**Evolution of IA practice in São Paulo State**

**Introduction**

Since its inception, in the 70’s, EIA has evolved and changed in response to drivers such as experiential learning, scientific advances and technological developments. While some aspects of practice seem to have improved (Landim and Sánchez, 2012), there are persistent shortcomings: poor data quality (Landim and Sánchez, 2012); low commitment level (Morgan, 2012); difficulties in applying best practices (Kågstrom, 2016); process streamlining (Bond et al, 2014); late public participation (Steinemann, 2001).

Enquirying at 30 years of EIA practice in São Paulo State, Brazil, this research aims to identify changes in EIA practice and explore its possible drivers. Considering the stock of 887 EIAs in the files of Cetesb, the State Environmental Agency, since EIA was adopted in 1987, mining projects were chosen for review because they represent a significant share of the total (36.3%) and are well represented across the whole time frame.

**Methods**

The research employed a qualitative approach, based on document review using content analysis. Out of the EIA database maintained by Cetesb, featuring 322 files related to mining projects, six cases were selected for review. For the selection of cases, the complete Cetesb EIA database was consulted to extract information on the files relative to mining projects. A spreadsheet was prepared containing data on proponent, year of filing, municipality, mineral, status (approved/rejected) and location. A two-stage filtering was used to select the cases. Firstly, only approved quarry projects were considered. Quarry projects were chosen because they represent an important class of projects assessed over the whole study period, are larger than other frequent projects (mostly sand and clay pits) and have more significant impacts. Although we use the term ‘mining’, there is virtually no metal mine active in the State, the extractive industry being represented by industrial minerals and aggregates. From this subset (quarries), the cases were selected to cover (1) the longest time spectrum possible; (2) different rocks; and (3) different locations and settings (urban or rural).

For each case, the whole series of EIA documents was reviewed. They comprise: (1) terms of reference (ToR), (2) environmental impact statement (EIS), (3) its supplements, (4) records of public hearings, and (5) review report. The non-technical summary was not included.

For each kind of document, a script containing questions was developed. Guidance for reviewing the EIS was adapted from literature (Lee et al., 1999; EC, 2001), using the criteria employed by Landim and Sánchez (2012) for content analysis of EIS. For reviewing public hearing records, the questions prepared by Duarte et al. (2016) were adopted. For the other documents, a list of questions was prepared by the authors. The set of five scripts was tested in one case, then modified as needed, and applied to the six cases.

For this research, content analysis was used to check text against research hypothesis about its contents. The reduction of the complexity of a text to a number of categories of analysis allows for replicable inferences (Krippendorf, 2004). Data collected from each document was tabled and compared aiming at detecting regularities, temporal changes or innovations, in a longitudinal approach, in order to do comparisons over a long period, restricted to a particular context (Bauer, 2000).

Hypothesis about possible drivers of changes were drawn from the reviewed EIA literature and from the authors’ experience with Brazilian EIA system. Furthermore, some suggestions for potential improvements were provided.

**Results**

From June 1987, when the first EIS was filed, up to December 2015, Cetesb records 322 files of mining projects. Considering the criteria for the filtering, 54 files passed the first filter. Six of them were intentionally, shown in table 1. The main results from each of the documents reviewed were summarized and are shown in tables 2 to 6.

Table 1: Cases selected for research

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **#** | **Year** | **Proponent** | **Municipality** | **Rock** | **Setting** | **ROM (t/yr)** |
| 1 | 1990 | Paupedra | Guarulhos | Granite | Urban | 2,000,000 |
| 2 | 1992 | Horizonte Novo | Ribeirão Branco  | Limestone | Rural | 360,000 |
| 3 | 1998 | Iúdice Mineração | São Paulo | Granite | Urban | 1,400,000 |
| 4 | 2003 | CCRG | Ribeirão Grande | Limestone | Rural | 1,450,000 |
| 5 | 2012 | Votorantim Cimentos | Salto de Pirapora | Limestone | Rural | 7,400,000 |
| 6 | 2013 | Leão Engenharia | Jardinópolis  | Basalt | Rural | 1,200,000 |

R.O.M.: run of mine

Table 2: Comparison of ToR main results

|  |  |
| --- | --- |
| **Question** | **Case** |
| **1** | **2** | **3** | **4** | **5** | **6** |
| Are there ToR for the EIS? | No | No | Yes | Yes | Yes | Yes |
| How many pages does it have? | n.a. | n.a. | 10 | 3 | 17 | 25 |
| Did the public take part on it?  | n.a. | n.a. | No | ? | No | No |
| Did any other public agency made considerations or contribute to the ToR? | n.a. | n.a. | No | Yes | No | No |
| Do they have guidelines for the baseline?  | n.a. | n.a. | No | No | Yes | Yes |
| Do they have guidelines for determining impact significance? | n.a. | n.a. | Yes | No | Yes | Yes |
| Do they have guidelines for mitigation? | n.a. | n.a. | No | No | No | No |
| Do they require assessment of cumulative or synergic impacts? | n.a. | n.a. | No | Yes | Yes | Yes |
| Do they have guidelines for environmental management?  | n.a. | n.a. | No | No | Yes | Yes |

n.a. not applicable ? unknown due to incomplete records

Table 3: Comparison of Public Hearings Records main results

|  |  |
| --- | --- |
| **Question** | **Case** |
| **1** | **2** | **3** | **4** | **5** | **6** |
| Did a public hearing take place?  | ? | ? | Yes | Yes | Yes | Yes |
| Did the public hearing bring new information about the project? | n.a. | n.a. | Yes | No | Yes | No |
| Is there evidence of public opinion expressed at the hearing being considered in the EIS review?  | n.a. | n.a. | Yes | No | Yes | Yes |
| Did it result in any project change, complements to the EIS or further commitment in Review Report?  | n.a. | n.a. | No | No | Yes | Yes |

Table 4: Summary EIS contents

|  |  |
| --- | --- |
| **Question** | **Case** |
| **1** | **2** | **3** | **4** | **5** | **6** |
| Number of experts in the team | 19 | 12 | 23 | 47 | 61 | 23 |
| Number of pages of the EIS | 189 | 47 | 411 | 815 | 729 | 505 |
| Are there comparisons of locational and technological alternatives?  | No | No | No | Yes | Yes | No |
| Are the project and its operational activities described? | Yes | Yes | Yes | Yes | Yes | Yes |
| Are the criteria used to determine the areas likely to be affected according to what is asked in the ToR? | n.a. | ToR does not determine them |
| Are the issues of physical environment according to the ToR? | n.a. | n.a. | No | No | Yes | Yes |
| Are there primary data for physical environment baseline? | Yes | Yes | Yes | Yes | Yes | Yes |
| Are there primary data for fauna baseline?  | Yes | Yes | Yes | Yes | Yes | Yes |
| Are there primary data for vegetation baseline?  | Yes | Yes | Yes | Yes | Yes | Yes |
| Is there an integrated landscape analysis?  | No | No | No | No | Yes | No |
| Does the EIS identify and locate the protected areas inside the areas likely to be affected?  | No | No | No | Yes | Yes | Yes |
| Were surveys undertaken with affected communities? | No | No | Yes | Yes | Yes | No |
| Does baseline describe vulnerable people? | Yes | No | Yes | Yes | Yes | No |
| Are there archaeological data? | No | No | No | Yes | No | Yes |
| Are specific methods used to impact prediction?  | Yes | Yes | Yes | Yes | Yes | No |
| Are baseline data used in impact prediction? | Yes | Yes | Yes | Yes | Yes | No |
| Does the EIS consider cumulative and synergic impacts? | No | No | Yes | Yes | No | No |
| Does the EIS assess impact significance? | No | No | No | Yes | Yes | Yes |
| Are the most significant impacts scheduled to be monitored? | n.a. | n.a. | n.a. | No | Yes | No |
| Do environmental management programmes include goals and indicators to evaluate achievement of goals? | No | No | No | No | No | No |
| Do the proposed monitoring include parameters, procedures, schedules, etc.? | No | No | No | Yes | No | No |

Table 5: Comparison of EIS Supplement main results

|  |  |
| --- | --- |
| **Question** | **Case** |
| **1** | **2** | **3** | **4** | **5** | **6** |
| Did the Agency require the EIS to be supplemented?  | No | Yes | Yes | Yes | Yes | Yes |
| Did the Agency require supplemental data, in addition to what was requested in the ToR ? | n.a. | n.a. | No | No | Yes | Yes |
| Was the EIS Supplement considered as satisfactory by the Agency? | n.a. | Yes | No | No | No | No |

Table 6: Comparison of EIS Review Report main results

|  |  |
| --- | --- |
| **Question** | **Case** |
| **1** | **2** | **3** | **4** | **5** | **6** |
| How many pages does it have? | 15 | 12 | 37 | 71 | 44 | 35 |
| Does it request any commitment from the proponent due to the public hearing? | n.a. | n.a. | No | No | Yes | Yes |
| Are there technical requirements about alternatives? | n.a. | n.a. | n.a. | No | No | No |
| Was any impact considered as significant in the EIS not reviewed? | n.a. | n.a. | n.a. | No | No | No |
| Does the Review Report recommend any additional mitigation as compared to those proposed in the EIS and its supplement?  | No | No | Yes | Yes | Yes | Yes |
| Does the Review Report recommend any additional environmental management programme? | No | No | No | Yes | Yes | Yes |
| Does the Review Report establish conditions for project follow-up? | Yes  | No | Yes  | Yes  | Yes | Yes |

**Discussion and conclusions**

The preparation of ToR became mandatory in December 1994. In the reviewed cases, their structure and contents are not uniform and their size varies from mere 3 pages to 25 pages. The more detailed ToR set forth guidelines for baseline, impact significance determination and environmental management. Besides regulatory change, accumulation of experience may have influenced these changes (Morgan, 1998).

Public hearings became more important and influential over time in the reviewed cases. Opinions and requests from the public were explicitly considered in the EIS Review in the more recent cases, evidenced by the finding that the Review Reports requested commitments from the proponent as a result of public hearings. Examples include, in case 5, support to traditional communities, additional environmental management programmes for monitoring air pollution and noise, and its follow-up, and a programme for supporting local labor; in case 6, it includes biodiversity offsets. Despite improvements, the documents contained no evidence of more advanced stakeholder engagement (IAP2, 2007).

The research also documented changes in the contents of EIS. Over time, they became larger and more experts took part in their preparation, confirming findings of Landim and Sánchez (2012). The most recent EIS, however (Case 6), is an exception, once does not comprise advances observed in other recent EIS, especially case 5. Some observed advances can be attributed to legislation, like the consideration of potential impacts on protected areas in the project surroundings (due to a law passed in 2000) and archaeological studies (due to new regulations in 2003), both found from Case 4 onwards. Other advances, like surveys undertaken with affected communities, found from Case 3 onwards (except case 6, as described before), may be due to mandatory ToR, more regulation (Landim and Sánchez, 2012) and experience accumulation (Morgan, 1998).

Project description, use of primary data on physical and biotical baseline, methodologies on impact assessment and use of data from baseline on impact assessment and prediction were recurrent practices, but got more detailed over time, due ToR inception and more detailed ToR over time.

Some sporadic evolutions, like landscape analysis (case 5), were found, but did not become recurrent practice and cannot be considered as advances, with baseline remaining descriptive with no new approaches (Landim and Sánchez, 2012). Other changes, like, consideration of cumulative impacts (cases 3 and 4), monitoring of significant impacts (case 5) and environmental programmes detailing (case 4, but without goals and indicators) were also sporadic.

The practice of requiring the EIS to be supplemented has been recurrent over the whole period. The driver of such request is either deficiencies found during EIS review or gaps identified in the public hearing or during the site visit conducted by the Agency’s officers.

Review Reports also got larger and more detailed over time and began to request more commitments from the proponents and recommend additional mitigation and environmental programmes. Conditions for project follow-up were usual practice, despite on cases 5 and 6 they became more detailed, due to improved regulation by Agency. Experience accumulation may also be cited for it (Morgan, 1998, 2012).

Considering the findings, potential improvements comprise: changes on Agency procedures, with public hearing and mandatory site visit on the scoping phase; adoption of specific methodologies for scoping phase and EIS review; and inclusion of new issues, as cumulative and synergic impact assessment and use of indicators in environmental programmes.

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