B	2C	3B, 3E	4A	5D	6D

Source: Elaborated by the authors.

4. Conclusions

This article developed an integrative literature review on EPE. In this sense, 30 studies were selected through an advanced search in academic bases, and codified based in a system proposed by the authors. Through structuring the existing knowledge, it was possible to identify some gaps in the literature, leading to the proposition of a research agenda with 8 recommendations, which intends to strengthen and advance the current knowledge available on EPE, guiding the research field and its relation to public policies.

We identified that the subject is still in construction in the literature and few quantitative studies were developed. Due to its recency, there is still a strong demand for qualitative studies that support a thorough understanding of the problematic to give support for future quantitative, and more complex studies which combine both approaches. The quality of data found is an additional burden that slow down the advancements in quantitative methods, such as cost-efficiency approach. Therefore, a joint effort of academia and public sector could be a way to improve the quantity and quality of data gathered on EPE.

Indicators are relevant instruments for analysing the efficiency of public environmental management, providing a longitudinal analysis, and the possibility to compare different realities. Therefore, more efforts are needed in developing reliable measures, consistent with the complexity found in the environmental arena. Not less attention needs to be driven to the enhancement of accounting tools that support decision making.

Also, comparative analyses are one of the gaps identified and are an important tool to provide knowledge and competence sharing, as it highlights good practices and suggest improvements in environmental management of local, state or federal governments. Additionally, authors in this area need to start considering strategic alliances with the private sector and among different public spheres, aiming to maximize the success of public action.

The study is limited due to its methodology, since the combined use of keywords in Portuguese and English may have influenced the number of Brazilian articles found. Still, the research had no intention to exhaust all the available knowledge, but to gather, through a well-defined research methodology, all the articles that approach the topic in discussion and that fit in the established criteria.

Restrictions in developing researches in this field are determined, largely, by the absence and limitations of environmental databases. Therefore, this article intends also to emphasize the problem, fomenting more accounting transparency and organization, as well as proposals for the development of environmental indicators. Considering the contemporary ecological crisis and the scarce financial resources, efforts in understanding environmental actions' financing turn out to be essential to guide sustainable development.

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ENVIRONMENTAL PUBLIC EXPENSES: AN INTEGRATIVE LITERATURE REVIEW AND FUTURE RESEARCH AGENDA

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Abstract: Several studies analysed the environmental public expenditures, its allocation and role as an instrument for public action. However, there is still a gap in the literature, since there are no works that integrate and systematize the existing knowledge. Therefore, we conducted an integrative literature review, and selected thirty articles for synthesis, classification and coding based on a system proposed by the authors. We identified that researches on this field are still recent and publications are concentrated in Europe and Latin America. Regarding the research methods, the qualitative approach based on case studies was used to develop the majority of the studies. Also, the studies in general combined different spheres of analysis, discussing topics on performance and description of expenses. The results showed that there is a need for studies that promote themes such as transparency, accounting organization and the creation of indicators, enabling deeper analysis. An agenda with eight research suggestions was proposed based on observed theoretical limitations.

Keywords: Environmental expenditures. Environmental management. Environmental public policy. Literature review.

Resumo: Diversos estudos foram realizados visando analisar gastos públicos ambientais, sua alocação e seu papel como instrumento de ação pública. Contudo, ainda existe uma lacuna em pesquisas que integrem e sistematizem o conhecimento existente. Assim, nós realizamos uma revisão integrativa da literatura e trinta artigos foram selecionados para síntese, classificação e codificação baseada em um sistema proposto pelos autores. Foi identificado que o campo de pesquisa ainda é recente e as publicações estão concentradas na Europa e América Latina. Com relação aos métodos usados, abordagens qualitativas baseadas em estudos de caso são maioria. Ainda, os estudos no geral combinam diferente esferas de análise, objetivando discutir tópicos sobre descrição e performance dos gastos. Segundo os resultados, permanece a necessidade de estudos que promovam transparência, organização

contábil e criação de indicadores, possibilitando análises mais profundas. Uma agenda de pesquisa com oito sugestões foi proposta baseada nas limitações teóricas observadas.

Palavras-chave: Gastos ambientais. Gestão ambiental. Política pública ambiental. Revisão de literatura.

Resumen: Muchos estudios fueron desarrollados con fines de analizar gastos públicos ambientales, su asignación y papel como instrumento de acción pública. Sin embargo, todavía hay una brecha en investigaciones que integren y sistematicen el conocimiento existente. Se realizó una revisión integradora de literatura, y treinta estudios fueron seleccionados para síntesis, clasificación y codificación basada en un sistema propuesto por los autores. Fue identificado que el campo es reciente y publicaciones están concentradas en Europa y América Latina. Cuanto a los métodos, los enfoques cualitativos basados en estudios de casos representan la mayoría. Además, los estudios generalmente combinan diferentes niveles de análisis, para discutir temas sobre descripción y rendimiento de los gastos. Además, sigue existiendo una necesidad de estudios que promuevan transparencia, organización contable, creación de indicadores, permitiendo un análisis más profundo. Una agenda de investigación con ocho sugerencias fue propuesta basada en las limitaciones teóricas observadas.

Palabras clave: Gastos ambientales. Gestión ambiental. Política pública ambiental. Revisión de la literatura.
