THE EFFECTIVENESS OF ENVIRONMENTAL IMPACT ASSESSMENT SYSTEMS IN SÃO PAULO AND MINAS GERAIS STATES[1]

MARIA RITA RAIMUNDO E ALMEIDA[2]
MARCELO MONTAÑO[3]

Introduction

Environmental Impact Assessment (EIA) is an internationally accepted and established instrument (JAY et al., 2007; SÁNCHEZ, 2008) used to check the effects of human action on the environment. According to Morgan (2012), EIA is widely used in the world: 191 out of the 193 United Nations' members have a legislation concerning the use of EIA (MORGAN, 2012). Introduced in the United States in 1969, it is used to identify, predict, assess and mitigate the relevant effects of biophysical and social nature, as well as other effects resulting from development projects, before major decisions are made (IAIA, 1999).

Despite almost 50 years of institutionalized practice worldwide, the potential of use and the benefits EIA has brought to the development process, many critics are made to the effectiveness of its procedures (MORGAN, 2012). Such criticism is largely based on the distance between theory and practice (LOBOS; PARTIDÁRIO, 2014). Therefore, it is possible to perceive an increasing interest in EIA performance and in the benefits it can bring to society and to the environment (SÁNCHEZ, 2013; MONTAÑO; SOUZA, 2015; FISCHER, 2016).

Researches focused on EIA effectiveness analysis can provide learning opportunities for those involved in the process and foster continuous improvement in the use of the instrument (AGRA FILHO; MARINHO; SANTOS, 2007; KIDD; FISCHER; JHA-THAKUR, 2011). The effectiveness of the herein addressed instrument has been analyzed in terms of the fulfillment of criteria found in methodological guides or guidelines (see, for example, Ahmad and Wood [2002], Badr [2009] and Marara *et al.* [2011]). According to Wood (2003), if an EIA system does not meet a significant portion of the

1. The authors are grateful to São Paulo State Research Support Foundation for granting a PhD fellowship for the development of the current research.

2. Doctor in Environmental Engineering Science and professor at the Federal University of Uberlândia. E-mail: mrralmeida@ufu.br

3. Doctor in Civil Engineering and professor at the School of Engineering of São Carlos / University of São Paulo. E-mail: minduim@sc.usp.br

effectiveness assessment criteria, it is not able to promote the expected benefits to environmental protection.

According to Sadler (1996) and Macintosh (2010), the effectiveness of an EIA system is established through its *procedural* (which sets to which extent the EIA process is aligned with the international principles of good practice), *substantive* (aimed at interpreting the influence the results achieved through EIA exert on the decision-making process), *normative* (linked to changes in the values and behaviors of agents involved in the EIA process, based on the learning they have accomplished) and *transactive* aspects (allow measuring the applied resources – mainly the financial and time ones - based on the quality of the decisions made).

The international good practice criteria have been increasingly used over the years to guide the EIA effectiveness analysis. It is worth emphasizing the approach focused on quality review of EIA reports such as those by Lee and Brown (1992), European Commission (1996) and Hickie and Wade (1998), in the United Kingdom; by Lee and Dancey (1993), in Ireland; by Pardo (1997), in Spain; by Mwalyosi and Hughes (1998), in Tanzania; by Steinemann (2001), in the United States; by Canelas et al. (2005), in Spain and Portugal; by Androulidakis and Karakassis (2006), in Greece; by Pinho, Maia and Monterosso (2007), in Portugal; by Agra Filho (1993) and Omena and Santos (2008), in Brazil; by Sandham and Pretorius (2008), in South Africa; by Peterson (2010), in Estonia; and by Badr, Zahran and Cashmore (2011), in Egypt.

However, the aforementioned approach has limitations that restrict its scoping to elements directly linked to the content of the studies. Thus, it leaves aside important aspects of the decision-making process and, therefore, of EIA effectiveness, as it was already pointed out by Bond et al. (2010) and Lima and Magrini (2010).

In light of the foregoing, the aim of the current paper is to analyze the effectiveness of EIA systems in Minas Gerais (MG) and São Paulo (SP) states through the application of criteria set for the different stages integrating the EIA process as implemented in these states. The study is based on developing - according to the literature - a set of good practice criteria applied to 20 cases selected in SP, as well as to 17 cases selected in MG.

The current study focuses on analyzing the so-called 'EIA systems'. Such analysis brings together institutional, normative, procedural, managerial and administrative elements, as well as the components (actors, interest groups, organizations and institutions) working throughout the EIA and decision-making processes in the implementation of development projects that could lead to significant environmental impacts (Pölonen et al., 2011; Kolhoff et al., 2016). The link between EIA and environmental licensing as it was set by the Brazilian legislation to deal with these types of project is recognized herein as a basic aspect of the Brazilian EIA system. Therefore, in this paper we interpret environmental licensing as being part of the EIA system.

Methodological procedures

Given the structure of the EIA system in the state of Minas Gerais, which is based on the distribution of EIA processes in regional agencies, it was chosen to select the cases

to study from a single agency (Regional Superintendence of Environmental Regulation - SUPRAM Sul de Minas).

In São Paulo State, all the EIA cases selected for analysis were under the responsibility of the Environmental Impact Assessment Department (DAIA - Departamento de Avaliação de Impacto Ambiental/Cetesb).

Relevant to say that SUPRAM Sul de Minas is subject to standards and procedures that define the unique framework of the EIA system applied in the state, as well as all other regional agencies. Therefore, it is understood that the selected cases constitute representative sets of the real operations adopted in the EIA systems in SP and MG, which are adapted to different institutional contexts.

Considering both the methodological approach and the features of the object of study (the EIA systems in SP and MG), it is important to stress that we did not intend to work with samples in order to establish the statistical representativeness of the results. Instead, it was made the option for selecting a number of cases in each state that would be able to represent the use of EIA in the context of each state, similar to what is largely found in the literature.

The herein analyzed cases refer to EIA-supported licensing processes issued between 2004 and 2012. A set of 20 EIA/environmental licensing processes analyzed by the environmental agency in São Paulo State during the studied period was selected in the present study. These processes comprised projects concerning sanitation, housing, pipelines, transportation, industrial activities and power generation. The selection was randomly made based on the list of processes (254 EIA/environmental licensing processes) provided by the environmental agency. All the selected processes were individually consulted, thus allowing the collection of the information to be analyzed.

The lack of a previous list of EIA and licensing processes in MG led to a random selection of cases. In this case, searches conducted on the website of the state's environmental agencies and at the Official Gazette of Minas Gerais State allowed finding 22 EIA/licensing processes, which were assumed to have been supported by EIA and the preparation of an EIS (Environmental Impact Statement). The processes were individually analyzed, depending on their availability, after the consent from the SUPRAM Sul de Minas. Processes instructed by simplified studies (Environmental Control Report and/or Environmental Control Plan) were rejected. Thus, the current study comprised a set of 17 EIA and licensing processes.

Table 1 presents the list of SP and MG processes analyzed in the current study.

Table 1 – List of EIA-supported licensing processes analyzed in the current study

Process	Project Type	License	Project	Status
	São Paulo			
13705/2002	Treatment of industrial solid wastes	PL	New	Approved
13522/2004	Solid residue overflow station	PL	New	Rejected
13558/2004	Residential allotment	PL	New	Approved
13734/2004	Sugar and alcohol plant - agroindustrial unit	PL	New	Approved
13509/2005	Airport Expansion	PL	Expansion	Stand by
13572/2005	Food industry	PL	Expansion	Approved
13625/2005	Mining –Mining of granite, feldspar and sand for construction sites and ceramics industries	PL	Correction	Filed
13702/2005	Sugar and alcohol plant - agroindustrial unit	PL	Expansion	Rejected
13503/2007	Residential allotment	PL	New	Approved
13522/2007	Central for the sorting, treatment and disposal of household solid waste	PL	Modernization	Approved
13534/2007	Mining - Mining and processing of granite to grave/production	PL	New	Approved
13545/2007	Production of biodiesel and special solvents	PL	Expansion	Approved
13602/2007	Gas pipeline	PL	New	Approved
13638/2007	Industrial district	PL	New	Approved
13724/2007	Thermoelectric power plant	PL	New	Rejected
13854/2007	Sugar and alcohol plant - agroindustrial unit	PL	Expansion	Approved
1683/2008	Automotive industry	PL	New	Approved
13/2009	Alcohol distillery and sugar plant	PL	Expansion	Approved
258/2009	Small Hydropower Plant	PL	New	Filed
3827/2009	Sugar and alcohol plant - agroindustrial unit	PL	Expansion	Approved
	Minas Gerais			
00508/2001/002/2005	Small Hydropower Plant	PL	New	Rejected
03405/2006/001/2007	Gas pipeline	PL	New	Approved
03522/2008/001/2008	Thermoelectric power plant	PL	New	Filed
10202/2008/002/2008	Industrial solid waste treatment system	PL	New	Approved
18872/2009/001/2009	Thermoelectric power plant	PL	New	Approved
00287/1994/009/2009	Mining - Ornamental stone	COL	Correction	Approved
00085/1980/085/2009	Mining - Tailings/Waste Dam	PL +IL	Expansion	Approved
07060/2010/001/2010	Mining - Marble and granite	PL +IL	New	Approved
10889/2009/001/2010	Flood containment system	PL	New	Approved
16872/2008/002/2010	Mining - Mineral water extraction	CIL	Correction	Approved

00116/2000/004/2010	Mining - Syenite	COL	Correction	Approved
13129/2010/001/2011	Industrial District	PL	New	Approved
00362/2007/003/2011	Mining - Infrastructure works, reject pile, and ornamental stone drilling	CIL	Correction	Approved
00259/2000/008/2011	Mining - Granite Extraction	COL	Correction	Approved
00085/1980/091/2011	Mining - Tailings/Waste Dam	PL +IL	Expansion	Approved
00812/2012/001/2012	Mining - Tailings pile	COL	Correction	Approved
20842/2005/007/2012	Mining - Bauxite	PL +IL	Expansion	Approved

PL – prior license; PL+IL – prior license concurrent with the installation license; CIL – corrective installation license; COL – corrective operation license. Both CIL and COL take place within the scope of corrective licensing in Minas Gerais State, respectively, in the licensing of projects that have already been implemented or that are in operation without the proper environmental license.

The processes in MG were conducted according to the Normative Deliberation (ND) issued by the Environmental Policy State Council (Copam - Conselho Estadual de Política Ambiental), n. 74/2004, which is still in place. The processes began when the license application was submitted to the licensing body through the Project Characterization Form (PCF), which presents information about the type and location of the project. This information allowed framing the project in one of the six polluting/degrading potential and size classes set by the legislation in force. The Basic Orientation Form (BOF) containing the list of documents required to formalize the process was issued after the project was framed. The licensing of projects framed from class 3 to 6 was supported by EIA and, depending on the case, it was necessary preparing an Environmental Impact Statement (EIS) or an Environmental Control Report (ECR). The scoping of the environmental studies was set through pre-existing Terms of Reference (ToRs) guided by the project's type and made available on the website of the environmental agency. The technical analysis stage began after the environmental report and other documents were received; there was the possibility of conducting a public hearing. If the analysis applied to the studies have indicated insufficient information for the decision-making process, it was up to the environmental agency to request for complementary information (CI). Once the analysis was finished, a technical opinion based on the environmental acceptability or unacceptability of the project was released and it was subsequently sent to Copam wherein the Prior License (PL) request was approved or rejected. Next, Copam's conclusion was sent back to the environmental agency wherein the decision was formalized. The environmental agency checked whether the requirements necessary to issue the subsequent licenses (IL and OL) were met, in case of approval.

On the other hand, the processes concerning São Paulo State were conducted according to the SMA Resolution n. 54/2004 (currently replaced by the SMA Resolution N. 49/2014). The processes started with the presentation, by the proponent, of the Working Plan (WP) to the preparation of the Environmental Impact report, which is considered before ToR issuance. At this moment the State Council for the Environment (Consema - Conselho Estadual do Meio Ambiente) would be communicated and would define whether the content of the ToR should be specified by the Council (thus allowing the society to

participate) or by the ordinary process. Public hearings may happen depending on the Council's decision. The technical analysis stage began after the EIS (prepared according to the established guidelines) was received. Although there was not a specific rule, the environmental agency has systematically called for public hearings to discuss the EIS results and to gather society's opinion as a way to instruct the technical analysis process. If the information delivered by the environmental studies was not sufficient to analyze the impacts of the project, the environmental agency could request for complementary information. The conclusion resulting from the technical analysis of the environmental impact studies, as well as from the analysis of its complementary information, should hold the recommendation made by the environmental agency regarding the environmental acceptability of the project. The process was then sent to Consema wherein the final decision would be made. In case of approval, the environmental agency would issue the PL and set the requirements to be met during the other licensing stages (IL and OL).

The literature review focused on the current knowledge about EIA effectiveness, in the broad sense, and the connections to the EIA systems. The herein selected references address different contexts of EIA application, this increasing the possibility of conflicts to the contexts in Minas Gerais and São Paulo states. Thus,14 criteria were initially set to assess the EIA systems based on studies by Glasson and Salvador (2000); Ahmad and Wood (2002); Wood (2003); El-Fadl and El-Fadel (2004); Zeremeriam and Quinn (2007); Hinte, Gunton and Day (2007); Nadeem and Hameed (2008); Badr (2009); Kolhoff, Runhaar and Driessen (2009); Toro, Requena and Zamorano (2010); Ruffeis et al. (2010); Haydar and Pediaditi (2010); Clausen, Hoa Vu and Pedrono (2011); and Marara et al., (2011).

The criteria referring to the EIA scoping elaboration, to the development of alternatives, as well as to public participation, were subdivided to allow analyzing substantive effectiveness aspects. In addition, two other analysis criteria were included in the current study, encompassing aspects of the context wherein the EIA is applied in the states (level of details in the Term of Reference; the occurrence of field inspection for technical analysis). Finally, 19 criteria (Table 2) were individually applied to each of the 37 analyzed processes and complemented by the proceeding time of the processes, according to Table 3.

Table 2 – Set of criteria used to assess the EIA/licensing systems in SP and MG.

	Criterium	Assessment scale	Analized document
Scoping	1. ToR prepared for the project	M: The Term of Reference (ToR) was prepared for the project. NM: The used ToR was pre-elaborated and generalized.	ToR
	2. Detailed ToR	M: the ToR described how each topic should be elaborated. NM: The ToR only presented topics, there was no development guidelines.	
	3. Participatory scoping: There was public participation or public hearing in the scoping stage	M: There was some type of public participation (written referrals or population manifestation and/or involvement of the Environment Council) and/or public hearing. NM: There was no public participation in the scoping stage.	Hearing minute and documents bringing contributions to the scoping stage
	4. Participatory scoping: The public participation resulted in contributions to the scoping	M: The public participation brought contributions to the stage in the form of topics that should be addressed by the EIS. NM: The public participation did not occur or, when it occurred, it did not contribute to the stage.	
Study elaboration	5. Considering alternatives: Alternatives were taken into consideration	M: The EIS discussed technological and/or locational alternatives. NM: The EIS did not take any alternative into consideration.	EIS and Complementary Information (CI)
	6. Considering alternatives: The presented alternatives were plausible	M: The discussion about the alternatives allowed selecting more environmentally feasible options for the project. NM: The EIS did not take any alternative into consideration or the discussion about the alternatives led to the choice of the rejected option.	
	7. Delimiting the Influence Area	M: The EIS delimited the influence areas (IA) of the project. NM: The EIS did not delimit any IA.	
	8. Analysis of main impacts	M: The EIS presented the main impacts commonly associated with the type of project. NM: The EIS did not present the main impacts.	
	9. Mechanisms to assess cumulative impacts	M: The EIS presented some discussion on cumulative impacts. NM: The EIS did not present any information about cumulative impacts.	
	10. Proposition of environmental measures applied to the main impacts	M: At least one environmental measure was presented to avoid, mitigate and/or compensate each of the main impacts to be generated by the project. NM: At least one of the main environmental impacts did not present an environmental measure associated with it.	EIS (and ECP in the case of MG) and CI
	11. Monitoring programs for the main impacts	M: One monitoring program was presented to monitor the implementation and/or operation stage of each of the main monitorable impacts. NM: At least one of the main monitorable environmental impacts did not present a monitoring program associated with it.	
	12. EIS written in accessible language	M: The EIS was written in non-technical language accessible to the population. NM: This document is a copy/summary of the EIS or was written in strictly technical language.	EIR
Technical Analysis	13. Conduction of inspection	M: At least one technical inspection was carried out to base the technical opinion on the environmental feasibility of the project. NM: No inspection was carried out.	Inspection report
	14. The environmental studies meet the scoping (ToR)	M: All ToR topics were presented in the EIS or in the CI or, if not, their non-approach was justified. NM: Some ToR topic was not presented in the EIS or in the CI, and there was no justification for it.	Comparing the ToR to the EIS and to the CI

Participation	15. Publicity	M: There were publications notifying the existence of the process, the opening of the period to request for the hearing, the conduction of the hearing (when it happened) and the license issuance. NM: Some of the publications described above have not been released.	Publication of newspapers
	16. Public Hearing: Conducting a hearing	M: The public hearing was held during the technical analysis of the study. NM: The public hearing was not held during this stage.	Hearing minute
	17. Public Hearing: hearing contribution to the process	M: The issues addressed at the public hearing brought some contribution to the process, such as the CI application or the positioning of the population for or against the project. NM: The hearing was not held or, when it was held, it was nothing more than the fulfillment of a legal requirement and the addressed subjects did not contribute to the process.	
Decision	18. Influence of the technical analysis	M: The decision of the Environmental Council complied with what was established by the technical opinion. NM: The decision of the Environmental Council did not comply with what was established by the technical opinion.	Council meeting minute and Technical Opinion
	19. Influence of the participation	M: The questioning and positioning of the population, when there was public participation, were taken into account in the decision-making process. NM: There was no public participation or questioning and positioning of the population. When there was public participation, it was not taken into account in the decision-making process.	

M: met; NM: not met

The proceeding time of the processes (related to the transactional efficiency) was identified along the different EIA process stages, according to Chart 3. The ToRs were previously established in MG, which is different from what happened in SP, where it is first necessary presenting the WP for the ToR to be elaborated. In addition, it was not possible to assess the time necessary to prepare the Environmental Impact Study in MG because such information was not available in the analyzed documents.

Table 3 – Categories used to identify the proceeding time of the analyzed processes

Stage	São Paulo	Minas Gerais
WP analysis	Period between the WP protocol and the ToR issuance	Non-applicable
EIS elaboration	Period between the ToR issuance and the EIS submission	Not found
EIS and CI analysis	Period from the EIS submission to the issuance of the technical opinion by the environmental agency, including all the requests for complementary information	
Proceeding in the Council	Period between the issuance of the technical opinion and the final decision made by Consema (SP) or Copam (MG)	

Results and discussion

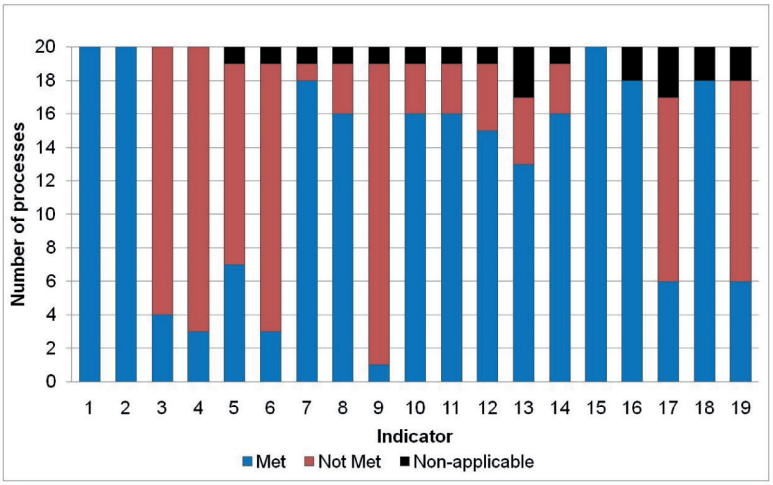
The results of the effectiveness criteria applied to the EIA cases in SP and MG are presented in Figures 1A and 1B, respectively. The results are arranged according to the EIA stages considered in the present study in order to guide the discussion.

Scoping stage

According to Figure 1A, the scoping definition procedures are aligned with the good practices in São Paulo State (criteria 1 and 2); however, it is still necessary checking the quality of this stage in regard to the content of ToR. A negative aspect concerns society participation, since it is not systematically found during this stage (criteria 3 and 4). Only 4 out of the 20 cases analyzed for the state have reported some sort of participation during the scoping stage (Process 13522/2004 has reported the conduction of a public hearing and the participation of Consema; Processes 13602/2007 and 1683/2008 involved the participation of Consema; and Process 13545/2007 counted on the conduction of a public hearing). However, only 3 out of these 4 cases allowed identifying the influence such participation had on decisions concerning the ToR. In other words, only 3 of them resulted in the inclusion of issues to be assessed in the EIA.

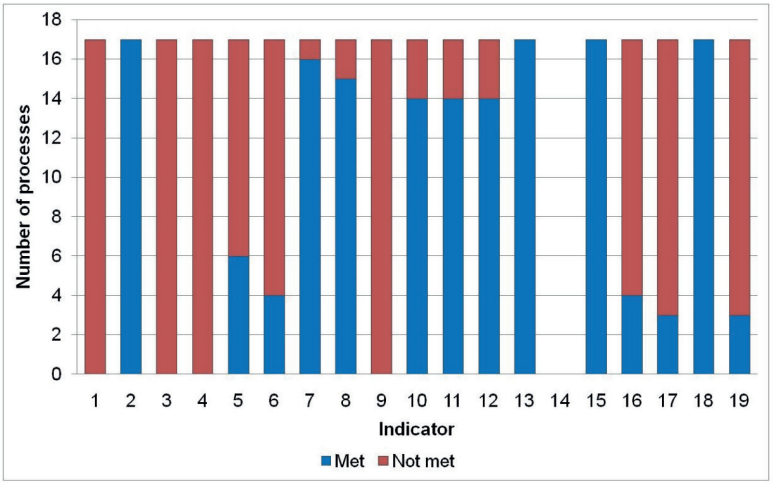
With respect to Minas Gerais State (Figure 1B), the scoping stage was defined by previously established ToRs, which could be general or adapted for certain types of activities. Thus, the possibility of the ToRs to consider the specificities of the affected environment (criterion 1) is very small, and it constitutes a relevant deficiency against the good practices. Consequently, even if the ToRs are presented in detail (criterion 2), the environmental studies are expected to address issues that, strictly speaking, may not be relevant to assess the impacts of such activities. It was the case, for example, of Process 18872/2009/001/2009. Although this process required highly detailed information to be included in the diagnosis of the soil in the region ("*definition of soil classes at taxonomic level of morphologically and analytically characterized series*"), a general ToR was used. This ToR did not relate the need for such details to the impacts expected from the type of project in analysis (thermoelectric power plant).

Figure 1.(A) Application of effectiveness indicators to the processes in SP. (B) Application of effectiveness indicators to the processes in Southern Minas Gerais.



"Non-applicable" refers to cases wherein the licensing process did not reach the stage the indicator refers to.

(A)



(B)

CRITERIA: **Scoping:** 1: ToR prepared for the project; 2: Detailed ToR; 3 - Participatory scoping – The public hearing or public inquiry took place in the scoping stage; 4: Participatory scoping – The public participation resulted in contributions to the scoping. **Environmental study elaboration:** 5: Alternatives – Alternatives were taken into consideration; 6: Technological or locational alternatives - The presented alternatives were plausible; 7: IA delimitation; 8: Analysis of the main impacts; 9: Mechanisms to assess cumulative impacts; 10: Proposing environmental measures to the main impacts; 11: Monitoring programs for the main impacts; 12: EIS written in accessible language**. Technical analysis:** 13: Holding inspections; 14: The environmental studies meet the scoping (ToR). **Participation:** 15: Publicity; 16: Public hearing - Holding public hearing; 17: Public hearing - hearing contribution to the process. **Decision:** 18: Influence of the technical analysis; 19: Influence of the public participation.

These aspects negatively contributed to the effectiveness of the EIA system in Minas Gerais State, since they increased the EIS preparation time, the need of financial resources and, possibly, the analysis time demanded by the environmental agency. In addition, the aspects relevant to the understanding of the importance of the impacts and that are not part of the standardized ToRs face the risk of not being included in the EIA scoping (it is worth emphasizing that such possibility must be assumed as equivalent in São Paulo State, given the deficiencies in the quality of the scoping practiced in this state, as reported by Barreto and Montaño (2012)). Finally, this stage took place in MG without any evidence of participation by the interested public (criteria 3 and 4).

Elaboration of environmental studies

With respect to the aspects related to the quality of the environmental studies that have supported the decisions (criteria 5 to 12), the outcomes herein were based on the information available in the EIS documentation and on the complementary information requested by the environmental agency along the EIA process. Interestingly, the answer to this set of criteria was virtually similar in SP and MG - the EISs have shown a poor performance in considering technological and locational alternatives (criteria 5 and 6), as well as in the assessment of cumulative impacts (criterion 9). Such performance has also indicated a serious deficiency in both systems (SP and MG) due to implications resulting from the lack of locational studies and cumulative effects assessment. There was no evidence that the environmental agencies have requested for studies and/or complementary information that could resume the discussion about locational alternatives, which are essential elements for EIA effectiveness.

Moreover, when cumulative effects was presented, it was merely treated as an attribute of the already identified impacts and was not subjected to any type of specific analysis or assessment. There was a single case (Process 13602/2007) wherein the analysis of cumulative impacts was presented at ToR request; however, it was clearly unsatisfactory, considering the amount of complementary studies requested by the environmental agency specifically aimed at such purpose.

The proposition of locational and/or technological alternatives (criterion 5) was found in 7 cases in SP. Only 3 of these cases appeared to have adopted reasonable criteria and procedures related to the project's environmental acceptability to choose locational alternatives (criterion 6). One of these processes (Process 13522/2007) presented the study of 9 alternatives for solid waste overflow areas; the selection of the best alternative was based on clearly established criteria and presented plausible justifications for the exclusion of the others. This proportion was slightly higher in MG – 4 out of the 6 cases proposing alternatives have presented adequate justifications for the locational studies, whereas the others have just presented selection criteria and made no comparison between alternatives that could allow to understand how the winning option was chosen. Process 10202/2008/002/2008 is a good example of a good analysis of locational alternatives in MG. Three (3) alternatives for project location were assessed through the assignment of values to specific priority items in the impact analysis, according to five major groups,

namely: public health and safety; natural environment; social environment; cultural environment; and costs. Therefore, it was possible seeing that environmental, social and economic criteria were adopted, as reported in the study conducted by Montaño et al. (2012).

The delimitation of influence areas (IA) (Criterion 7), the analysis of the main impacts (Criterion 8), the proposition of environmental measures (Criterion 10) and monitoring programs (Criterion 11), and the writing of EIS in an accessible language (Criterion 12) were well-assessed stages in both states.

Nevertheless, a clear relation between these aspects and the objection to the environmental license applications was found in SP, considering the cases that the low quality of the studies was pointed out as decisive for the opinion of the environmental agency. The same relation was not found in MG - none of the rejected licenses had the poor quality of the information provided by the EIS or the complementary information indicated as justification, although there were situations that the quality of the studies has considerably hindered the decision-making about the environmental acceptability of projects under analysis, such as lack of delimitation of impacts influence area (one case), insufficient analysis of main impacts (two cases) and lack of environmental measure propositions and of monitoring programs focused on the significant impacts (two cases).

Technical analysis

EIS's technical analysis comprised the inspection (Criterion 13) of all 17 cases analyzed in MG, as well as of 13 cases analyzed in SP. This is a good practice in EIA, since the inspection *in loco* allows the environmental agency analysts to better perceive the environment to be affected, to perceive the arrangement of the intended project, as well as to gauge much of the information presented in the environmental studies, fact that contributes to the consistency of the technical verdict. The usual practice of a "corrective licensing" in MG (wherein the projects have already been built and/or are already in operation) reinforces the importance of conducting the inspections.

It was not possible confirming the EIS compliance with the ToR (criterion 14) in MG cases because these documents were not found in the herein analyzed processes and because there was no mention to such aspect in the analyzed documents. The EIS compliance with the ToR was not confirmed in 3 SP cases, only. These cases were precisely those that had the license rejected due to the poor quality of the studies.

Public inquiry/society participation

The society participation throughout the processes was assessed through criteria 15 to 17. The proceedings of all cases were disclosed and communicated (criterion 15) through the means often used in similar circumstances (publications in the official gazette, newspapers of local and regional circulation, and radio broadcasting insertions). It was done in order to inform the population about the beginning of the EIA process, about the possibility of participating in the public hearings and about the decisions made.

The public hearings (criterion 16) intended to discuss the impact studies were held in all SP cases. These hearings were requested by the environmental agency itself (DAIA/Cetesb), whenever there was no manifestation by society or by the Public Prosecutor in this respect. The public hearings in MG only took place in four cases, which were requested by a civil entity (two cases), by Copam Sul de Minas' Regional Collegiate Unit (one case), and by the Municipal Council for the Environment belonging to the city wherein the project would be implemented (one case).

However, publicity and public hearings may not assure the necessary conditions for society to exert influence over the decision-making process. This influence (criterion 17), which was checked through the analysis of the documents related to the processes, was identified in 6 cases in SP, wherein the discussions and referrals of clarification requests by the participants during the meetings, as well as the submission of documents to the environmental agency after the meetings, have directly affected the decision-making process. The manifestations of society that influenced the decisions in São Paulo State concerned the quality of the studies, the need of complementary information for environmental diagnosis and prognosis, the questions and comments about the locational alternative, as well as the favorable arguments to the projects in relation to the benefits to be earned by the communities. As it was evidenced in the environmental agency technical verdict, the public participation had influenced the requests for additional information and, consequently, the technical conclusions. Despite the number of public hearings indicating a relevant drawback in the EIA system in MG (only 4 public hearings were conducted in the 17 analyzed cases), the only hearing that did not presented evidence of influences on the decision-making process was the one whose process presented serious deficiencies related to the EIS availability, according to some of the information registered in the public hearing minute.

The windows of participation notably promoted by the public hearings allowed society to decisively influence some cases. It was the case of Processes 13522/2004 and 13509/2005 in SP, and Process 00508/2001/002/2005 in MG. Process 13522/2004 had intense participation in the initial stages (screening and scoping), as well as manifestations against the project that, in combination with the poor quality of the presented study, led to the rejection of the license application even before the EIS analysis hearing. There was intense society (civil associations, universities, environmental entities) involvement and participation in the second process, to the point of halting the process after the hearing. It is worth emphasizing the performance of university representatives who, based on independent studies, were strongly against the project due to its environmental unacceptability resulting from the locational factor. Finally, the intense popular demonstration has led to the rejection of the license application in the third case, after EIS elaboration failures were pointed out. These failures have concealed the vulnerability of the fauna and flora in the region, as well as the municipal laws that protected the local water bodies. These arguments were accepted by the environmental agency and used as basis to justify the license[i] rejection, given the environmental unfeasibility of the project.

Decision-making process

The decision made by the State Environmental Councils (Consema in SP and Regional Collegiate Unit (URC) of Copam Sul de Minas) about the project's environmental acceptability should be guided by the technical opinion and by society participation.

It was verified that the decision-making process took the technical analysis into account in all processes (criterion 18), fact that demonstrated that such process was in line with the technical opinions issued by the environmental agency. The documents analyzed did not include details about the council meetings, and it prevented the identification of evidences regarding the influence of society on the committees (criterion 19). Nonetheless, such influence occurred at least indirectly due to the influence exerted on the opinions from environmental agencies, as it was previously reported. Thus, the number of cases wherein the criterion was met was maintained.

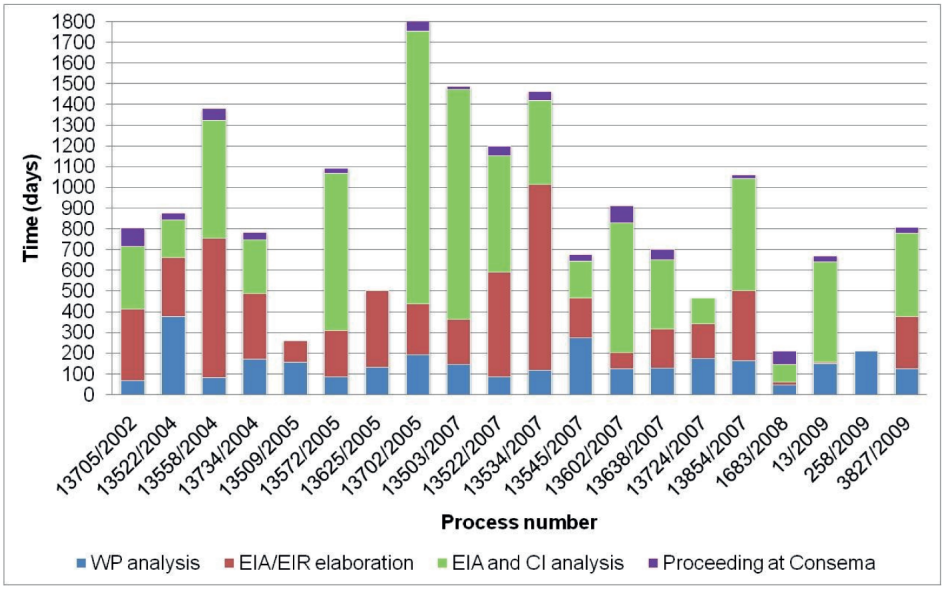
Proceeding Time

Figures 2A and 2B show the results of the survey about the proceeding time of the processes, according to the stages taken into consideration in the current study. It is worth highlighting that the documents referring to one of the cases in MG (Process 03522/2008/001/2008) were incomplete, thus making it impossible identifying the desired information.

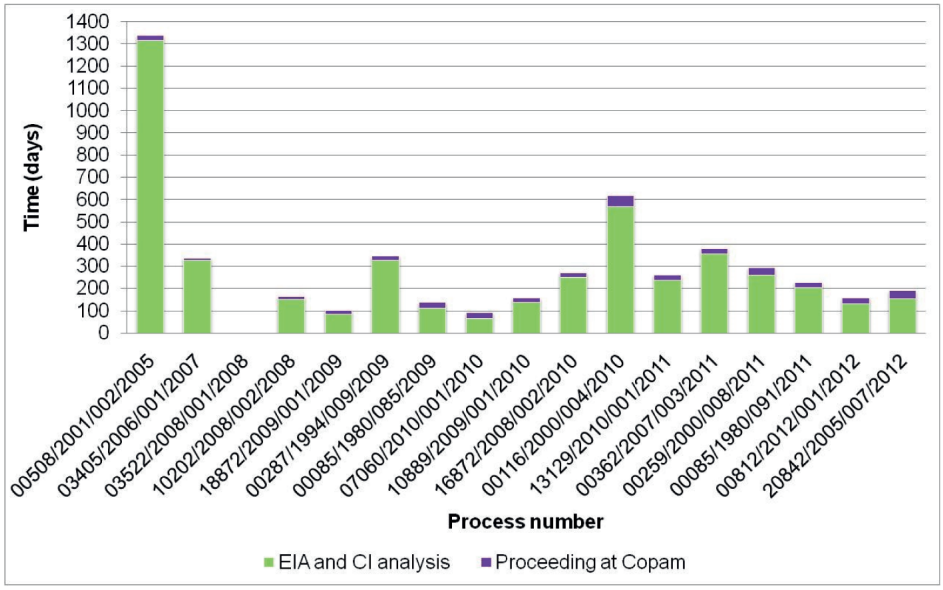
The participation in the EIA and licensing processes may be inadvertently related to an increase in time spent issuing the license. However, the evidence produced in this paper prevents such possibility. By comparing the number of days spent in the WP analysis of the participatory-scoping cases (Processes 13522/2004, 13545/2007, 13602/2007 and 1683/2008) in SP (Figure 2A) and the cases without any form of participation, it was possible seeing that the participation of Consema in the WP analyses (Processes 13602/2007 and 1683/2008) did not imply total analysis time increase when it was compared to the other cases. As it was expected, the cases that demanded most time in the scoping stage were those wherein public hearings were held to discuss the WPs (Processes 13522/2004 and 13545/2007). Interestingly, these cases were among those demanding shorter time in the EIA analysis stage. It suggested that there was straight relation between them.

According to the norms in force for the cases (SMA Resolution N. 54/2004 in SP, and the BOF observations in MG), the legal deadline predicted for EIS elaboration is 180 days. In the case of MG, the information found in the analyzed processes did not actually allowed identifying the necessary time. On the other hand, 7 cases in SP did not demand time extension (Figure 2A). The EIS elaboration time in Process 13558/2004 and 13534/2007 was 897 and 674 days, respectively. However, Processes 1683/2008 and 13/2009 required, respectively, 14 and 7 days between the ToR issuance and the EIS protocol.

Figure 2. Proceeding time of the processes analyzed in (A) São Paulo and (B) Minas Gerais.



(A)



(B)

It is understood that the studies were already finished before the ToR was issued. Therefore, the scoping stage had little contribution to its elaboration. In the case of Process 13/2009, the EIS insufficiency resulted in 5 requests for complementary information, which have comprised a large volume of details, namely: more details about the work; estimate on the amount of generated wastes and effluents and their destination; presentation of socio-environmental indicators for the direct influence area/DIA; restricted areas (such as Permanent Preservation Areas) map; environmental compliance program details; assessment of endangered flora species in the DIA; and assessment of impacts resulting from the increased generation of domestic liquid effluents, from atmospheric emissions and from the vehicular traffic during the expansion works); and the consequent analysis time expansion. Such situation highlights a relevant aspect to be taken into consideration with respect to the EIA systems' effectiveness, i.e., the time and resources 'saved' by the project proponents, when they submit an EIS that does not consider specific aspects pointed out in the ToR, end up being spent in the provision of complementary information.

With respect to Process 1683/2008, since Consema has participated in the process even before the ToR was issued, the discussions about the content of the study allowed developing it in parallel with the WP analysis. Although the nature of the project (automotive industry) cannot be ruled out as a proceeding-streamlining factor, it is reasonable understanding that the previous discussions have helped identifying relevant issues to be incorporated to the EIS in order to facilitate the analysis process (in this case, there was a single CI request).

The study analysis time in São Paulo State was influenced by the amount of complementary information requested. In turn, this information was directly related to the quality of the presented study and, mainly, to the time of response to the request for this information. The shortest EIS analysis time, 83 days, was found in Process 1683/2008 (Figure 2A), and it was much shorter than all others. The longest times were found in Processes 13702/2005 and 13503/2007, 1316 and 1112 days, respectively. With respect to the first process, the entrepreneur/consultant has made four deadline extension requests to deliver the complementary information. However, the information was not delivered in time, and it made the environmental agency present new requests for information. On the other hand, the long time for analysis in the second process has also resulted from three deadline extension requests to deliver the complementary information, from the delay in the (mandatory) Hydrographic Basin Committee reply to the project and, mostly, from the involvement of the legal department (this was the main time expansion element) as the result of requirements demanded to fulfill the conditions set to another licensing process related to an adjacent subdivision under the proponent's responsibility.

The EIS and complementary information analysis time in MG was quite different, similar to the SP case (Figure 2B). It was not possible finding evidence able to support the idea that society participation implied longer time to process the licensing. The analysis time (in decreasing order: 1315, 570, 326 and 139 days) of the four cases holding public hearings was influenced by a combination of factors wherein specific aspects linked to process progress stood out. Among these cases, the process with the longest analysis time (Process 00508/2001/002/2005, 1315 days) has involved a situation whose impacts (rela-

ted to the sensitivity of the fauna and flora in the region, as well as to the flooding in the area and to the consequent population displacement and interference in the economic activities developed by the community, such as fishing and farming) triggered an intense society mobilization against the project. Such situation was followed by the emergence of local laws with specific rules to the area to be affected by the project. These local laws were reinforced by State Law N. 15082/2004, which created the figure of 'permanent preservation rivers'. In addition, the responsibility for this process' proceeding was transferred to a new regional superintendence (SUPRAM) throughout the process.

As for the last case (Process 10889/2009/001/2010), which presented one of the shortest analysis times in the set of investigated processes (139 days), the agility of the process resulted from political articulations often linked to environmental licensing processes. In this case, a memorandum (MEMO N. 381/Gab./SEMAD/SISEMA) requesting agility in the licensing process was sent by the Office of the State Secretariat for Environment and Development (SEMAD - Secretaria Estadual de Meio Ambiente e Desenvolvimento) to the Superintendence in charge (SUPRAM Sul de Minas). The request was motivated by a letter the governor sent to SEMAD on behalf of the county's mayor. The letter was supported by the social interest in a project "*of great importance to definitely solve the recurrent flood problems in our County*" (GAPREF Letter N. 458/10).

Another case to be highlighted (Process 03405/2006/001/2007) presented one of the longest analysis time among the set of processes (329 days). This process has indicated that the factors intervening in the proceeding time may be strictly related to the project's complexity (in this case, the natural gas distribution network) and to its potential impacts (besides, of course, the time spent in the internal proceeding of the environmental agencies involved), since there was no public hearing or request for complementary information.

The shortest analysis times observed in MG were 66 and 85 days. In the first case, the process (mining/marble and granite) began when an ECR was submitted to SUPRAM Central Metropolitana and later transferred to SUPRAM Sul de Minas. An EIS was requested after the inspection, as well as after the meeting involving the environmental agency, the entrepreneur and its representatives. Since the deadline taken into consideration for the purposes of the present research was that involving only the EIS analysis, it is possible saying that it was quite short. A similar situation explains the short EIS analysis time in the second case (85 days/thermoelectric power plant) – the license application had already been initiated in another process and the opinion was favorable to its viability. However, the first process was interrupted due to lack of payment and, when it was reopened, the previous analyses were taken into consideration for its progress.

Finally, the proceeding time in the collegiate bodies was linked to the specificities of the processes in each state. As for SP, the proceeding within the Consema was longer when the proponent was required to present the project in order to provide clarifications to the counselors. Such situation was verified in four processes (13705/2002, 13558/2004, 13602/2007 and 1683/2008). However, the time spent in these occasions was 37 days, on average, which clearly indicated that the situation was solved in the period between two collegiate body meetings.

During the process analysis meetings held in MG, the Copam URC members could request clarification to the entrepreneur/consultant, as well as to SUPRAM's technicians themselves (present at the meetings). Such dynamics – personally followed by the author of this paper throughout the research steps – has contributed to the agility in the decision-making process and allowed the decision to be quickly made without any need of completions or new meetings for further discussions. Thus, the time elapsed between the issuance of SUPRAM's technical verdict and the final Copam URC decision was shorter than 30 days.

Comparing the effectiveness of the Environmental Impact Assessment systems between São Paulo and Minas Gerais

The first major difference between the two EIA/licensing systems concerns setting the scoping of the environmental studies. The regulation in force in SP at the time[ii] allowed considering the study specificities, i.e., defining its scoping based on preliminary studies able to guide the EIS toward significant aspects to each case. However, according to Barretto and Montaño (2012), in practice, the structure recommended for the scoping in São Paulo State does not assure the formulation of concise ToRs focused on the significant impacts that might be caused by the projects, and it provides little contribution to the effectiveness of impact assessments. Nevertheless, the structuring of the SP system was more in line with the good practices advocated for EIA. In addition, although there was little participation of stakeholders, there was the clear possibility of their participation in this EIA stage. The same did not happen in MG.

The quality control of the EISs presented to SUPRAM Sul de Minas was poorer than that of São Paulo. Some studies in MG were presented to the environmental agency without satisfactorily responding to the content expected in a study of such nature (as it can be seen in the results of the present study). Nonetheless, little complementary information was requested and no EIS was rejected due to poor quality.

Another major difference between the two states was related to the performance of public hearings: with respect to SP, the EIS-discussion hearing occurred in all cases. As for MG, hearings were held in four cases, only. Thus, it was possible understanding that the society participation was very limited in MG and that it did not contribute to the technical analysis and to the decision-making process. In many cases, there was no evidence of any type of participation (except, of course, for civil society representatives who were possibly present at Copam's final decision meetings). Although the hearings in SP were sporadically carried out during the scoping stage and systematically carried out during the study analysis stage, the real contribution of society to the decision-making process should remain object of further investigation.

However, the evidences presented in this paper has confirmed that society participation was essential to the decision-making process in six SP cases, as well as in four MG cases, since it allowed identifying information crucial to the final decision, fact that should be understood as extremely relevant in the context of EIA good practices. The windows of participation found within the analyzed processes provided concrete conditions for

society to become involved in the decisions through the introduction of new topics or through the deepening of discussions. It corroborates the conclusions of Partidário and Sheate (2013), who advocate for the need of finding new ways to provide information, as well as to get involved in the processes, in order to promote effective public participation. The changes introduced in 2014 through the establishment of new regulations for the EIA process in São Paulo State are able to simplify procedures previously applied to the scoping elaboration and to reduce society manifestation deadlines. Thus, they should be closely monitored and assessed.

Impact studies have shown similar aspects related to positive and negative aspects in both systems, fact that corroborated previous studies. Thus, it is worth discussing aspects related to elements essential to the EIA process, since they refer to the analysis of locational alternatives and to the assessment of cumulative impacts, as it was emphasized by Gallardo and Bond (2011). The assessment of a single alternative has prevailed in both states, fact that prevented the confrontation of options during the analysis process and configured a serious restriction to the correct EIA application, which became basically a reactive instrument and restricted to the identification of mitigating measures (AGRA FILHO et al., 2012). The assessment of cumulative impacts was found in a single case in São Paulo State. It means that the projects have been individually analyzed, thus disregarding the influence their impacts have on the environment when they are taken in combination with other already implemented activities, and therefore taking a decision that ignores these aspects.

Given the results of the present study, the three main aspects demanding immediate actions to be taken in both systems are: the promotion of an effective and systematic society participation throughout all EIA stages; the rigorous analysis of locational alternatives for the projects; and the integration of cumulative effect assessments in line with the state of the art for this approach. It is worth emphasizing that, as it was highlighted by Pope et al. (2013) in the international context, as well as by Hanna et al. (2014) and Sánchez (2013) in the Brazilian context, these are the EIA aspects that persist on presenting a deficient practice worldwide.

Time and cost are very important factors to assess the effectiveness of EIA-based licensing systems, mainly from the project proponents' perspective. According to the National Industry Confederation (CNI, 2007), the three main environmental licensing issues identified by companies were: process analysis delay; cost of investments necessary to meet the environmental requirements; and the difficulties to meet the required technical criteria. The same entity has reinforced the importance of these licensing issues in 2014 and added the excess of requirements throughout the licensing process, the lack of clarity in regulation, the lack of preparation of environmental agency technicians, the excess of conditions, the lack of specific information regarding the process and studies required, and the lack of supervision to the list of issues (CNI, 2014).

As it was previously discussed, several factors have influenced the proceeding time of the EIA and licensing processes in the two states. As it was reported by Cerqueira and Alvez (2010) in Portugal, the high variability of the mean proceeding times has indicated substantial differences between processes.

Based on our evidences, it is possible stating that the processes tended to present shorter processing time in MG, which may be partly explained by the shortening of the scoping stage (due to the adoption of standardized ToRs) and by the lack of public hearings carried out in a systematic way. Thus, it is necessary conducting specific studies to identify other factors that may influence the proceeding time of the processes. However, it is worth highlighting Morrison-Saunders and Sadler (2010), according to whom the EIA environmental quality results (or different sustainability measures) achieved due to their contributions should be considered more important than the process speed.

The literature describing the aspects allowing the understanding of the factors influencing the proceeding time of the processes remains scarce. Thus, EIA may be understood as a long and costly process (MIDDLE; MIDDLE, 2010) and the responsibility for such performance may be attributed to the inefficiencies of the environmental agency. However, the present analysis of EIA and licensing systems in the two Brazilian states allowed understanding that much of the delay in the processes resulted from the poor quality of the studies submitted to the environmental agency and from the delay in forwarding the requested information. In addition, there is an intrinsic aspect to certain contexts wherein EIA is carried out, which implies the need of conducting extensive surveys for environmental diagnosis. However, these aspects do not rule out the criticism about the EIA systems, which concern the excess of procedures to be followed (making it difficult for the proponents and the society to understand their objectives) and, mainly, the lack of accuracy in the analysis of presented information.

Conclusions

The effectiveness of the EIA systems analyzed in this paper was influenced by aspects already described in the international literature. There are deficiencies concentrated around the scoping elaboration, the consideration of locational alternatives for the projects, the assessment of cumulative impacts, and the participation of society.

Society participation should essentially take place in the EIA process as early as possible (preferably in the screening and scoping stages). In addition, mechanisms able to promote the involvement of the affected population, as well as of other stakeholders, should be set. According to our findings, the early participation of society (in the scoping stage, above all) helps reducing the time spent in the EIS analysis. On the other hand, the SP model, which systematically holds public hearings to discuss the EISs, has not shown significant differences from the MG system in terms of the effective influence of society on the decision-making process.

In addition, the EIA is restricted to the search for corrective measures concerning the impacts to be caused in a context wherein the consideration of locational alternatives is far from the good practices recommended for the EIA practice. Such measures are essentially oriented toward the projects' implementation acceptability - many times in environmentally unfavorable locations. Consequently, the EIA process deviates from its essential aims, namely: the introduction of environmental aspects in order to improve the projects. It is worth emphasizing that the consideration of locational alternatives

and the assessment of cumulative impacts require the EIA systems to integrate other instruments (environmental zoning, river basin plans, environmental assessments of plans and programs, etc.) in the decision-making process, thus establishing environmental aims to guide the decisions about project licensing. The evidences found in the herein selected cases suggested that the use of instruments focused on guiding the location for certain activities within the EIA and licensing processes is very weak or, at most, it has little influence on the location of the projects. Although both states have established instruments for this purpose (including their own regulatory framework, as in the case of COPAM's RD 129/2008 in MG, which enables using the results of the Ecological--Economic Zoning as elements to help the environmental licensing), there is still a large gap to be filled in the sense of effectively integrating such RD to the EIA processes and environmental licensing processes.

Finally, it was possible understanding that the analyzed EIA systems have low substantive effectiveness. It means that the impact assessments have very small influence on the design of the projects. Therefore, they do not explore the full potential of EIA. In addition, the weaknesses reported in the present paper have indicated that, if both systems kept their current features, they would present low improvement capacity, i.e., they would not be able to meet the good practices recommended for the instrument.

Notes

i There was also another process in MG wherein the license was not issued. The process was filed due to lack of payment of license application fees.

ii The EIA procedures in São Paulo State are currently regulated by the SMA Resolution 49/2014, and they present differences markedly related to the procedures applied during the scoping and public participation stages.

References

AGRA FILHO, S. S. Situação atual e perspectivas da avaliação de impacto ambiental no Brasil. In: SÁNCHEZ, L. E. (Org). **Avaliação de impacto ambiental**: situação atual e perspectivas. São Paulo: Epusp, 1993. p. 153-156.

AGRA FILHO, S. S.; MARINHO, M. M. O.; ORRICO, S. R. M.; SANTOS, F. C. Avaliação de Impactos Ambientais: uma discussão dos procedimentos metodológicos da aplicação no estado da Bahia. In: 1° CONGRESSO BRASILEIRO DE AVALIAÇÃO DE IMPACTO. São Paulo, 2012.

AGRA FILHO, S. S.; MARINHO, M. M. O.; SANTOS, J. O. Avaliação de Impacto Ambiental (AIA): uma proposta metodológica para análise de efetividade de aplicação através da avaliação *Ex-Post*. In: 24º CONGRESSO BRASILEIRO DE ENGENHARIA SANITÁRIA E AMBIENTAL. Belo Horizonte, 2007.

AHMAD, B.; WOOD, C. A comparative evaluation of the EIA systems in Egypt, Turkey and Tunisia. **Environmental Impact Assessment Review**, v. 22, p. 213-234, 2002.

ANDROULIDAKIS, I; KARAKASSIS, I. Evaluation of the EIA system performance in Greece, using quality indicators. **Environmental Impact Assessment Review**, v. 26, p. 242-256, 2006.

BADR, E. A. Evaluation of the environmental impact assessment system in Egypt. **Impact Assessment and Project Appraisal**, v. 27, n. 3, p. 193-203, 2009.

BADR, E. A.; ZAHRAN, A. A.; CASHMORE, M. Benchmarking performance: Environmental impact statements in Egypt. **Environmental Impact Assessment Review**, v. 31, p. 279-285, 2011.

BARRETTO, F. R. M.; MONTAÑO, M. Avaliação da etapa de delimitação do escopo de Estudos de Impacto Ambiental no estado de São Paulo. In: 1° CONGRESSO BRASILEIRO DE AVALIAÇÃO DE IMPACTO. São Paulo, 2012.

BOND, A. J.; VIEGAS, C. V.; COELHO, C. C. S. R.; SELIG, P. M. Informal knowledge processes: the underpinning for sustainability outcomes in EIA? **Journal of Cleaner Production**, v. 18, n. 1, p. 6-13, 2010.

CANELAS, L.; ALMANSA, P.; MERCHAN, M.; CIFUENTES, P. Quality of environmental impact statements in Portugal and Spain. **Environmental Impact Assessment Review**, v. 25, p. 217-225, 2005.

CASHMORE, M.; RICHARDSON, T.; HILDING-RYEDVIK, T.; EMMELIN, L. Evaluating the effectiveness of impact assessment instruments: Theorising the nature and implications of their political constitution. **Environmental Impact Assessment Review**, v. 30, p. 371-379, 2010.

CERQUEIRA, P.; ALVES, R. P. Regulação de mercados por licenciamento. **Economia Global e Gestão**, v. 15, n. 3, p. 109-134, 2010.

CLAUSEN, A.; HOA VU, H.; PEDRONO, M. An evaluation of the environmental impact assessment system in Vietnam: The gap between theory and practice. **Environmental Impact Assessment Review**, v. 31, p.136-143, 2011.

CNI – Confederação Nacional da Indústria. Empresas enfrentam dificuldades no licenciamento ambiental. **Sondagem Especial da CNI**, ano 5, n. 2, 2007.

CNI – Confederação Nacional da Indústria. **Licenciamento ambiental: propostas para aperfeiçoamento**. Brasília: CNI, 2014. 91 p.

EL-FADL, K.; EL-FADEL, M. Comparative assessment of EIA systems in MENA countries: challenges and prospects. **Environmental Impact Assessment Review**, v. 24, p. 553-593, 2004.

EUROPEAN COMISSION. **Evaluation of the Performance of the EIA Process.** Brussels: European Comission, 1996.

FISCHER, T. B. (Ed.). **Environmental Assessment.** Critical concepts in built environment. Routlegde, 2016. 1478 p.

GALLARDO, A. L. C. F.; BOND, A. Capturing the implications of land use changes in Brazil through environmental assessment: time for a strategic approach? ***Environmental Impact Assessment Review***, v. 31, n. 3, p. 261-270, 2011.

GLASSON, J.; SALVADOR, N. N. B. EIA in Brazil: a procedures–practice gap. A comparative study with reference to the European Union, and especially the UK. **Environmental Impact Assessment Review**, v. 20, p. 191-225, 2000.

HANNA, P.; VANCLAY, F.; LANGDON, E. J.; ARTS, J. Improving the effectiveness of impact assessment pertaining to Indigenous peoples in the Brazilian environmental licensing procedure. **Environmental Impact Assessment Review**, v. 46, p. 58-67, 2014.

HAYDAR, F.; PEDIADITI, K. Evaluation of the environmental impact assessment system in Syria. **Environmental Impact Assessment Review**, v. 30, p. 363-370, 2010.

HICKIE, D.; WADE, M. Development of guidelines for improving the effectiveness of environmental assessment. **Environmental Impact Assessment Review**, v. 18, p. 267-287, 1998.

HINTE, T. V.; GUNTON, T. I.; DAY, J. C. Evaluation of the assessment process for major projects: a case study of oil and gas pipelines in Canada. **Impact Assessment and Project Appraisal**, v. 25, n. 2, p. 123-137, 2007.

IAIA – International Association for Impact Assessment. Principles of environmental impact assessment best practice. Fargo: IAIA, 1999. v. 1. (Special Publication). Disponível em: <http://www.iaia.org/publicdocuments/special-publications/Principles%20of%20IA_web.pdf>. Acesso em: 7 out. 2013.

JAY, S.; JONES, C.; SLINN, P.; WOOD, C. Environmental impact assessment: Retrospect and prospect. **Environmental Impact Assessment Review**, v. 27, n. 4, p. 287-300, 2007.

KIDD, S.; FISCHER, T. B.; JHA-THAKUR, U. Developing the learning potential of strategic environmental assessment in spatial planning. In: ROGERSON, R. et al (Eds.). **Sustainable Communities** – skills and learning for place-making. Hatfield: University of Hertfordshire Press, 2011.

KOLHOFF, A. J.; RUNHAAR, H. A. C.; DRIESSEN, P. P. J. The contribution of capacities and context to EIA system performance and effectiveness in developing countries: towards a better understanding. Impact Assessment and Project Appraisal, v. 27, n. 4, p. 271-282, 2009.

KOLHOFF, A. J.; RUNHAAR, H. A. C.; GUGUSHVILE, T.; SONDEREGGER, G.; VAN DER LEEST, B.; DRIESSEN, P. P. J. The influence of actor capacities on EIA system performance in low and middle income countries – Cases from Georgia and Ghana. Environmental Impact Assessment Review, v. 57, p. 167-177, 2016.

LEE, N.; BROWN, R. Quality control in environmental assessment. **Impact Assessment and Project Appraisal**, v. 7, n. 1, p. 41-5, 1992.

LEE, N.; DANCEY, R. The quality of environmental impact statements in Ireland in the United Kingdom: a comparative analysis. **Impact Assessment and Project Appraisal**, v. 8, n. 1, p. 31-36, 1993.

LIMA, L. E.; MAGRINI, A. The Brazilian Audit Tribunal's role in improving the federal environmental licensing process. **Environmental Impact Assessment Review**, v. 30, p. 108-115, 2010.

LOBOS, V.; PARTIDÁRIO, M. Theory versus practice in Strategic Environmental Assessment (SEA). **Environmental Impact Assessment Review**, v. 48, p. 34-46, 2014.

MACINTOSH, A. The Australian Government's environmental impact assessment (EIA) regime: using surveys to identify proponent views on cost-effectiveness. **Impact Assessment and Project Appraisal**, v. 28, n. 3, p. 175-188, 2010.

MARARA, M.; OKELLO, N.; KUHANWA, Z.; DOUVEN, W.; BEEVERS, L.; LEENTVAAR, J. The importance of context in delivering effective EIA: Case studies from East Africa. Environmental Impact Assessment Review, v. 31, p. 286-296, 2011.

MIDDLE, G.; MIDDLE, I. The inefficiency of environmental impact assessment: reality or myth? **Impact Assessment and Project Appraisal**, v. 28, n. 2, p. 159-168, 2010.

MONTAÑO, M.; SOUZA, M. P. Impact Assessment research in Brazil: achievements, gaps and future directions. **Journal of Environmental Assessment Policy and Management**, v. 17, n. 1, p. 1550009 1 - 8, 2015.

MONTAÑO, M.; RANIERI, V. E. L.; SCHALCH, V.; FONTES, A. T.; CASTRO, M. C. A. A.; SOUZA, M. P. Integração de critérios técnicos, ambientais e sociais em estudos de alternativas locacionais para implantação de aterro sanitário. **Revista Engenharia Sanitária e Ambiental**, v. 17, n. 1, p. 61-70, 2012.

MORGAN, R. K. Environmental impact assessment: the state of the art. **Impact Assessment and Project Appraisal**, v. 30, n. 1, p. 5-14, 2012.

MORRISON-SAUNDERS, A.; SADLER, B. The art and science of impact assessment: results of a survey of IAIA members. **Impact Assessment and Project Appraisal**, v. 28, n. 1, p. 77-82, 2010.

MWALYOSI, R.; HUGHES, R. **The performance on EIA in Tanzania**: an assessment. London: International Institute for Envonmental and Development, 1998.

NADEEM, O.; HAMEED, R. Evaluation of environmental impact assessment in Pakistan. **Environmental Impact Assessment Review**, v. 28, p. 562-71, 2008.

OMENA, M. L. R. A.; SANTOS, E. B. Análise da efetividade da Avaliação de Impactos Ambientais – AIA – da Rodovia SE 100/Sul-Sergipe. **Revista Brasileira de Gestão e Desenvolvimento Regional**, v. 4, n. 1, p. 221-237, 2008.

PARDO, M. Environmental Impact Assessment: myth or reality? Lessons from Spain. **Environmental Impact Assessment Review**, v. 17, p. 123-142, 1997.

PARTIDARIO, M. R.; SHEATE, W. R. Knowledge brokerage – potential for increased capacities and shared power in impact assessment. **Environmental Impact Assessment Review**, v. 39, p. 26-36, 2013.

PETERSON, K. Quality of environmental impact statements and variability of scrutiny by reviewers. **Environmental Impact Assessment Review**, v. 3, p. 169-176, 2010.

PINHO, P.; MAIA, R.; MONTERROSO, A. The quality of Portuguese Environmental Impact Studies: the case of small hydropower projects. **Environmental Impact Assessment Review**, v. 27, p.189-205, 2007.

PÖLONEN, I.; HOKKANEN, P.; JALAVA, K. The effectiveness of the Finnish EIA system – What works, what doesn't, and what could be improved? *Environmental Impact Assessment Review*, v. 31, p. 120-128, 2011.

POPE, J.; BOND, A.; MORRISON-SAUNDERS, A.; RETIEF, F. Advancing the theory and practice of impact assessment: Setting the research agenda. **Environmental Impact Assessment Review**, v. 41, p. 1-9, 2013.

RUFFEIS, D.; LOISKANDL, W.; AWULACHEW, S. B.; BOELEE, E. Evaluation of the environmental policy and impact assessment process in Ethiopia. **Impact Assessment and Project Appraisal**, v. 28, n. 1, p. 29-40, 2010.

SADLER, B. (Org.) **Environmental assessment in a changeling world, evaluating practice to improve performance**. Ottawa: Canadian Environmental Assessment, 1996. 248 p.

SÁNCHEZ, L. E. **Avaliação de impacto ambiental: conceitos e métodos**. São Paulo: Oficina de Textos, 2008. 495 p.

SÁNCHEZ, L. E. Development of Environmental Impact Assessment in Brazil. **UVP Report**, v. 27, p. 193-200, 2013.

SANDHAM, L. A.; PRETORIUS, H. M. A review of EIA report quality in the North West province of South Africa. **Environmental Impact Assessment Review**, v. 28, p. 229-240, 2008.

STEINEMANN, A. Improving alternatives for environmental impact assessment. **Environmental Impact Assessment Review**, v. 21, p. 3-21, 2001.

TORO, J.; REQUENA, I.; ZAMORANO, M. Environmental impact assessment in Colombia: Critical analysis and proposals for improvement. **Environmental Impact Assessment Review**, v. 30, p. 247-261, 2010.

WOOD, C. Environmental impact assessment in developing countries: an overview. In: CONFERENCE ON NEW DIRECTIONS IN IMPACT ASSESSMENT FOR DEVELOPMENT: Methods and Practice, 24-25 Nov. 2003, EIA Centre School of Planning and Landscape, University of Manchester, 2003. **Conference Paper**.

ZEREMARIAM, T. K.; QUINN, N. An evaluation of environmental impact assessment in Eritrea. **Impact Assessment and Project Appraisal**, v. 25, n. 1, p. 53-63, 2007.

Submitted on: 14/10/2015
Accepted on: 02/11/2016
http://dx.doi.org/10.1590/1809-4422ASOC235R2V2022017

THE EFFECTIVENESS OF ENVIRONMENTAL IMPACT ASSESSMENT SYSTEMS IN SÃO PAULO AND MINAS GERAIS STATES

MARIA RITA RAIMUNDO E ALMEIDA
MARCELO MONTAÑO

***Abstract*:** The effectiveness of the Environmental Impact Assessment (EIA) has been analyzed through the application of good practice criteria, with emphasis on assessing the quality of studies involved in it. However, such approach is restricted to elements directly linked to the subject of the studies and leaves aside important aspects. The aim of the present study is to analyze the effectiveness of EIA systems through the application of 20 effectiveness criteria to a set of 37 environmental licensing cases in São Paulo (SP) and Minas Gerais (MG) states. The results show that the EIA is effective in both states with respect to procedural aspects. On the other hand, the systems were ineffective when it came to substantive effectiveness aspects such as the promotion of public participation, the development of locational alternatives and the assessment of cumulative effects. These aspects increase the proceeding time and limit the EIA influence on decisions, thus being restricted to adjustments in project designs and to the adoption of mitigation/compensation measures.

Keywords: Environmental Impact Assessment systems; effectiveness criteria; environmental licensing; environmental policy instruments.

***Resumo*:** A efetividade da AIA tem sido analisada através da aplicação de critérios de boas práticas, com destaque para a avaliação da qualidade dos estudos envolvidos. Contudo, tal abordagem restringe-se aos elementos diretamente ligados ao conteúdo dos estudos, deixando de lado aspectos importantes. O presente trabalho analisa a efetividade de sistemas de AIA aplicando 20 critérios de efetividade a um conjunto de 37 casos de licenciamento ambiental em SP e MG. Os resultados mostram que a AIA é efetiva em ambos os estados com relação a aspectos procedimentais. Por outro lado, os sistemas demonstram ser pouco efetivos com relação a aspectos substantivos da efetividade, como promoção da participação pública, desenvolvimento de alternativas locacionais e avaliação de efeitos cumulativos, o que aumenta o tempo de tramitação e limita a influência da AIA sobre as decisões, ficando restrita a ajustes no desenho dos projetos e adoção de medidas de mitigação/compensação.

Palavras-chave: sistemas de Avaliação de Impacto Ambiental; critérios de efetividade; licenciamento ambiental; instrumentos de política ambiental.

Resumen: La efectividad de la Evaluación de Impacto Ambiental (EIA) es comúnmente analizada por criterios de buenas prácticas, especialmente para evaluar la calidad de los estudios de impacto. Sin embargo, este enfoque se limita a elementos directamente relacionados con el contenido de los estudios, y omite aspectos importantes relacionados con el proceso de EIA. El trabajo analiza la efectividad de los sistemas de EIA con 20 criterios aplicados a 37 casos en SP y MG. Los sistemas de EIA mostraron ser eficaces cuanto a aspectos de procedimientos y ineficaces cuanto a los aspectos sustantivos relacionados con participación de la sociedad, el desarrollo de alternativas de localización y la evaluación de los efectos acumulativos, lo que aumenta el tiempo para la toma de decisiones y disminuye la influencia de la EIA, quedando restringida a ajustes en el diseño de los proyectos y la adopción de medidas de mitigación y compensación de impactos.

Palabras clave: sistemas de Evaluación de Impacto Ambiental; criterios de efectividad; permisos ambientales; instrumentos de política ambiental