

The environmental dimension in master plans: international experiences in strategic environmental assessment

A dimensão ambiental em planos diretores: experiências internacionais de avaliação ambiental estratégica

Débora Mendonça Monteiro Machado [I]
Amarilis Lucia Casteli Figueiredo Gallardo [II]
Cláudia Terezinha Kniess [III]

Abstract

The strategic environmental assessment (SEA) is applied in 90 countries to integrate the environment into planning, such as master plans, but remains voluntary in Brazil. The environmental dimension in international reports on SEA master plans is explored in this article using the theoretical framework of good SEA practices to identify contributions to the Brazilian context. Many of these practices were observed, such as standardization of stages and integration between urban and environmental planning, corroborating intrinsic and systemic SEA features that allow the integration of the environmental dimension into master plans regardless of the country's planning context. We recommend that SEA be adopted locally to foster the integration of environmental issues into intersectoral urban policies, a challenge in urban planning.

Keywords: strategic environmental assessment; master plan; municipality; environmental dimension; urban planning.

Resumo

A Avaliação Ambiental Estratégica (AAE) é aplicada em 90 países para integrar o meio ambiente ao planejamento, como planos diretores, mas permanece voluntária no Brasil. A dimensão ambiental em relatórios internacionais de AAE de planos diretores é discutida pelo referencial teórico de boas práticas de AAE para identificar contribuições para o contexto brasileiro. Verificou-se elevado número de evidências dessas boas práticas, de padronização de etapas, de integração entre os planejamentos urbano e ambiental corroborando características intrínsecas e sistêmicas da AAE que permitem integrar a dimensão ambiental em planos diretores, independente do contexto de planejamento do país. Recomenda-se que a AAE seja adotada localmente, pois possibilita fomentar a integração da temática ambiental em políticas intersectoriais urbanas, um desafio no planejamento urbano.

Palavras-chave: avaliação ambiental estratégica, plano diretor; município; dimensão ambiental; planejamento urbano.

Introduction

The Strategic Environmental Assessment (SEA) is a decision-making support instrument that allows considering the environmental effects associated with the implementation of policies, plans and programs (PPP), or simply, planning (Thérivel et al., 1992; Sánchez, 2017). Thus, the SEA allows the integration of environmental issues in strategic planning (Partidário, 2007), as well as in carrying out the master plan (De Montis et al., 2014; Gallardo et al., 2017; Ledda et al., 2021).

The systematic use of SEA in sectoral and spatial planning has led to benefits related to the promotion of pluralism (Cape et al., 2018) and social participation (Costa et al., 2009) in the decision-making process and strengthening of governance (Monteiro; Partidário, 2017), contributing to the transition to sustainability, mainly regarding its environmental dimension (Dávila et al., 2019). These benefits associated with the application of SEA in the development of plans have fostered a solid mandatory use platform in about 90 countries worldwide (Milner-Gulland et al., 2021).

In Brazil, the SEA is still an instrument of voluntary adoption (Gallardo et al., 2021), in which only 68 cases of application are known (Tshibangu; Montañó, 2019) in sectoral and regional/spatial planning (Rizzo; Gallardo; Moretto, 2017), despite its mention in some legal diplomas in the country.

In 1994, in the state of São Paulo, there was a pioneering initiative to institutionalize the SEA, through Resolution SMA 44/94, which did not materialize. At the federal level, Law Project n. 2072/2003 and Law Project No 261/2011 tried to introduce the obligation of

SEA for PPP by amending Law n. 6.938/81, but were shelved, the latter on 1/31/2019. More recently, the São Paulo State Policy on Climate Change, from 2010, (Nadruz et al., 2018), the São Paulo Oil and Natural Gas Program, also from 2010 (Siqueira-Gay; Sánchez, 2019), and the development of sectoral public policies in the state of Minas Gerais (Crespo; Raimundo, 2018) recommend its use. In the Strategic Master Plan of the municipality of São Paulo (Law No 16,050/2014), the SEA is highlighted as one of the environmental management instruments to enable territorial organization and urban management (Sepe; Pereira, 2015). More recently, the Master Plan of Niterói, article 202 of the municipal law of 3,385/2019 (Niterói, 2024), also highlights the use of SEA in the context of preparing this plan.

Even so, in the country, SEA has been practiced without specific guidelines and the few local experiences without evidence of their influence on decision-making and with a lack of learning in the strategic evaluations of plans (Montañó; Souza, 2015). For Sánchez and Croal (2012), the expansion of SEA to countries that have not yet managed to experience the instrument's contribution to planning should be encouraged, as is the case of Brazil. According to Sánchez (2017), the process of consolidating the practice of SEA in the country should be directed, mainly, towards planning that does not have repercussions on engineering projects evaluated by environmental licensing, such as municipal planning.

The Master Plan is one of the main instruments of municipal planning, according to Ultramari et al. (2018), and consists of the document that materializes the aspirations of society, urban planners and legislators, defining territorial priorities in a complex

legal and social framework. For Rezende and Ultramari (2008), although there is a plurality of understandings about urban planning and spatial organization in Brazilian cities, planning in municipalities aims to correct administrative distortions, facilitate municipal management and ensure the feasibility of strategic proposals for the adequate functioning of municipalities. According to Ultramari and Rezende (2008), the Municipal Master Plan is one of the main mechanisms of current urban planning, materializing Brazilian urban policy in accordance with the guidelines of the Statute of Cities (Brazil, 2001). For Lima et al. (2019) socio-environmental issues have been standing out in the processes of planning and land use planning, however, the harmonious relationship between master plans and adequate urban expansion requires new paradigms to overcome the current challenges of urban management and environmental problems. According to Martins (2011), the inclusion of the environmental issue in the urban sphere leads to reflection on the scope of the urban political nature.

Of the small number of Brazilian SEA cases (Tshibangu; Montaña, 2019), there is no known application for Brazilian master plans. Some national research experiences discuss the benefits of integrating the environmental agenda into urban planning through the application of SEA to master plans, providing a potential contribution to Brazilian municipal management in line with what is recommended in the statute of cities. Sousa (2003) postulates that the SEA allows the inclusion of the assessment of urban socio-environmental impacts in the master plan. Fabbro Neto and Souza (2009) consider the potential of SEA for the sustainable direction of municipal development mediating local conflicts during

political interests with the participation of society, strengthening democratic management. Gallardo (2012) considers that urban planning materializes the conditions for the continuous application of the SEA with a view to ordering the space for housing, guaranteeing the socio-environmental functions of the urban organization. Gallardo et al. (2017) reinforce the potential of SEA in integrating environmental issues into urban management, as emphasized by Amaral et al. (2022) in the discussion of its use in the implementation of urban intervention projects within master plans.

With the practice of SEA more consolidated, the international literature has presented works that discuss the benefits of using the instrument in master plans. Tao et al. (2007) propose a roadmap to assess how SEA has been applied as a tool to integrate land use planning into a process of building a friendly society in China. De Montis et al. (2014) discuss the benefits of SEA in the context of its application to master plans of Italian cities. Ledda et al. (2021) highlight the potential of SEA to integrate relevant environmental themes such as adaptation to climate change into urban plans.

Considering the potential benefits of including the SEA in the development of master plans and integration of environmental issues and the mention of its use associated with master plans of some Brazilian municipalities, it is defined as a research question: How can the SEA support the integration of the environmental dimension in the context of the master plan? The main objective of this work is to discuss the inclusion of the environmental dimension in the elaboration of master plans based on the evaluation of SEA reports of master plans. It is hoped that this discussion will

help to illustrate the importance of SEA, widely recognized internationally, in the preparation of Brazilian master plans and in the integration of sectoral themes with environmental themes in urban planning, a great challenge for urban planning.

Given the reduced number of cases of SEA application in Brazil and the lack of any devoted to master plan development, the choice was to explore international cases of SEA applied to master plans, in the light of the theoretical perspective of good international SEA practices. This theoretical basis does not aim to replicate the same good practices for Brazilian municipalities, which would require adapting it to local specificities and is far beyond the scope and reach of the method of this work. This theoretical framework aims to seek evidence on how the environmental dimension can be fostered when the master plan elaboration process is subsidized by the SEA and, thus, make recommendations for the adoption of the instrument in the context of Brazilian municipalities.

Method

This exploratory research uses secondary data as an object of document analysis supported by a theoretical framework for the development of the article.

To obtain the data, a search in the gray literature was done using the “Google” tool (Paez, 2017), considered the premise of

Haddaway et al. (2015) that the most relevant sources appear on the first pages of search results. Thus, using the keywords “strategic environmental assessment” “master plan”, as documentary material in the gray literature, 17 SEA reports of master plans carried out from municipalities in different parts of the world were selected (Chart 1). The search for words in the English language is justified by the absence of Brazilian cases and to obtain ample documents that could be analyzed, given the exploratory and qualitative character of the research. The validity of this premise lies in the identification of SEA also in cases of SEA written in Portuguese and Spanish.

According to Chart 1, the vast majority of cases (13 of the 17) come from the European continent, this is justified by the fact of the implementation of the European Directive of SEA 2001/42/EC which, since 2004, obliges the member countries to use the instrument and also influences the international scenario for its adoption (Partidário, 2012). As the research is exploratory and not exhaustive, this data set does not affect the achievement of the objective, but reinforces the selection of the other four non-European cases.

Document analysis of the 17 SEA reports was carried out in three steps:

- 1) procedures for carrying out the SEA: evaluation of SEA performance criteria proposed by the IAIA (2002) which aim to evaluate good practices in the use of the instrument, which were also used by Rizzo et al. (2017) to evaluate the planning of the transport sector in São Paulo; this step aims to explore

Chart 1 – Description of the SEAs of the master plans selected for analysis

Cases	AAE Master Plan	Period	Country	Continent	Population	Territorial Extension (km ²)
1	Kinsale	2009 - 2015	Ireland	Europe	2.298	11.644,00
2	South Kesteven	2011 - 2036	England	Europe	141.853	942,60
3	Lisboa	2012 - 2024	Portugal	Europe	504.718	100,05
4	Prizren	2012 - 2025	Kosovo	Europe	177.781	627,00
5	Greenbelt*	2013 - 2023	Canada	North America	37.242.571	9.984.670,00
6	Gilgit	2014 - 2025	Pakistan	Asia	1.800.000	38.021,00
7	Seixal	2015 - 2027	Portugal	Europe	184.269	95,50
8	Cork	2015 - 2021	Ireland	Europe	124.391	187,00
9	Vasilikos	2015 - 2045	Greece	Europe	799	405,55
10	Barcelos	2015 - 2025	Portugal	Europe	120.391	378,90
11	Dublin	2016 - 2022	Ireland	Europe	1.361.000	115,00
12	Espinho	2016 - 2026	Portugal	Europe	31.786	21,06
13	Tavira	2017 - 2027	Portugal	Europe	26.167	606,97
14	Clare County	2017 - 2023	Ireland	Europe	118.817	3.450,00
15	Belfast	2017 - 2021	Ireland	Europe	275.000	132,50
16	Yerevan	2017 - 2030	Armenia	Asia	1.073.700	29.000,00
17	Coquimbo	2018 - 2022	Chile	South America	163.036	1.429,30

* Greenbelt is a region located in Ontario, Canada that includes a set of different municipalities. It was decided to use this SEA in the data set analyzed because it could represent the context of the metropolitan region.

Source: the authors.

how these criteria have been considered in the realization of SEA of master plans and that eventual contributions of the cases analyzed are based on good international practices recommended for SEA (Chart 2);

2) analytical structure for carrying out the SEA: evaluation of the main steps of the SEA using the theoretical framework proposed by Fischer (1999), OECD (2006), McCluskey and João (2011) and Partidário (2012) which represent methodologies for the use of SEA; this step aims to explore which structure of the SEA reports of master plans has been used and which possible contributions of the analyzed cases are supported by the expected

methodological structure for the use of the SEA, in reports that have the expected scope to influence the environmental dimension of the master plan throughout the SEA cycle (Chart 3);

3) integration of the environmental dimension into the SEA of master plans: evaluation of the six aspects of integration of the SEA into urban planning, as proposed by He et al. (2011); this step aims to explore whether the master plan SEA reports have sought to integrate the environmental dimension into urban planning to promote urban sustainability, in order to identify which aspects have been considered relevant for this purpose (Chart 4).

Chart 2 – Performance criteria for analysis of SEA studies proposed by IAIA (2002)

Criteria	Items	Understanding
Integrated	1. Ensure proper environmental assessment of relevant strategic decisions to achieve sustainable development? 2. Does the planning integrate the social, environmental and economic dimensions? 3. Does the plan indicate its objectives related to other PPPs?	Does it consider strategic decisions with a view to sustainable development? Has the environmental assessment of strategic decisions been applied?
		Does it present integration of environmental, social and economic aspects?
		Is it demonstrated how the SEA addresses the insertion of planning in the policy framework?
Focused on sustainability	4. Does the Plan indicate more sustainable alternatives?	Does it present an analysis of sustainable alternatives, specifying criteria and methodology?
With focus	5. Does it provide sufficient, reliable and usable information for the development of the planning and decision-making process? 6. Does it focus on key sustainable development issues? 7. Does it fit the characteristics of the decision-making process? 8. Is it cost and time effective?	Is there a survey and analysis of the impacts with the implementation of the planning?
		Does it present considerations on sustainable development?
		Is there a clear relationship between the SEA and the decision-making process?
		Is there a survey of costs and duration for the implementation of activities?
Verifiable	9. Is it carried out by the agencies responsible for the strategic decisions to be taken? 10. Is it conducted with professionalism, rigor, fairness, impartiality and balance? 11. Are there independent government assessments and verifications? 12. Document and justify how sustainability issues are considered in the decision-making process?	It cannot be obtained by consulting documents
		idem
		idem
		idem
Participative	13. Is there social and government participation throughout the decision-making process? 14. Do you explicitly consider their contributions and concerns in documentation and decision-making? 15. Is the information presented clear and easy to understand for everyone involved?	Does it have the involvement and participation in the SEA of all interested parties?
		Is the participatory analysis present in the documentation included in the SEA?
		Regarding language and clarity, does the document have easy understanding of the information, as well as availability for access by all interested parties?
Interactive	16. Are assessment results made available in a timely manner to influence decision-making and future planning? 17. Is the information made available sufficient on the impacts of implementing the strategic action, in order to enable the decision to be reviewed and provide bases for future decisions?	It cannot be obtained by consulting documents.
		Check if there is an integrated assessment of the cumulative, synergistic and indirect impacts in the studies, considering the related plans.

Source: adapted from Rizzo, Gallardo and Moretto (2017).

Chart 3 – Main steps that make up the SEA instrument and the respective SEA report

SEA Steps	Objectives
Objectives and Critical Decision Factors	Establish objectives focusing on environmental issues linked to the decision phase. Focus on identifying environmental problems related to the implementation of the plan and identifying actors involved.
Environmental Diagnosis Phase	Identify application points; carry out a survey of actions and measures necessary for planning, aiming to reduce negative points and increase positive effects. Develop an environmental report for public discussion.
Relevance, Trend and Implications	Analyze trends and implications in the planning process to produce transparent and comprehensive results at national, regional and local levels.
Identification of alternatives	Define strategic paths to achieve goals. Value the discussion of alternatives to planning.
Impact mitigation	Evaluate impacts dynamically and check alternatives for future improvement. Promote environmental enhancement measures for integration into strategic action.
Monitoring	Discuss the SEA report with stakeholders prior to decision making. Monitor SEA decisions and implementations in PPPs. Make monitoring results publicly available.

Source: adapted from Fischer (1999); OECD (2006); McCluskey, John (2011); Partidário (2012).

Chart 4 – SEA integration steps to urban planning and environmental planning to promote urban sustainability

Integration aspects	Description of integration aspects
Actors	Participation and interaction of different actors in the process of evaluation and preparation of plans.
Procedures	Integration of different procedural and approval requirements for urban planning licensing.
Contents	Integration of information, data and report content. Typically, the final report should cover all major urban planning, ecological planning and SEA content and highlight their shared parts.
Methodologies	Integration of urban and ecological planning approaches; approaches to economic and social evaluation.
Institutions	Definition of the organization to ensure integration; the exchange of information and possibilities for interventions between different sectors; defining duties and responsibilities of the actors involved.
Policies	Integration of sustainable development as a general guiding principle in planning and assessing the environmental impact of projects, integration of sectoral regulations; the integration of sectoral strategies; provisions of policy interventions to ensure mainstreaming.

Source: adapted from He et al. (2011).

The QCA was adopted as a rationale for the quantitative analysis of data referring to the SEA reports of municipal master plans carried out in different countries in the world (Rihoux; Ragin, 2008; Ragin, 2009). According to Schneider and Wagemann (2010), the QCA allows verifying causality relationships in the cross-analysis of data with a view to synthesizing data, verifying the consistency of data with the alleged relationships between sets, testing hypotheses and theories, providing a global view on assumptions of the analysis, develop new theoretical arguments and create empirical typologies. The QCA analysis offers the possibility of combining detailed qualitative analysis with systematic comparisons between cases, identifying patterns and deviations from these patterns (Legewie, 2013), also allowing, according to Varone, Rihoux and Marx (2006), the analysis between cases, intracases and between empirical reality and theoretical ideal-types.

Thus, the three steps of theoretical analysis were triangulated by document analysis and QCA analysis, in two phases: a) learning from the analyzed SEA cases; b) codification of learning outcomes based on urban planning through the QCA. As described by Ragin (2009), there are two main set variants to operationalize in QCA: csQCA sets which correspond to a conventional binary set with only two categories of information (0 or 1) and set theory in this variant (csQCA). that ramifies the notions of belonging or not belonging. An advantage of this binary analysis is the possibility of scaling different membership scores between partial

or complete (Ragin, 1987). Thus, in the analysis of the 17 SEA reports, 0 was attributed to those cases that did not meet the specified criteria and 1 to those that did.

The qualitative analysis of the content of SEA reports for municipal master plans was based on the framework discussed by Tshibangu and Montaña (2019) on the importance of procedural aspects and technical guidelines for the effectiveness of SEA implementation in Brazil to compose a framework of guidelines for the elaboration of the SEA of master plans.

This qualitative analysis also used the content of SEA reports from international municipal master plans to identify proposals for the main intersectoral policies contained in Brazilian master plans, as established in the Statute of Cities (Brasil, 2001): urban mobility, land use, energy, water resources, buildings, green areas, solid waste, housing, economic development and cultural development. According to Grangeiro et al. (2020), there is a lack of articulation between sectoral policies in the urban environment that affect their management. Thus, the lack of integration between environmental and urban issues has an impact on territorial management, as reinforced by Pizella (2015) the need for integration between sectoral activities that affect the urban territory. The last step of analysis refers to exploring, based on the results of the analyzed cases, evidence of the inclusion of the environmental dimension in master plans provided by the use of SEA. Thus, recommendations for the use of SEA applied to the master plan in the country can be discussed.

Analysis of the environmental dimension in international SEA cases

Table 1 presents the analysis of the SEA reports of the international master plans, according to the IAIA (2002) criteria established in Chart 2.

Table 1, considering the individual results of each SEA report, shows that all 17 SEA reports of the master plans meet more than half of the 12 performance criteria of the IAIA (2002). Of the 17 SEA reports, 11 meet more than 75% of the criteria, including two meeting the criteria in their entirety.

Table 1 – IAIA (2002) Performance Criteria Review of International Master Plans

Criteria	Items	Understanding the IAIA (2002) Criteria for analysing SEA studies	SEA Cases of Municipal Master Plans																	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Integrated	1	Do you consider a strategic decision with a view to sustainable development? has the environmental assessment of strategic decisions been applied?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17
	2	Does it present integration of environmental, social and economic aspects?	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	1	14
	3	Is it demonstrated how SEA addresses planning input?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17
Sustainability	4	Does it present an analysis of more sustainable alternatives, specifying criteria and methodology?	0	1	1	0	0	1	0	0	1	1	1	0	1	0	0	1	1	9
With focus	5	Is there a survey and analysis of the impacts with the implementation of the planning?	1	1	1	1	0	1	1	0	1	1	1	0	1	0	0	0	1	11
	6	Does it present considerations on sustainable development?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17
	7	Is there a clear relationship between the SEA and the decision-making process?	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	16
	8	Is there a survey of costs and duration for the implementation of activities?	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	4
Participative	13	Does it have an interested party involvement and participation in the SEA?	0	1	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	12
	14	Is the participatory analysis present in the documentation included in the SEA?	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	15
	15	Regarding language and clarity, does the document have easy understanding of the information, as well as availability for access by all interested parties?	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	16
Interactive	17	Check if there is an integrated assessment of the cumulative, synergistic and indirect impacts in the studies, considering the related plans.	1	1	1	0	1	1	0	0	1	1	1	1	1	1	1	0	1	13
Total			9	11	11	7	9	9	7	8	11	11	12	8	11	9	8	8	12	

Source: prepared by the authors, 2019.

Regarding the criteria and their respective items, it is observed that each of the five criteria is met by at least half of the SEA reports; regarding the items, only one item (item 8) is well below half of the attendance, but as it composes a criterion, this low attendance does not affect the composition of the criterion as a whole.

The results of the SEA analysis of transport plans and programs in Europe carried out by Fischer (2002) reached a similar level of service, while the SEA analysis of Brazilian transport plans carried out by Rizzo et al. (2017), a lower attendance close to 50%. Notwithstanding the limitations of universalizing these SEA good practice criteria to all SEA systems in different countries around the world that need to be adapted to this reality, they have successfully helped SEA practitioners in evaluating the effectiveness of SEA implementation, as discussed by Fischer and Gazolla (2006).

Thus, the analysis of these 17 SEA reports of master plans demonstrate that they meet most of the assumptions of good SEA practices and can provide evidence about the discussion of the integration of the environmental dimension in master plans supported by SEA.

Table 2 presents the analysis of the SEA steps observed in the analysis of the SEA of master plans, as established in Chart 3.

Table 2, considering the individual results of each SEA report, shows that with the exception of three reports (numbers 4, 5 and 12), all the other 14 SEA reports of the master plans meet more than half of five of the six steps, evaluated by binary quantitative analysis, of the expected structure for the SEA. Regarding

the steps, it is observed that each of the five of the six evaluated steps is considered in the performance of at least half of the SEA reports.

The SEA monitoring step is absent in almost half of the SEAs of the analyzed master plans. This step is necessary to obtain information about the implementation of urban planning and to carry out the evaluation of planned actions. This is considered a relevant step for the effectiveness of SEA in planning, since it allows transcending the theoretical perspective in relation to the implementation proposal, enabling the monitoring of planned actions (Morrison-Saunders; Arts, 2004). According to Jiricka-Pürner et al. (2021), the lack of monitoring compromises the learning effect of SEA and the effectiveness of the decision-making process itself, its presence strengthens the visibility of the decision-making process and communication between decision-makers and society. The impact mitigation step is the second most absent step in the analyzed SEA reports, in which some even foresee actions, but not in detail. For Thérivel and González (2020) highlight that the low efficiency of SEA in plans may be the result of not robustly considering mitigation measures, causing them to be ignored by planners and decision makers, compromising the effectiveness of SEA results.

Regarding the step of objectives and critical factors for the decision evaluated qualitatively, it is observed that the SEA reports cover a broad theme, with a higher prevalence of themes: biodiversity, urban mobility, water, air and climate factors. Thérivel and González (2020), Gallardo et al. (2023) and Nadruz et al. (2018) confirm the relevant role that SEA

Table 2 – Analysis of the steps that make up the SEA instrument in the SEA reports of the international Master Plans

Master Plan SEA Cases	Objectives and critical decision factors	SEA Steps					Total
		Environmental Diagnosis Phase	Relevance, Trend and Implications	Identification of alternatives	Impact mitigation	Monitoring	
1	biodiversity, soil; water, air and climate, energy, relevant assets, cultural heritage, panorama.	1	1	1	1	1	5
2	air quality; biodiversity, flora and fauna, climatic factors, cultural heritage, landscape, material heritage, population, water and soil.	1	1	0	1	1	4
3	housing function and human experience, environmental and cultural resources, mobility, energy and climate change, economic vitality and governance.	1	1	1	1	0	4
4	biodiversity, landscape and land use, solid waste management, water protection, climate change and energy efficiency.	1	0	0	0	0	1
5	water, biodiversity, pollution prevention, sustainable mobility, culture and identity, agriculture.	1	0	1	0	0	2
6	land use strategies; traffic management, solid waste infrastructure, urban economic and sociocultural power, adaptation to climate change, future expansion strategies.	1	1	1	0	0	3
7	territorial cohesion and mobility, ecological balance, equity and social cohesion and socioeconomic development	1	1	1	1	0	4
8	population and health, biodiversity, flora and fauna, soil, water, climate, relevant assets, cultural heritage and landscape.	1	1	1	0	1	4
9	air, climate factors, soil, water, biodiversity, relevant assets, efficiency, climate factors, soil, water, biodiversity, relevant assets, resource and waste efficiency, landscape, built environment and land use planning, archaeological and architectural cultural heritage, health and population and socioeconomic environment.	1	1	1	1	1	5
10	cultural identity, valorization of territorial resources, valorization of territorial resources, competitiveness, municipal organization and management, territorial planning, social cohesion and human potential.	1	1	1	1	0	4
11	population and human health, biodiversity, flora and fauna, air, climatic factors, water, transport and waste management, cultural heritage, landscape and soils.	1	1	1	1	1	5
12	ground; coastline, quality of life.	1	0	1	0	0	2
13	environment and landscape, quality of life, urbanism and mobility, generation of value and environmental risks and dysfunctions	1	1	1	1	1	5
14	biodiversity, flora and fauna, population, human health and quality of life, soil and geology, air and climate, water, relevant assets, cultural heritage and landscape	1	1	1	1	1	5
15	population, air and climate factors, biodiversity, cultural heritage, relevant assets.	1	1	1	1	0	4
16	air, climatic factors, soil, waste, population, heritage.	1	1	1	0	1	4
17	strategic urban development, environmental development, strategic-social economic development, cultural development, health, sports development.	1	1	1	1	1	5
Total		17	14	15	11	9	

Source: the authors.

plays in the incorporation of major themes on the global environmental agenda, such as biodiversity and climate change.

Table 3 shows the analysis of the six aspects proposed by He et al. (2011) to integrate urban planning and environmental planning to promote urban sustainability guided by the SEA of master plans, as set out in Chart 4.

Table 3, considering the individual results of each SEA report, shows that all 17 SEA reports of the master plans meet more than half of the

six aspects of integrating environmental issues in urban planning and more than half meet all aspects. Regarding the six aspects, it is observed that they are also considered in the preparation of more than half of the SEA reports and two aspects (procedures and policies) are present in all SEA reports. These results are consistent with those observed by Gallardo et al. (2017) demonstrating the role that SEA plays in the integration between urban planning and environmental planning.

Table 3 – Analysis of aspects of the integration of SEA to urban planning and environmental planning to promote urban sustainability in the master plans analyzed

Aspects for integrating the environmental dimension into the SEA of master plans								Total
Cases	Actors	Procedures	Content	Metodologias	Institutions	Policies		
1	Kinsale	1	1	1	0	0	1	4
2	South Kesteven	1	1	1	1	1	1	6
3	Lisboa	1	1	1	1	1	1	6
4	Prizren	1	1	0	0	0	1	3
5	Greenbelt	1	1	0	0	1	1	4
6	Gilgit	1	1	0	0	1	1	4
7	Seixal	0	1	1	1	0	1	4
8	Cork	0	1	0	1	1	1	4
9	Vasilikos	1	1	1	1	1	1	6
10	Barcelos	1	1	1	1	1	1	6
11	Dublin	1	1	1	1	1	1	6
12	Espinho	1	1	0	0	0	1	3
13	Tavira	1	1	1	1	1	1	6
14	Clare County	1	1	0	1	1	1	5
15	Belfast	1	1	0	1	0	1	4
16	Yerevan	1	1	1	1	1	1	6
17	Coquimbo	1	1	1	1	1	1	6
Total		15	17	10	12	12	17	

Source: the authors.

integration of SEA into master plans

Based on the analysis of the SEA reports of the master plans, worldwide, a summary of the main aspects identified that favor the integration of the SEA to the master plans is presented, as shown in Chart 5. This analysis is in line with what was discussed by

Tshibangu and Montaño (2019), as well as that highlighted by Montaño and Fischer (2018, p.1) on the proposition of “written guidelines” to contemplate, in addition to legal requirements, the promotion of instrument quality in a specific application situation. Malvestio and Montaño (2019) have also emphasized the need to provide a structured system, with clear SEA objectives to advance the effectiveness of its application in the country.

Chart 5 – Summary of lines of action, objectives, activities and potential benefits of including the environmental dimension in the master plan with the integration of the SEA into the national master plans

Lines of action		Objectives	Activities	Potential benefits with the inclusion of the environmental dimension in the master plan
1 ^o	Inclusion of the SEA structure for the development of Master Plan revisions	Ensure the inclusion of environmental issues in all the planning cycle of the master plan.	Implement the structural stages of the SEA in carrying out the Master Plan.	Master Plan considering strategic environmental issues in decision-making on the organization of urban and rural space and associated activities.
2 ^o	Insertion of the SEA methodology	Adapt the inclusion of the SEA methodology in the Master Plan, according to the stages of: Objectives and Critical Decision Factors; Identification of alternatives; Monitoring. Insert the missing steps in the instrument: Environmental Diagnosis Phase; Relevance, Trend and Implications; Impact mitigation.	Carry out a preliminary study of the needs of each Strategic sector of the Municipality based on the 6 methodological factors of SEA application.	Elaboration in a participatory way of the guidelines for each Strategic objective of the PDE. With insertion of environmental concerns in the methodological and evaluative phases of the SEA.
3 ^o	Insert the SEA performance criteria	Guide the development of SEA processes with a focus on IAIA guidelines.	Implement the SEA performance criteria in the analysis of alternatives.	Incorporate sustainable issues into the alternative analysis process to ensure a guided and democratic decision-making process.
4 ^o	Evaluation of sustainable alternatives for municipal urban development policy	Maximize the existing alternatives in the PDE that make up positive effects for growth and urban development. Adapt new objectives to meet sustainable issues, meeting the needs of the Municipality to enable the development and implementation of sectoral Plans for municipal development.	Prior study of the needs of each strategic area of the Municipality together with public participation, reviewing the alternatives and proposing new sustainable alternatives.	Report of previous sectorial studies, with suggestions for reassessments or creation of Municipal Laws, as well as adaptive proposals for alternative actions with a sustainable nature for the impacts of each alternative, with the aim of obtaining the most appropriate option in terms of use of environmental resources, including verification of economic impacts and socio-cultural aspects.
5 ^o	Incorporate SEA integrative issues	Adapt the SEA variables to the plan at all stages of plan review.	After the structure and methodology implementation phases, the steps must be reassessed according to criteria for integrating actors, procedures, content, methodology, institutions and policies.	Ensure the integration of the SEA to the Master Plan. With a review of all the initial stages of the instrument, verifying compliance with key aspects for SEA in urban planning. Verify and guarantee in the previous steps the obtaining and participation of different actors in the evaluation process and plan elaboration, integrating the approaches, information, data and content of reports, defining duties and responsibilities of the actors involved and promoting the integration with sectorial regulations.
6 ^o	Insert instruments to induce urban development	Ensure the implementation of the objectives of the strategic master plan through regulatory instruments.	Training for municipal employees and insertion of inspections to develop and implement all the objectives of the instrument.	Hold meetings with all municipal administration bodies to incorporate SEA into processes. Training and Development of municipal employees regarding the objectives of the plan and its proposals based on the SEA. Incorporation of follow-up reports on the actions carried out and supervision of the sectors involved.
7 ^o	Insert monitoring step	Ensure the continuous evaluation of the SEA steps included in the PDE.	Develop monitoring actions to identify the need to change or correct the actions provided for in the instrument, including in the monitoring phase.	Evaluate and supervise the quality of the information regarding the monitoring phase to identify changes or corrections to the measures established in the previous steps.

Source: the authors.

The points identified in Chart 5 are in line with those established by Fabbro Neto and Souza (2009), who reinforced the need to carry out the SEA during the revision of the municipal master plan as a way to increase the participation of the actors and support their points of view in the discussion of the ecological consequences resulting from the urban development actions, also presenting several additional elements that can reinforce this. The structural and systematic integration of the SEA in the construction of master plans is also in line with what was discussed by Gallardo et al. (2017), Amaral et al. (2022) and He et al. (2011), allowing to reap the potential benefits of environmental integration in the urban planning agenda, materialized by master plans. The importance of the SEA monitoring stage is reinforced, according to Partidário and Arts (2005), which aims to manage the implementation of planning processes, or on the implementation of decisions at a strategic level.

The SEA instrument aims to subsidize the construction of the master plan considering the environmental theme, but also in a strategic perspective, as recommended by Ultramari and Rezende (2008), in terms of the most current view of public administration. Likewise, the systematic use of the SEA allows including socio-environmental issues in the territorial planning processes, as recommended by Lima et al. (2019) to face the challenges of urban management and environmental planning.

Chart 6 considers how the main intersectoral policies oriented to be considered in Brazilian master plans, as established in the

Statute of Cities (Brasil, 2001), are present in the SEA reports of international master plans. Table 10 highlights some of the main proposals or objectives for these same intersectoral policies presented in these SEA reports.

Chart 6 shows that, considering the set of SEA reports analyzed, intersectoral policies as recommended by national policy (Brasil, 2001) are also considered in international master plans, with some of them having a high or total presence in the considered sample, such as green spaces, cultural diversity and urban mobility. This corroborates the analysis carried out on the validity of the contributions of this set of SEA reports analyzed for national practice.

Chart 7, in turn, details that for intersectoral policies that are relevant to the construction of master plans in the country, the use of SEA to guide master plans guarantees the transversality of the environmental theme between them. For example, policies that are not directly linked to environmental issues, such as economic development, present proposals related to it, such as renewable energy, sustainable consumption, sustainable food and recovery of degraded environments. It is also possible to consider that there is synergy among policies with strong adherence to the environmental theme, as can be seen if the policies for green spaces, water resources and land use are analyzed in an integrated manner. Intersectoral policies that are closely integrated with territorial management and sectoral management such as housing, buildings, energy and urban mobility present

Chart 6 – Main intersectoral policies that appear in the SEA reports of international municipal master plans

Master Plan SEA Cases		Urban mobility	Land use	Energy	Water resources	Constructions	Green spaces	Solid waste	Housing	Economic development	Cultural development
1	Kinsale	x	x	x	x		x	x			x
2	South Kesteven	x	x	x	x	x	x				
3	Lisboa	x	x	x	x		x		x	x	x
4	Prizren	x	x	x	x		x	x			x
5	Greenbelt	x		x	x	x	x	x		x	x
6	Gilgit	x	x	x	x			x	x	x	x
7	Seixal	x	x				x			x	x
8	Cork	x	x		x	x	x				x
9	Vasilikos	x	x	x	x	x	x	x		x	x
10	Barcelos	x	x			x	x		x	x	x
11	Dublin	x	x	x	x		x	x			x
12	Espinho	x		x	x	x	x		x	x	x
13	Tavira	x	x	x	x	x	x	x		x	x
14	Clare County	x		x	x		x	x	x		x
15	Belfast	x	x		x		x	x	x	x	x
16	Yerevan	x	x		x		x	x	x	x	x
17	Coquimbo	x				x	x	x	x	x	x

Source: the authors, in 2019.

Chart 7 – Main proposals or objectives for intersectoral urban policies identified in the master plan SEA reports

Urban mobility	<ul style="list-style-type: none"> Promote sustainable and integrated mobility by reducing dependence on cars and encouraging the use of public transport, bicycle paths and walks. Develop and improve the road network and public transport, favoring intermodality, connectivity between urban areas and accessibility on the road network. Mitigation and adaptation to climate change, including risk management, air quality and noise reduction. Maximize sustainable modes of transport and provide ease of movement for all users, encouraging sustainable mobility. Evaluate the evolution of the transport network, the articulation of intermodal functions and trends in modal transfer, in view of parking control mechanisms and the quality of the offer of transport alternatives. Improve transportation and engineering infrastructure to ensure air quality, reduce greenhouse gases and protect road safety.
Land Use	<ul style="list-style-type: none"> Conservation and restoration of land cover to maintain its ecological functional capacity. Reduction of soil contamination and preservation of its quality to ensure its environmental, social and cultural functionality. Improvement of the planning structure and territorial integration of the urban environment to ensure the functional sufficiency and sustainability of territorial development. Identification and sustainable use of natural resources such as sand and building materials and optimization of the use of irrigated agricultural land. Planned territorial development and increased efficiency of urban land use to ensure adequate supply of urban services and facilities. Prevention of the occupation of contaminated areas and establishment of conditions for the relocation of risky activities in areas of non-contaminated soil and water.
Energy	<ul style="list-style-type: none"> Use of renewable resources, such as wind and hydropower, with a view to reducing dependence on fossil fuels and mitigating environmental impacts; Monitoring the energy efficiency of public spaces, as well as the management of supply systems, with the aim of promoting the rational use of energy; Promotion of renewable energy technology, with incentives for its use at home and in small businesses; Assessment of the potential for promoting energy efficiency and the use of renewable energy sources, taking into account the territorial vulnerability to extreme meteorological phenomena and the adaptation mechanisms to climate change; Minimize all forms of air pollution, as well as promote energy conservation in all sectors; Promotion of trade development and low-carbon buildings; Combat climate change by promoting energy-efficient layouts and buildings and encourage the use of renewable energy sources Implementation of sustainable urban plans that anticipate the effects of climate change; Recognize the threat posed by climate change and improve preparedness and capacity to respond to its impacts, including limiting greenhouse gas emissions from oil consumption and promoting alternative sources of energy.
Water resources	<ul style="list-style-type: none"> Adoption of sustainable practices in the management of water resources, with emphasis on the rational and efficient use of water and reduction of pollution; Improvement of water quality in rivers, lakes, coastal and underground waters, through planning, implementation of measures and prevention of contamination; Protection and restoration of aquatic ecosystems and reduction of the impact of polluting substances; Ensure universal access to safe drinking water and upgrade infrastructure to meet future needs; Implementation of sustainable urban drainage systems to minimize impacts on the quality and quantity of groundwater; Assessment of the quality of water resources and infrastructure in urban areas; Implementation of infrastructure reconstruction projects for sewage treatment and cleaning of river and lake beds; Protection and cleaning of reservoirs, lakes and coastal strips to maintain quality and preserve aquatic ecosystems.
Constructions	<ul style="list-style-type: none"> Encourage high-performance buildings; Ensure the successful integration of new residential development areas into existing residential areas; Consider sustainability factors when planning industrial areas; Promote the sustainable development of new infrastructure to serve the future population of the city; Preserve and promote the public use of historical heritage; Ensure infrastructure management, upgrade existing public spaces and increase ecological connectivity; Evaluate existing illegal constructions; Protect the environment, natural and built landscapes.
Green spaces	<ul style="list-style-type: none"> Promote the conservation and restoration of ecosystems and green spaces, including forests and landscapes, through actions such as planting forests and protecting areas vulnerable to natural disasters. Protect habitats and species, including marine, aquatic, flora and fauna biodiversity, through strategic coastal management and identification of opportunities for new habitats and wildlife zones. Minimize the emission of greenhouse gases and conserve elements of the city's landscape. Protect and restore terrestrial and marine ecosystems and species, effectively implementing maritime spatial planning and integrated coastal management in coastal zones. Develop, regenerate and revitalize urban areas, assessing the enhancement and safeguarding of natural values, in particular in protected areas. Increase the number of green spaces and amenities available to the public by protecting, conserving and enhancing the diversity and integrity of the wide range of habitats, species and wildlife corridors, as well as other nature conservation sites, eliminating threats to biodiversity, including invasive species, and promoting green infrastructure, including riparian zones and wildlife corridors.
Solid waste	<ul style="list-style-type: none"> Reduction in the generation of solid waste and minimization of the volume produced, with a sustainable approach to waste management, including recycling and the proper location of sanitary landfills. Improvement of solid waste management in the municipality, through the adoption of good management practices, including reuse, recycling and other forms of recovery. Prevention and minimization of pollution caused by industrial waste and other uses and activities, ensuring a high level of environmental protection. Implementation of the waste pyramid, encouraging the reuse and recycling of materials whenever possible, as well as the assessment of urban areas to ensure that they are served by the basic network of adequate infrastructure.
Housing	<ul style="list-style-type: none"> Promote the improvement of the population's living conditions and the modernization of housing through strategies that consider the dynamics of the real estate sector, demographic trends and the quality of the housing supply. Develop industries with environmentally sustainable practices and exclude the expansion of industrial zones, in addition to redesigning or removing agricultural facilities from urban areas. Identify resettlement requirements and provide appropriate strategies for affected populations in order to reduce the urbanization gap in the rural sector and promote community decentralization. Maximize the sustainable reuse of the existing built environment, including derelict, disused and local sites, to provide opportunities for good quality housing and meet the housing needs of the population.
Economic development	<ul style="list-style-type: none"> Establish a business center with databases of resources to support entrepreneurs; Offer training in energy management, renewable energies and sustainable consumption for small and medium-sized companies; Evaluate the capacity for social inclusion, attraction of new investments and production of knowledge in the region; Support local agriculture and sustainable food production; Promote sustainable production and consumption and improve quality of life; Reclassify reception spaces and control the dispersion of industrial activities inside and outside the urban system; Offer qualified spaces dedicated to economic activities; Value the region's agricultural areas.
Cultural development	<ul style="list-style-type: none"> Conceive a strategy to safeguard and enhance the natural and built heritage, as well as the preservation of rural areas as a cultural and landscape identity. Promote tourist attractiveness around identity values, protecting, rehabilitating, valuing and promoting historical and cultural heritage. Evaluate the municipality's cultural dimension, including the appreciation of cultural, architectural, archaeological and intangible heritage, as well as the social dimension of culture through the potential for integration of immigrants as a multicultural differentiation factor, identifying places of cultural value, nature, conservation and recreational importance that require protection and development; Recognize the religious, ethnic and sociocultural diversity of the city, and rescue the community's original ethnic groups; Protect, conserve and enhance natural and built landscape with views of local value and touristic features, and enhance residents' skills and education by providing accessible, high-quality lifelong learning opportunities.

Source: the authors.

proposals that highlight the environmental theme as proactive measures for the recovery of environmental liabilities ("sustainable reuse of the existing built environment, including abandoned sites" in housing, for example) environmental preservation ("increasing ecological connectivity" in buildings, for example) and optimization of natural resources ("maximizing sustainable modes of transport in urban mobility, for example). Such a view is consistent with that discussed by Lima et al. (2019) for the preparation of master plans for Brazilian cities, which given the accelerated transformation process has been demanding dynamic planning, with integration among sectoral plans in a holistic view.

It can be considered from the analysis of Charts 6 and 7 that the international master plans, oriented with the SEA subsidies, consider proposals or have objectives that encourage the efficient use of natural resources, the preservation of ecosystems, the reduction of environmental impacts and the promotion of the quality of life of the population. Topics such as renewable energies, sustainable use of water resources, greenhouse gas emissions, adaptation to climate change, biodiversity, integrated waste management, among others relevant to the environmental area, are present in more than one intersectoral policy, denoting potential for synergy among themselves. This integrated vision based on sustainable development is in line with what was highlighted by He et al. (2011) as an essential principle in the development of municipal master plans.

Thus, it can be considered that the main actions or objectives for intersectoral urban policies identified in the SEA reports of the international master plans have been

directed towards the promotion of sustainable development, as reinforced by He et al. (2011) for making master plans and reinforced by Lima et al. (2019) for the national context.

Final considerations

The SEA has been used in several municipalities around the world (more than 90 countries use it regularly) to prepare their master plans as an instrument to support decision-making characterized by a broad, participatory, strategic and integrative process of the environmental theme in urban planning.

The good SEA practices found in most cases of SEA reports for master plans denote the flexibility of the instrument to perform adequately, and consequently reap potential benefits, in a wide range of decision-making and planning contexts for the elaboration of master plans in municipalities in different locations, in different socio-environmental and planning conditions.

The identification of good practices, standardization of steps, integration between urban planning and environmental planning found in the cases of SEA of international master plans studied corroborate intrinsic and systemic characteristics of the instrument that allow considering benefits associated with its systematic use.

It can be considered that the inclusion of the environmental dimension in the elaboration of master plans is made possible using the SEA, in an integrated and synergistic way. The resources inherent to the use of the SEA instrument support the integration of the environmental dimension in the context

of making the master plan, regardless of the planning characteristics and decision-making contexts. As it is a widely used and tested instrument, with objective evaluation metrics, it allows achieving its objective of including the environmental theme in planning, as can be seen in the analyzed cases, which, due to their diversity, allow recommendations for the application of SEA in the country.

Thus, in line with Brazilian municipalities, such as São Paulo and Niterói, which advocate the use of the instrument in carrying out their master plans, it is recommended that this guideline be internalized to other municipalities in the country. This recommendation is based on the instrument's potential to allow the environmental theme to be discussed transversally among the intersectoral policies that make up the master plan of Brazilian municipalities, adding technical knowledge with public participation.

The analysis of SEA cases from international master plans also revealed weaknesses in the use of the instrument, such as aspects related to costs and deadlines and little emphasis on monitoring plans after approval. These limitations cannot be generalized due to

the scope of the study, but expose aspects that must be improved to maximize the benefits associated with the use of SEA in this context.

Although the lines of action discussed in this work for the incorporation of SEA in the preparation and revision of municipal master plans are still preliminary, they tend to value the potential benefits of its use to optimize the internalization of the environmental variable in master plans in the country.

As it is a theoretical proposal, based on external practice compared to the national context, it needs to be tested to demonstrate its viability. It is considered that urban planning, due to the complex processes of urbanization and occupation of space and its interfaces with the socio-environmental theme, is a promising field for SEA to become a mandatory instrument. The systematic use of SEA in master plans may strengthen the premises of the Statute of Cities, given the strategic scope of this national urban policy and this decision-making support instrument.

It is recommended that future studies can detail and/or adjust the lines of action proposed for carrying out the SEA in line with a flow of elaboration of a municipal master plan.

[I] <https://orcid.org/0000-0001-7797-3247>

Universidade Nove de Julho, Programa de Pós-Graduação em Cidades Inteligentes e Sustentáveis.
São Paulo, SP/Brasil
debora87mm@gmail.com

[II] <https://orcid.org/0000-0002-5169-997X>

Universidade Nove de Julho, Programa de Pós-Graduação em Cidades Inteligentes e Sustentáveis.
São Paulo, SP/Brasil.
Universidade de São Paulo, Escola Politécnica. Departamento de Engenharia Hidráulica e Ambiental.
São Paulo, SP/Brasil.
amarilislcgallardo@gmail.com

[III] <https://orcid.org/0000-0002-1961-2037>

Universidade Federal de São Paulo, Escola Paulista de Política, Economia e Negócios, Departamento Acadêmico de Administração, Osasco, SP/Brasil
Universidade São Judas, Mestrado Profissional em Engenharia Civil, São Paulo, SP/Brasil
kniesscl@gmail.com

Acknowledgments

Amarilis Lucia Casteli Figueiredo Gallardo gratefully acknowledges FAPESP, grant Fapesp 2023/14.497/6, grant Fapesp 2024/01097-2, Foundation for Research Support of the State of São Paulo (Fapesp), and CNPq, grant CNPq 306419/2023-8, Brazilian National Council for Scientific and Technological Development
Cláudia Terezinha Kniess also thanks CNPq, grant CNPq 306244/2020-9.

References

- AMARAL, G. V., SANTOS, M. H. C. D., GALLARDO, A. L. C. F.; SIQUEIRA-GAY, J. (2022). Avaliação ambiental estratégica e projetos de intervenção urbana: integração das questões ambientais estratégicas no planejamento urbano de São Paulo. *Anais*. Blumenau, v. 19, n. 1, pp. 1-34. Disponível em: https://repositorio.usp.br/directbitstream/48299ae4-cbf2-4227-8dcc-550fe0c38409/Avalia%C3%A7%C3%A3o_Ambiental_Estrat%C3%A9gica_e_Projetos_de_Interven%C3%A7%C3%A3o_Urbana_integra%C3%A7%C3%A3o_das_quest%C3%B5es_ambientais_estrat%C3%A9gicas_no_planejamento_urbano_de_S%C3%A3o_Paulo.pdf. Acesso em: 26 ago 2024.
- BARCELOS (2015). *Plano Diretor Municipal de Barcelos: Avaliação Ambiental Estratégica*. Disponível em: <https://www.cm-barcelos.pt/wp-content/plugins/download-attachments/includes/download.php?id=11238>. Acesso em: 8 ago 2019.

- BELFAST (2017). The Belfast Agenda Community Plan for Belfast: Strategic Environmental Assessment. Disponível em: <https://www.belfastcity.gov.uk/nmsruntime/saveasdialog.aspx?IID=33488&SID=1644>. Acesso em: 9 ago 2019.
- BRASIL (1988). *Constituição da República Federativa do Brasil*. Disponível em: http://www.planalto.gov.br/ccivil_03/Constituicao/Constituicao.htm. Acesso em: 2 maio 2018.
- _____. (2000). *Lei n. 11.520*, de 3 de agosto. Institui o Código Estadual do Meio Ambiente e estabelece normas para a proteção, preservação e recuperação do meio ambiente no Estado do Rio Grande do Sul. Disponível em: <http://www.al.rs.gov.br/filerepository/repLegis/arquivos/LEI%2011520.pdf>. Acesso em: 28 abr 2023.
- _____. (2001). *Lei Federal n. 10.257*, de 10 de julho. *Estatuto da Cidade*. Regulamenta os arts. 182 e 183 da Constituição Federal, estabelece diretrizes gerais da política urbana e dá outras providências. Disponível em: http://www.planalto.gov.br/ccivil_03/Leis/LEIS_2001/L10257.htm. Acesso em: 2 maio 2018.
- _____. (2007). *Decreto n. 44.820* de 20 de julho. Regulamenta a Lei n. 11.520, de 3 de agosto de 2000. Institui o Código Estadual do Meio Ambiente. Porto Alegre, RS, Governo do Estado do Rio Grande do Sul.
- _____. (2010). *Lei Complementar n. 646* de 9 de dezembro. Institui o Plano Diretor de Desenvolvimento Urbano Ambiental de Porto Alegre e dá outras providências. Porto Alegre, RS, Câmara Municipal de Porto Alegre.
- _____. (2019). *Lei n. 11.181* de 5 de dezembro. Dispõe sobre o Plano Diretor de Belo Horizonte e dá outras providências. Belo Horizonte, MG, Prefeitura de Belo Horizonte.
- CAPE, L. et al. (2018). Exploring pluralism—Different stakeholder views of the expected and realised value of strategic environmental assessment (SEA). *Environmental Impact Assessment Review*, v. 69, pp. 32-41.
- CELLARD, A. (2008). “A análise documental”. In: POUPART, J. et al. *A pesquisa qualitativa: enfoques epistemológicos e metodológicos*. Petrópolis, Vozes, v. 295, pp. 2010-2013.
- CLARE COUNTY (2017). *Clare County Development Plan 2017-2023*. Disponível em: <https://www.clarecoco.ie/services/planning/publications/clare-county-development-plan-2017-2023-volume-1-written-statement-24125.pdf>. Acesso em: 9 ago 2019.
- COQUIMBO (2017). *Evaluación ambiental estratégica: plan regional de ordenamiento territorial*. Disponível em: <https://eae.mma.gob.cl>. Acesso em: 8 ago 2019.
- CORK (2015). *Development Plan Cork City Council 2015-2021*. Disponível em: <https://www.corkcity.ie/en/council-services/services/planning/development-plan/city-development-plan.html>. Acesso em: 10 ago 2019.
- COSTA, H. A.; BURSZTY, N. M. A. A.; NASCIMENTO, E. P. D. (2009). Participação social em processos de avaliação ambiental estratégica. *Sociedade e Estado*. Brasília, v. 24, n. 1, pp. 89-113.
- CRESPO, B. R. M.; RAIMUNDO, M. R. (2018). Discussão de alternativas nos processos de Avaliação Ambiental Estratégica em Minas Gerais. *Geociências*, v. 37, n. 4, pp. 909-920.
- DE MONTIS, A. et al. (2014). SEA effectiveness for landscape and master planning: An investigation in Sardinia. *Environmental Impact Assessment Review*, v. 47, pp. 1-13.
- FABBRO NETO, F.; SOUZA, M. P. D. (2009). Avaliação Ambiental Estratégica e desenvolvimento urbano: contribuições para o Plano Diretor Municipal. *Revista Minerva*, v. 6, n. 1, pp. 85-90.

- FISCHER, T. B. (1999). Benefits arising from SEA application – a comparative review of North West England, Noord-Holland, and Brandenburg-Berlin. *Environmental Impact Assessment Review*, v. 19, n. 2, pp. 143-173.
- _____. (2002). Strategic environmental assessment performance criteria—the same requirements for every assessment?. *Journal of Environmental Assessment Policy and Management*, v. 4, n. 1, pp. 83-99.
- _____. (2007). Theory & practice of SEA: towards a more systematic approach. London, Earthscan.
- FISCHER, T. B.; GAZZOLA, P. (2006). SEA effectiveness criteria – equally valid in all countries? The case of Italy. *Environmental Impact Assessment Review*, v. 26, n. 4, pp. 396-409.
- GALLARDO, A. L. C. F.; BOND, A. (2023). Delivering an analytical framework for evaluating the delivery of biodiversity objectives at strategic and project levels of impact assessment. *Environmental Impact Assessment Review*, v. 99, p. 107049.
- _____. (2024). Tiering biodiversity issues from strategic environmental assessment to environmental impact assessment: exploring documentary evidence from Brazil and England. *Impact Assessment and Project Appraisal*, v. 42, n. 3, pp. 1-13.
- GALLARDO, A. L. C. F.; DUARTE, C. G.; DIBO, A. P. A. (2016). Strategic environmental assessment for planning sugarcane expansion: a framework proposal. *Ambiente & Sociedade*, v. 19, n. 2, pp. 67-92.
- GALLARDO, A. L. C. F.; MACHADO, D. M. M.; KNISS, C. T. (2021). Avaliação Ambiental Estratégica na Pesquisa Acadêmica Brasileira. *Ambiente & Sociedade*, v. 24, e00223.
- GALLARDO, A. L. C. F.; SANTOS, C. A.; BOND, A.; MORETTO, E. M.; MONTAÑO, M.; ATHAYDE, S. (2022). Translating best practice principles into criteria for evaluating the consideration of biodiversity in SEA practice. *Impact Assessment and Project Appraisal*, v. 40, n. 5, pp. 437-449.
- GALLARDO, A. L. C. F.; SIQUEIRA-GAY, J.; RAMOS, H. R. (2017). Contribuições da Avaliação Ambiental Estratégica à gestão urbana. In: ENANPUR. *Anais*. Natal, v. 17, n. 1.
- GILGIT (2014). *Master Plan for Gilgit City*. Disponível em: <http://api.commissierner.nl/docs/mer/diversen/pos722-sea-masterplan-gilgitcity.pdf>. Acesso em: 10 ago 2019.
- GRANGEIRO, E. L. D. A.; RIBEIRO, M. M. R.; MIRANDA, L. I. B. D. (2020). Integração de políticas públicas no Brasil: o caso dos setores de recursos hídricos, urbano e saneamento. *Cadernos Metrópole*. São Paulo, v. 22, pp. 417-434.
- GREENBELT (2013). *Canada's Capital Greenbelt Master Plan*. National Capital Commission. Disponível em: <http://ncc-ccn.gc.ca/our-plans/greenbelt-master-plan>. Acesso em: 10 ago 2019.
- HADDAWAY, N. R. et al. (2015). The role of Google Scholar in evidence reviews and its applicability to grey literature searching. *PLOS ONE*, v.10, n. 9, e0138237.
- HE, J. et al. (2011). Framework for integration of urban planning, strategic environmental assessment and ecological planning for urban sustainability within the context of China. *Environmental Impact Assessment Review*, v. 31, n. 6, pp. 549-560.
- JIRICKA-PÜRRER, A.; WANNER, A.; HAINZ-RENETZEDER, C. (2021). Who cares? Don't underestimate the values of SEA monitoring! *Environmental Impact Assessment Review*, v. 90, 106610.
- KINSALE (2009). *Kinsale Development Plan 2009-2015. Strategic Environmental Assessment and Appropriate Assessment*. Disponível em: <https://corkcoco-plans.ie/wp-content/uploads/bsk-pdf-manager/2016/07/KINSALE-DEV-PLAN-VOL-1-Survey-and-Analysis.pdf>. Acesso em: 8 ago 2019.

- LANGLEY, A. (1999). Strategies for theorizing from process data. *Academy of Management Review*, v. 24, n. 4, pp. 691-710.
- LEDDA, A. et al. (2021). Integrating adaptation to climate change in regional plans and programmes: The role of strategic environmental assessment. *Environmental Impact Assessment Review*, v. 91, 106655.
- LEGEWIE, N. (2013). An introduction to applied data analysis with qualitative comparative analysis. In: *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, v. 14, n. 3.
- LIMA, S. M. S. A.; LOPES, W. G. R.; FAÇANHA, A. C. (2019). Desafios do planejamento urbano na expansão das cidades: entre planos e realidade. *Revista Brasileira de Gestão Urbana*, v. 11, pp. 1-16.
- LISBOA (2012). *Plano Director Municipal de Lisboa*. AAE DO PDM DE LISBOA. Disponível em: <http://www.cm-lisboa.pt/viver/urbanismo/planeamento-urbano/plano-diretor-municipal/pdm-em-vigor>. Acesso em: 9 ago 2019.
- MALVESTIO, A. C.; MONTAÑO, M. (2019). From medicine to poison: how flexible strategic environmental assessment may be? Lessons from a non-regulated SEA system. *Impact Assessment and Project Appraisal*, v. 37, n. 5, pp. 1-15.
- MARICATO, E. (2000). “As ideias fora do lugar e o lugar fora das ideias: planejamento urbano no Brasil”. In: ARANTES, O.; VAINER, C.; MARICATO, E. *A cidade do pensamento único: desmanchando consensos*. Rio de Janeiro, Vozes.
- MARTINS, M. L. R. (2011). São Paulo, centro e periferia: a retórica ambiental e os limites da política urbana. *Estudos Avançados*, v. 25, n. 71, pp. 59-72.
- McCLUSKEY, D.; JOÃO, E. (2011). The promotion of environmental enhancement in Strategic Environmental Assessment. *Environmental Impact Assessment Review*, v. 31, n. 3, pp. 344-351.
- MILNER-GULLAND, E. J. et al. (2021). Four steps for the Earth: mainstreaming the post-2020 global biodiversity framework. *One Earth*, v. 4, n. 1, pp. 75-87.
- MONTAÑO, M.; SOUZA, M. P. (2015). Impact assessment research in Brazil: achievements, gaps and future directions. *Journal of Environmental Assessment Policy and Management*, v. 17, n. 1, 1550009.
- MONTAÑO, M; FISCHER, T. B. (2019). Towards a more effective approach to the development and maintenance of SEA guidance. *Impact Assessment and Project Appraisal*, v. 37, n. 2, pp. 97-106.
- MONTEIRO, M. B.; PARTIDÁRIO, M. R. (2017). Governance in Strategic Environmental Assessment: Lessons from the Portuguese practice. *Environmental Impact Assessment Review*, v. 65, pp. 125-138.
- MORGAN, R. K. (2012). Environmental impact assessment: the state of the art. *Impact Assessment and Project Appraisal*, v. 30, n. 1, pp. 5-14.
- MORRISON-SAUNDERS, A.; ARTS, J. A. (2004) Exploring the dimensions of EIA follow-up. In: IAIA'04 Impact Assessment for Industrial Development Whose Business Is It? In: 24TH ANNUAL MEETING OF THE INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT. Vancouver, Canadá.
- NADRUZ, V. N. et al. (2018). Identifying the missing link between climate change policies and sectoral/ regional planning supported by Strategic Environmental Assessment in emergent economies: lessons from Brazil. *Renewable and Sustainable Energy Reviews*, v. 88, pp. 46-53.
- NITERÓI (RJ) – Secretaria de Urbanismo e Mobilidade (2024). *Plano Diretor de Niterói*. Niterói/RJ: Prefeitura Municipal de Niterói. Disponível em: <https://urbanismo.niteroi.rj.gov.br/planodiretor.html>. Acesso em: 26 ago 2024.

- NITZ, T., BROWN, A. L. (2001). SEA must learn how Policy Making works. *Journal of Environmental Assessment Policy AND Management*, n. 3, pp. 329-342.
- NOBLE, B., NWANEKEZIE, K. (2017). Conceptualizing strategic environmental assessment: Principles, approaches and research directions. *Environmental Impact Assessment Review*, v. 62, pp. 165-173.
- OCDE – Organização para Cooperação e Desenvolvimento Econômico (2006). Regards sur l'éducation: les grandes lignes. organisation de coopération et de Développement Économiques.
- OVERGAARD, K. R. (2004). Planning methods. Road engineering for development. *Spon Press*. London, UK, pp. 92-113.
- PAEZ, A. (2017). Gray literature: An important resource in systematic reviews. *Journal of Evidence-Based Medicine*, v. 10, n. 3, pp. 233-240.
- PARTIDÁRIO, M. D. R. (2007). Guia de boas práticas para Avaliação Ambiental Estratégica – orientações metodológicas. *Agência Portuguesa do Ambiente. Lisboa*.
- _____. (2012). Guia de melhores práticas para Avaliação Ambiental Estratégica – orientações metodológicas para um pensamento estratégico em AAE. *Agência Portuguesa do Ambiente. Lisboa*.
- PARTIDÁRIO, M. R.; ARTS, J. (2005). Exploring the concept of strategic environmental assessment follow-up. *Impact Assessment and Project Appraisal*, v. 23, n. 3, pp. 246-257.
- PFEIFFER, P. (2000). *Texto para discussão 37: planejamento estratégico municipal no Brasil: uma nova abordagem*. Textos para Discussão e Ensaios da Enap.
- PIZELLA, D. G.; SOUZA, M. P. (2015). O uso da Avaliação Ambiental Estratégica nas decisões sobre cultivos transgênicos no Brasil. *Desenvolvimento e Meio Ambiente*, 33.
- PRIZREN (2012). Prizren Municipal Development Plan 2025 Strategic Environmental Assessment (SEA) Report (draft). Municipal Spatial Planning Support Programme in Kosovo. Disponível em: https://unhabitat-kosovo.org/un_habitat_documents/strategic-environmental-assessment-sea-for-municipal-development-plan-mdp-of-prizren/. Acesso em: 9 ago 2019.
- RAGIN, C. (1987). *The comparative method: moving beyond qualitative and quantitative strategies*. Berkeley, University of California Press.
- _____. (2009). Qualitative comparative analysis using fuzzy sets (fsQCA). Configurational comparative methods: Qualitative comparative analysis (QCA) and related techniques. *Sage Publications*, California, v. 51, pp. 87-121.
- REZENDE, D. A. (2009). Planejamento estratégico municipal: projeto de planejamento e de política pública de um município brasileiro. *Planejamento e políticas públicas*, v. 1, n. 32, pp. 173-204.
- REZENDE, D. A.; ULTRAMARI, C. (2007). Plano diretor e planejamento estratégico municipal: introdução teórico-conceitual. *Revista de Administração Pública*, v. 41, n. 2, pp. 255-272.
- RIHOX, B.; RAGIN, C. C. (2008). Configurational comparative methods: Qualitative comparative analysis (QCA) and related techniques. *Sage Publications*. California, v. 51.
- RIZZO, H. B.; GALLARDO, A. L. C. F.; MORETTO, E. M. (2017). Avaliação ambiental estratégica e planejamento do setor de transportes paulista. *Engenharia Sanitária e Ambiental*, v. 22, pp. 1085-1094.
- SADLER, B.; VERHEEM, R. (1996). Strategic environmental assessment 53: status, challenges and future directions. Ministry of Housing, Spatial Planning and the Environment of the Netherlands.

- SÁNCHEZ, L. E. (2017). Por que não avança a avaliação ambiental estratégica no Brasil? Instituto de Estudos Avançados da Universidade de São Paulo. v. 31, n. 89, pp. 167-183.
- SÁNCHEZ, L. E.; CROAL, P. (2012). Environmental impact assessment, from Rio-92 to Rio+ 20 and beyond. *Ambiente & Sociedade*, v. 15, n. 3, pp. 41-54.
- SANTOS, S. M.; GALLARDO, A. L. C. F. (2024). AAE no planejamento e gestão dos recursos hídricos: uma visão geral da literatura científica internacional. *Revista de Gestão de Água da América Latina*, v. 21, pp. 1-16.
- SÃO PAULO (1994). Secretaria do Meio Ambiente do Estado de São Paulo. Resolução SMA 44/94. Disponível em: https://www.cetesb.sp.gov.br/licenciamento/documentos/2008_Res_SMA_44.pdf. Acesso em: 1º maio 2023.
- _____. (2014a). Plano Diretor Estratégico do Município de São Paulo: 2014-2024. São Paulo, Prefeitura Municipal. Disponível em: <https://gestaourbana.prefeitura.sp.gov.br/marco-regulatorio/plano-diretor/texto-da-lei-ilustrado/>. Acesso em: 2 maio 2018.
- _____. (2014b). Prefeitura Municipal de São Paulo. Lei n. 16.050, de 31 de julho. Institui a Política de Desenvolvimento Urbano e dá outras providências. São Paulo, SP. Disponível em: <https://legislacao.prefeitura.sp.gov.br/leis/lei-16050-de-31-de-julho-de-2014/>. Acesso em: 22 ago 2024.
- SCHNEIDER, C. Q.; WAGEMANN, C. (2010). Standards of good practice in qualitative comparative analysis (QCA) and fuzzy-sets. *Comparative Sociology*, v. 9, n. 3, pp. 397-418.
- SEIXAL (2015). *Plano Director Municipal do Seixal*. Disponível em: <http://www.cm-seixal.pt/pdm-2015/conteudo-documental>. Acesso em: 9 ago 2019.
- SEPE, P. M.; PEREIRA, H. M. S. B. (2015). O conceito de Serviços Ambientais e o Novo Plano Diretor de São Paulo: uma nova abordagem para a gestão ambiental urbana. In: XVI ENCONTRO NACIONAL DA ANPUR. *Anais*. v. 16, n. 1.
- SHEATE, W. R.; PARTIDÁRIO, M. R. (2010). Strategic approaches and assessment techniques – Potential for knowledge brokerage towards sustainability. *Environmental Impact Assessment Review*, v. 30, n. 4, pp. 278-288.
- SIQUEIRA-GAY, J.; SÁNCHEZ, L. E. (2019). Mainstreaming environmental issues into housing plans: the approach of Strategic Environmental Assessment. *Environmental Impact Assessment Review*, v. 77, pp. 145-153.
- SOUTH KESTIVEN (2011). *South Kesteven District Council Local Plan 2011-2036*. Disponível em: <http://stamfordfirst.org.uk/wp-content/uploads/2018/09/SKDC-Local-Plan-2016-2036.pdf>. Acesso em: 9 ago 2019.
- SOUZA, C. M. M. (2003). *Avaliação ambiental estratégica como subsídio para o planejamento urbano*. Tese de doutorado. Florianópolis, Universidade Federal de Santa Catarina.
- TAO, T.; TAN, Z.; HE, X. (2007). Integrating environment into land-use planning through strategic environmental assessment in China: towards legal frameworks and operational procedures. *Environmental Impact Assessment Review*, v. 27, n. 3, pp. 243-265.
- TAVIRA (2017). *Plano Diretor de Tavira*. Disponível em: <http://www.cm-tavira.pt/site/content/pdm/o-pdm>. Acesso em: 8 ago 2019.
- TETLOW, M. F., HANUSCH, M. (2012). Strategic environmental assessment: the state of the art. *Impact Assessment and Project Appraisal*, v. 30, n. 1, pp. 15-24.

- THÉRIVEL, R. (2004). Sustainable Urban Environment-Metrics, Models and Toolkits-Analysis of Sustainability/social tools. Report to the sue-MoT consortium, 9.
- THÉRIVEL, R.; GONZÁLEZ, A. (2020). Is SEA worth it? Short-term costs v. long-term benefits of strategic environmental assessment. *Environmental Impact Assessment Review*, v. 83, 106411.
- TSHIBANGU, G. M.; MONTAÑO, M. (2019). Outcomes and contextual aspects of strategic environmental assessment in a non-mandatory context: the case of Brazil. *Impact Assessment and Project Appraisal*, v. 37, n. 3-4, pp. 334-343.
- ULTRAMARI, C.; DA SILVA, R. C. D. O.; MEISTER, G. (2018). Idealizing Brazilian cities: Their master plans from 1960 through 2015. *Cities*, v. 83, pp. 186-192.
- ULTRAMARI, C.; REZENDE, A. D. (2008). Planejamento estratégico e planos diretores municipais: referenciais e bases de aplicação. *RAC-Revista de Administração Contemporânea*, v. 12, n. 3, pp. 717-739.
- VARONE, F.; RIHOUX, B.; MARX, A. (2006). "A New Method for Policy Evaluation?" In: RIHOUX, B.; GRIMM, H. *Innovative comparative methods for policy analysis*. Boston, Springer, pp. 213-236.
- VASILIKOS (2015). *Strategic Environmental Assessment of the Vasilikos Area Master Plan Republic of Cyprus*. Disponível em: [http://www.mcit.gov.cy/mcit/hydrocarbon.nsf/All/DC0683EEF7A13D2BC2257F5A003AC12F/\\$file/SEA%20Non-Technical%20Summary%20English.pdf](http://www.mcit.gov.cy/mcit/hydrocarbon.nsf/All/DC0683EEF7A13D2BC2257F5A003AC12F/$file/SEA%20Non-Technical%20Summary%20English.pdf). Acesso em: 9 ago 2019.
- YEREVAN (2017). *Yerevan Green City Action Plan*. Disponível em: <https://www.yerevan.am/uploads/media/default/0001/72/e7224f93ad7096478f9aaddb96ba61ea0ca693c9.pdf>. Acesso em: 10 ago 2019.

Translation: this article was translated from Portuguese into English by Angela Freitas, email: angelaalfreitas53@gmail.com

Received: October 19, 2023

Approved: April 4, 2024

