

The experience of the municipalities of Minas Gerais State (Brazil) that implemented local environmental licensing

A experiência dos municípios de Minas Gerais que assumiram a competência originária do licenciamento ambiental de empreendimentos de impacto local

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ABSTRACT

The objective of this study was to explore the experience of the municipalities of the state of Minas Gerais that implemented local environmental licensing. For this purpose, representatives of the state administration were interviewed, and an electronic questionnaire was sent to analysts of 121 municipalities that took up environmental licensing, from which 39 responses were obtained. The key drivers of local environmental licensing were concerns over licensing procedural delays by the state government and the need for administrative efficiency. Knowledge of local conditions and the proximity between the local government, communities and developers were identified as facilitators of licensing. Shortage of staff, precarious hiring processes, and lack of infrastructure were identified as the main barriers to local environmental licensing. The municipalities that have implemented local environmental licensing perceive planning, administrative capacity, competent technical and legal teams, and capacity-building as essential elements of an effective local environmental licensing system. The study concludes with suggestions of future research avenues.

Keywords: Decentralization. Municipal Administration. Local Environmental Management. Municipal Environmental Licensing.

RESUMO

O objetivo desta pesquisa foi conhecer a experiência dos municípios que assumiram o licenciamento ambiental no âmbito do estado de Minas Gerais até dezembro de 2020. Para esse fim, representantes do estado foram entrevistados e um questionário eletrônico foi encaminhado aos 121 municípios enquadrados, obtendo-se 39 respostas. A morosidade da emissão de licenças pelo estado e a busca por agilidade foi o que mais motivou os municípios a assumirem o LA. O conhecimento da realidade local e a proximidade entre poder público, comunidade e empreendedores foram apontados como facilitadores. Equipes reduzidas, contratações precárias e falta de infraestrutura foram as principais dificuldades apontadas. Os municípios que já licenciam recomendam que aqueles que ainda vão assumir essa responsabilidade o façam com planejamento e que se estruturam com equipe técnica e jurídica competente e em constante capacitação. Sugerem-se novos estudos para acompanhar esse processo de descentralização do LA.

Palavras-chave: Descentralização. Gestão Municipal. Gestão Ambiental Local. Licenciamento Ambiental Municipal.

1 INTRODUCTION

Environmental licensing (EL) – one of the main instruments of the Brazilian National Environmental Policy (PNMA) (Law 6,938/1981) – is an administrative procedure used by public authorities (in Brazil, the federal government, the state governments or the municipal governments) to support environmental decision-making and protect the environment. It implies the use of preventive controls over the design, implementation, operation and expansion of activities and enterprises that use natural resources or can cause adverse environmental impacts. While issuing environmental licenses, authorities certify projects' feasibility and environmental suitability throughout their life cycles.

The integrated environmental management of the Brazilian federative entities was strengthened with the enactment of the Federal Constitution (1988), which divided the responsibilities over the protection of the environment and pollution control among the federal government, the state governments and the municipal governments (CF, Art. 23, Items VI and VII, 1988). Furthermore, the Complementary Law 140, December 8, 2011 (LC 140) has regulated Art. 23 from the Brazilian constitution defining authority and jurisdictional reach of federative entities concerning environmental licensing. In addition, LC 140 clarified legal issues and reinforced the participation of municipalities in Brazil's environmental management, including their roles in environmental licensing (BRASIL, 2011; BRITO, 2014; SOUZA; ZUBEN, 2012).

While state governments still issue most environmental licenses in Brazil, "municipal environmental licensing has been growing steadily" (ABREU; FONSECA, 2017, p. 168), especially after LC 140. The decentralization of licensing is considered a strategic action for redistributing political power from the central to the peripheral levels (GOMES; DOWELL, 2000; PIETRO, 2004).

Six years after the publication of LC 140, Minas Gerais state defined the rules and criteria for municipal EL through the publication of the Normative Deliberation (DN) of the State Council for Environmental Policy (Copam) No. 213 of February 22 2017, amended by DN Copam N° 219 of February 2, 2018. Following the guidelines from LC 140 – determining that state environmental councils define the projects likely to have 'local impacts' - Copam brought in DN 213, in its Single Annex, the list of projects and activities likely to have local impacts, therefore, be licensed by municipal governments. DN 213 also established several institutional and administrative conditions for municipalities considering taking such responsibility. Among these are: (i) Have a qualified environmental agency, with qualified technicians, or adhere to a regional consortium, (ii) Have established its Municipal Environmental Council, and (iii) formally notify the state government of its intention to implement local EL.

Through DN 213 and the Circular Letter Supram Semad No. 30 of March 9, 2017, the state government invited all 853 municipalities of Minas Gerais to take up its environmental licensing competence. It was not a mandatory determination but an 'option' for the municipalities, which, having met the requirements, could choose the types of projects listed in DN 213 that they want license at the local level. In the absence of formal notification, the state government will continue to exercise their licensing authority on a supplementary basis. For most Minas Gerais municipalities, the state government's supplementary role in licensing has been maintained - as provided for in Item II of Article 2 of LC 140 (BRASIL, 2011). To provide administrative and capacity-building support for the municipalities interested in implementing local environmental licensing, the government of Minas Gerais created the Municipal Management Support Board (Dagem).

Before 2017, when DN 213 was enacted, only 7 (0.82%) of the 853 municipalities of Minas were issuing environmental licenses, mainly through cooperation agreements and delegations of competence. In December 2020, 121 (14.18%) of the state municipalities were issuing environmental licenses in MG. There has been significant growth in the decentralization of environmental licensing in Minas Gerais. To a great extent, this phenomenon resulted from LC 140, which provided legal and technical incentives for decentralization (NASCIMENTO *et al.*, 2020).

The objective of this study was to explore the experience of the municipalities of the state of Minas Gerais that took up local environmental licensing. While relatively numerous, most studies on this topic have been restricted to dissertations, theses and articles published in conference proceedings, with few publications in peer-reviewed journals (NASCIMENTO; FONSECA, 2017). Furthermore, when addressed in the international literature, decentralization tends to be treated as a marginal and tacit issue (NASCIMENTO *et al.*, 2020). Therefore, besides contributing to the academic literature, this study provides critical information for the remaining 85% of the state's municipalities that have not implemented local environmental licensing yet.

2 METHODOLOGY

Data collection and analysis followed a four-step procedure: (i) literature reviews; (ii) content analysis of the environmental legislation; (iii) semi-structured interviews with representatives of the Minas Gerais State Secretariat for the Environment and Sustainable Development (Semad) and its Municipal Management Support Board (Dagem); (iv) application of electronic questionnaires, which were sent to representatives of municipal environmental agencies in charge of EL.

The two initial steps took place through literature reviews of the academic and grey literature, including environmental norms and laws. First, the academic articles were searched in the Scopus and Web of Science databases. The search is based on three keywords; "Environmental Licensing", "Municipalização" (the Brazilian word for decentralisation to municipal level), and "Decentralisation", both in Portuguese and English. Data from publications not included in the search but referenced in the selected publications were also used. The main legal and regulatory frameworks referring to Environmental Licensing for its creation and decentralisation were analysed; Federal Law 6,938 from August 31, 1981, Conama Resolution 237 from December 19, 1997, Federal Complementary Law 140 from August 8, December 2011, Normative Resolution Copam MG No. 213 from February 22, 2017, DN Copam MG No. 217 from December 6, 2017, DN Copam No. 2019 from February 2, 2018).

Still, in the initial phase of the research design, a meeting was held with Semad and Dagem representatives to ask for feedback and contributions to the study. In addition, semi-structured interviews with 10 initial questions were carried out with state government representatives. The main goal of these interviews was to understand what key issues should be considered in designing the electronic questionnaire sent to the municipalities. The study's methodological procedures obtained ethical clearance at the State University of Minas Gerais (CAAE/UEMG: 32724720.9.0000.5525).

The online questionnaire had 32 questions (28 closed-ended) divided into four parts. The first sought to understand the demographic profile of the participants. The second part explored critical elements of the EL process in each municipality, including driving factors, administrative capacity, and characteristics of the staff who were directly involved in the local EL. The third part sought to characterize the EL procedures in each municipality, their most frequent requirements, application fees, and implementation issues. Finally, the last part explored the municipalities' perceptions of challenges, difficulties, and positive aspects of local EL.

The questionnaire was administered through the Google Forms platform. Data collection took place between April 15 and December 31, 2020. The sampling effort involved the 121 municipalities in Minas that, until December 31, 2020, were eligible to implement their original competence of environmental licensing, control and inspection - according to data made available by Semad-MG. The municipalities were contacted through e-mails sent to the person responsible for the local environmental agency. The e-mail introduced the survey and invited participants to fill out the electronic questionnaire. This e-mail was resent up to three times to the non-responding municipalities. Follow-up contacts were also carried out by phone and WhatsApp.

2.1 STUDY AREA

Table 1 presents the 121 municipalities that implemented environmental licensing (individually or by the consortium) in Minas Gerais until December 2020, to which the electronic questionnaire was sent. Besides their competence, municipalities that signed an agreement with the state licensing projects without a local impact are discriminated against. The 39 municipalities (32.23%) that responded to the sample questionnaire are highlighted in grey.

Table 1 | List of the 121 municipalities implementing environmental licensing in Minas Gerais by December 2020. Those highlighted represent the 39 respondents (final sample). The date in parentheses indicates the beginning of the local EL system.

INDIVIDUAL IMPLEMENTATION	IMPLEMENTATION BY CONSORTIUM
Água Comprida (02/04/2019)	CONSORTIUM CIMVA – EAST
Além Paraíba (10/06/2018)	Alpercata (10/03/2020)
Alto Caparaó (12/12/2018)	Antônio Dias (21/12/2018)
Araporã (11/08/2017)	Belo Oriente (21/12/2018)
Araújos (26/12/2017)	Bom Jesus do Galho (22/10/2020)
Barbacena (03/10/2017)	Braúnas ((03/07/2019)
Belo Horizonte (18/01/1985)*	Bugre (21/12/2018)
Belo Vale (11/07/2017)	Caratinga (13/01/2020)
Betim (07/07/2013)*	Coronel Fabriciano (11/02/2020)
Bom Despacho (23/04/2018)	Córrego Novo (21/12/2018)
Brumadinho (01/10/2012)*	Dom Cavati (21/12/2018)
Capitólio (12/03/2020)	Entre Folhas (21/12/2018)
Carlos Chagas (12/06/2019)	Iapu (21/12/2018)
Carmo do Cajuru (15/09/2017)	Imbé de Minas (24/03/2020)
Cataguases (24/10/2019)	Ipaba (21/12/2018)
Conceição do Mato Dentro (03/10/2018)	Ipatinga (08/01/2019)

<i>INDIVIDUAL IMPLEMENTATION</i>	<i>IMPLEMENTATION BY CONSORTIUM</i>
Congonhas (24/06/2003)*	Joanésia (10/03/2020)
Contagem (28/04/2020)	Mesquita (15/10/2020)
Divinópolis (03/02/2020)	Naque (23/09/2019)
Dores do Indaiá (03/02/2020)	Periquito (21/12/2018)
Extrema (28/02/2018)*	Piedade de Caratinga (13/01/2020)
Felixlândia (01/12/2017)	Pingo-d'Água (21/12/2018)
Frutal (05/06/2017)	São João do Oriente (21/12/2018)
Governador Valadares (29/10/2018)	Sem-Peixe (03/07/2019)
Ibirité (27/10/2016)*	Ubaporanga (05/03/2020)
Indianópolis (06/05/2019)	Virginópolis (16/03/2020)
Itabira (13/11/2017)	<i>CONSORTIUM CISPAR</i>
Itabirito (10/07/2017)	Carmo do Paranaíba (02/07/2019)
Itajubá (22/09/2018)	Cruzeiro da Fortaleza (02/07/2019)
Itaúna (03/09/2018)	Guimarânia (02/07/2019)
Juatuba (01/10/2019)	Rio Paranaíba (02/07/2019)
Juiz de Fora (21/12/2002)*	Serra do Salitre (02/07/2019)
Lagoa Santa (01/02/2018)	Tiros (02/07/2019)
Limeira do Oeste (16/05/2018)	Varjão de Minas (02/07/2019)
Malacacheta (22/09/2017)	<i>CONSORTIUM CODANORTE</i>
Manhuaçu (05/08/2019)	Augusto de Lima (07/08/2020)
Mariana (15/08/2017)	Bocaiúva (28/11/2018)
Matozinhos (01/08/2019)	Botumirim (28/11/2018)
Monte Alegre de Minas (01/07/2019)	Brasília de Minas (31/05/2019)
Montes Claros (08/12/2017)	Buenópolis (28/11/2018)
Muriaé (09/10/2017)	Capitão Enéas (20/08/2019)
Pains (04/01/2020)*	Catuti (28/11/2018)
Pará de Minas (02/10/2017)	Claro dos Poções (28/11/2018)
Patrocínio (02/05/2017)	Cônego Marinho (20/08/2019)
Pompéu (15/12/2017)	Coração de Jesus (15/05/2020)
Ponte Nova (16/03/2020)*	Francisco Sá (28/11/2018)
Prata (05/02/2018)	Fruta de Leite (07/08/2020)
Ribeirão das Neves (01/12/2017)	Grão Mogol (28/11/2018)
Rio Casca (04/11/2019)	Itacambira (28/11/2018)
Sacramento (22/08/2017)	Itacarambi (08/01/2019)
Santa Luzia (17/07/2017)	Jaíba (31/01/2019)
São Gotardo (11/07/2019)	Joaquim Felício (19/06/2020)
São José da Lapa (14/02/2019)	Manga (30/09/2019)

INDIVIDUAL IMPLEMENTATION	IMPLEMENTATION BY CONSORTIUM
São Sebastião do Paraíso (01/07/2019)	Mirabela (28/11/2018)
Sete Lagoas (02/01/2020)	Montalvânia (26/04/2019)
Teófilo Otoni (13/02/2019)	Olhos-d'Água (27/03/2019)
Três Marias (11/07/2017)	Patis (23/01/2019)
Tupaciguara (15/09/2017)	Pedras de Maria da Cruz (20/08/2019)
Ubá (29/09/2020)*	Ponto Chique (29/08/2019)
Uberaba (25/11/2012)*	São Francisco (07/08/2020)
Viçosa (10/05/2018)	São João da Ponte (28/11/2018)
	São João do Pacuí (28/11/2018)
	Varzelândia (28/11/2018)

Source: Created by the authors. *Municipalities that also agree with the state government to license projects that do not have a local impact. Source: Prepared by the authors based on data provided by Semad/2020.

The sample of municipalities that participated in the survey covered several regions of the state of Minas Gerais (Figure 1).

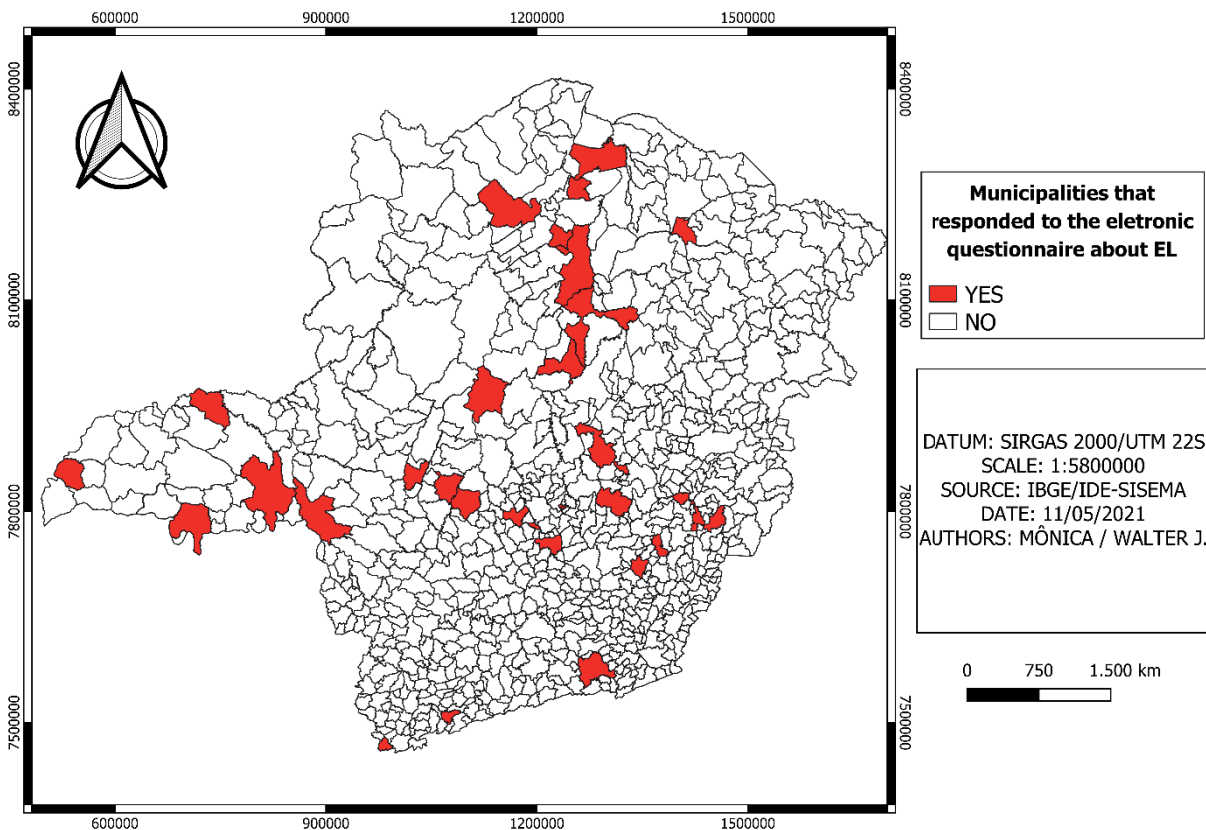


Figure 1 | Location of the municipalities that responded to the electronic questionnaire. Yes (red) 39 municipalities and no (blank) 814 municipalities.

Source: Created by the authors.

2.2 DATA ANALYSIS

The answers to the questionnaires were analyzed using descriptive and inferential statistics. The four open-ended questions were subjected to content analysis based on the theoretical model proposed by Bardin (1977), covering the following steps: (a) pre-analysis of data, (b) thematic tabulation, (c) grouping into categories, and (d) interpretation of results.

The Chi-square test with a significance level of 5% ($p < 0.05$) was used to verify whether the form of adherence to the LA, individually or by a consortium, influenced the EL application fees and the number of projects subject to local EL. In addition, Fisher's exact test was used to verify whether the form of implementation is related to specific municipal laws for EL. The R program carried out these analyses (R DEVELOPMENT CORE TEAM, 2021).

3 RESULTS & DISCUSSION

3.1 GENERAL ASPECTS OF THE DECENTRALIZATION OF ENVIRONMENTAL LICENSING IN MINAS GERAIS

Before the publication of DN Copam N° 213 of 2017, only Belo Horizonte (1985), Betim (2013), Brumadinho (2012), Contagem (2003), Juiz de Fora (2002), Ibirité (2016) and Uberaba (2012) issued environmental licenses through an agreement with the state government. These agreements were established in the Normative Deliberations Copam No. 29 (October 9, 1998) and No. 102 (October 30, 2006), which later became State Decree No. 46,937 from January 21, 2016.

After DN 213 came into force, on February 22, 2017, there was an evident growth in municipal environmental licensing in Minas Gerais (Figure 2) – except for 2020, when there was a 34% reduction compared to the previous two years, a fact that could be related to the Covid-19 pandemic or the municipal elections. However, in 2021, the number of municipalities adhering to EL doubled compared to 2020.

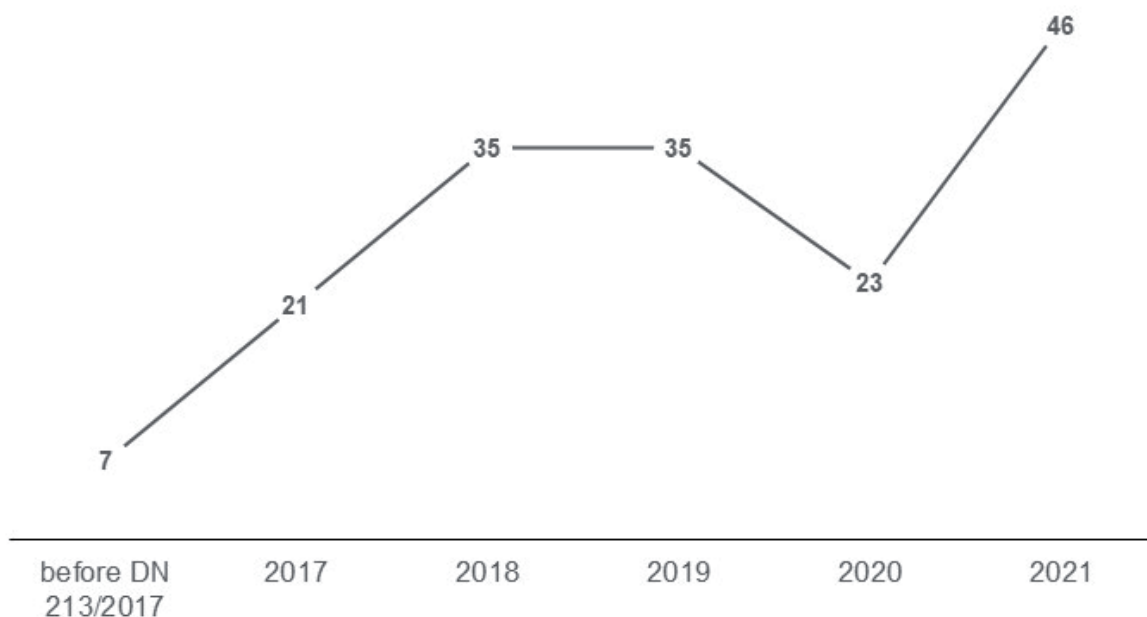


Figure 2 | Number of municipalities in Minas Gerais state that implemented environmental licensing since 2017, when DN Copam 213 came into force.

Source: Created by the authors based on data provided by Semad. As of December 13, 2021, 167 municipalities were eligible for environmental licensing in Minas Gerais (SEMAD, 2021).

3.2 FORMS OF IMPLEMENTATION AND MOTIVATIONS TO ASSUME ENVIRONMENTAL LICENSING

While considering the implementation of local EL, municipalities can choose the individual or consortia forms. Of the 39 responding municipalities, 56.4% implemented EL individually and 43.6% in the consortium modality (Figure 3 a). Since implementing environmental licensing is optional, the study tried to identify the main actors that influenced the uptake decision (Figure 3 b) – the mayor, environment secretary, technical team, joint decision, municipal consortia, among others.

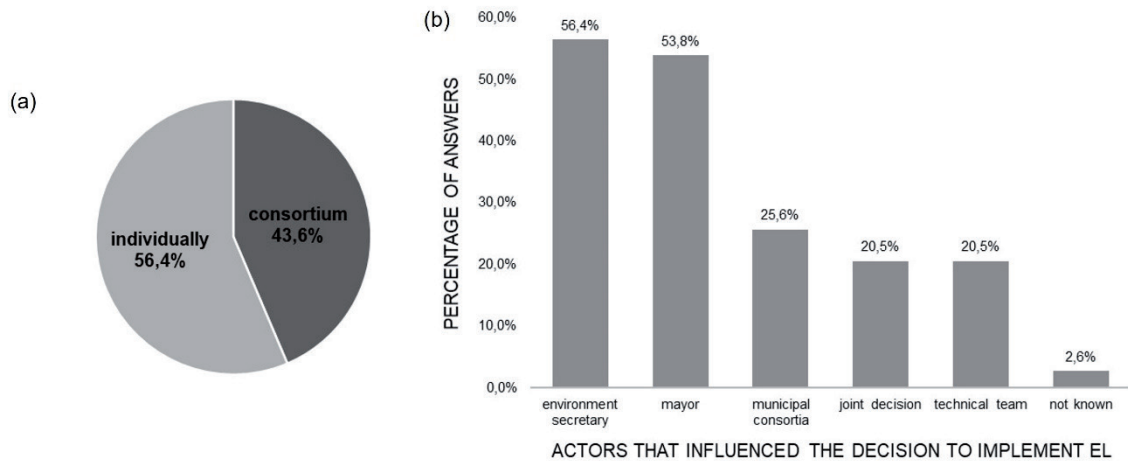


Figure 3 | Percentage of municipalities that implemented environmental licensing individually or by a consortium (a) and which actors influenced the decision to implement EL (b).

Source: Created by the authors.

Respondents were also asked to point out the main factors that influenced the municipality to implement EL. Ten (10) multiple choices were suggested. Among the data obtained (Table 2), it can be noted that 100% of the respondents indicated the option “agility”, corroborating what Fonseca *et al.* (2017) found, i.e., that licensing slowness (and its adverse impacts on profitability) is often perceived as one of Brazil’s key EL challenges. Accordingly, the reduction of bureaucracy (red tape) was pointed out by 61.50% of the respondents as a key driver of local EL, a finding that has been identified in other studies (e.g., ABREU; FONSECA, 2017). It was also observed that municipalities considered the proximity of the projects to be licensed to the local administration an essential factor. This finding is aligned with the study of Strengers (2004), for whom proximity would result in more effective actions to protect the environment and mitigate environmental impacts. Control of local environmental impacts was also a key driver (69.20%). Abreu and Fonseca (2017) reflect that territorial proximity facilitates the control of environmental impacts generated by licensed activities and projects.

Table 2 | List of the main factors that influenced municipalities’ motivation to implement environmental licensing in percentage data (N=39).

Factors	% the municipalities
Quicker administrative procedures	100,00%
Closer proximity to developers	69,20%
Stronger control over local impacts	69,20%
Administrative autonomy	61,50%
Reduction of bureaucracy	61,50%
Decision-making autonomy	56,40%

Factors	% the municipalities
New source of revenues (e.g., from application fees)	51,30%
Frustration with the state government's licensing procedures	48,70%
Pressure from local developers	30,80%
Pressure from communities and local citizens	15,40%

Source: Created by the authors.

3.3 ACADEMIC PROFILE OF THE LOCAL ACTORS AND THE ADMINISTRATIVE STRUCTURE OF LOCAL EL

All 39 respondents claimed to have higher education degrees (Figure 4). Some mentioned academic programs are environmental and sanitation engineering, agronomic, civil, forestry and metallurgical engineering, biology, food technology, social communication, law, nursing, environmental management.

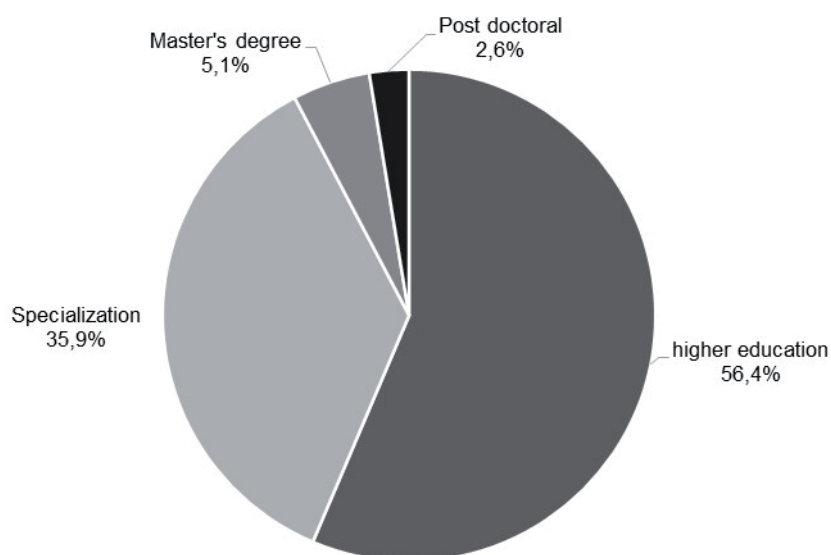


Figure 4 | Academic degrees of the survey participants.

Source: Created by the authors.

As for the professional experience, 53.8% of the respondents had their first professional experience in the environmental field. When asked how long they have been working in the environmental field, 42.1% said between 5 and 10 years; 36.8%, for more than 10 years, and 21.1% for less than five years. However, one should notice that these data reflect the qualification of professionals directly involved in the local EL.

Concerning the legal nature and attributions of the institutional body responsible for the EL in the municipal administration, 33 of the 39 respondents said that the responsible licensing body is a municipal environmental secretariat. In 3 municipalities, the institutions responsible for the EL were environment departments of other non-environmental secretariats. The fact that 84.6% of the surveyed municipalities have environmental secretariats is a positive aspect because, according to IBGE (2017) and other authors, environmental agencies at the secretariat level are potentially stronger and more effective since their budget and decision-making power are significant.

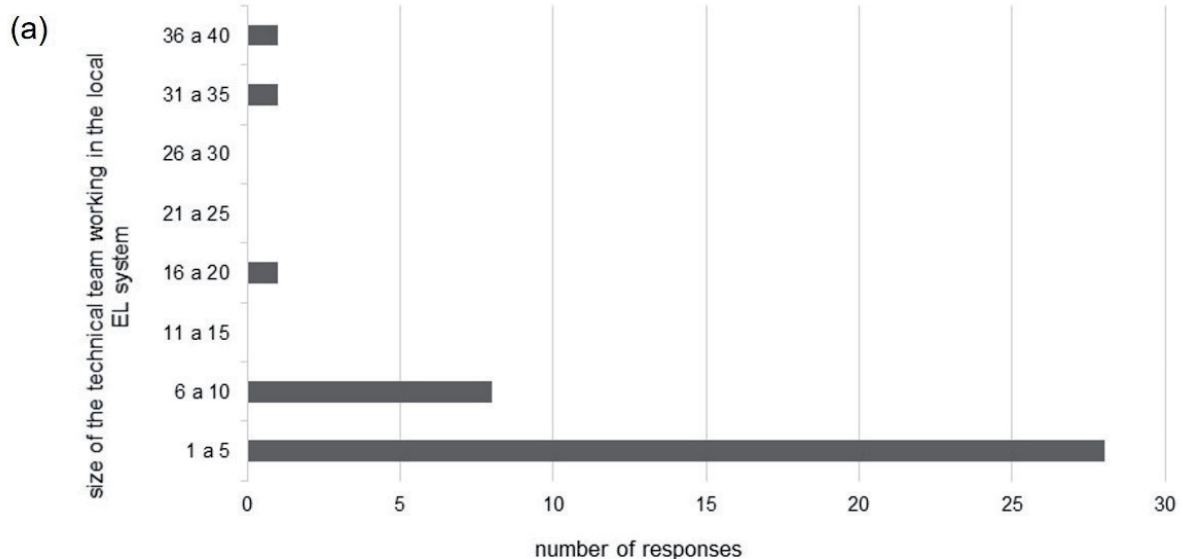
The survey also attempted to identify which other activities and competencies are under the responsibility of the local environmental institutions in charge of EL. Findings are presented in Table 3.

Table 3 | List of competencies of local environmental agencies

<i>Competencies of the local environmental institutions</i>	<i>% of the 39 responses</i>
Provide technical and administrative support to the local environmental council	87,20%
Oversee, along with other federative entities, compliance with laws and regulations in connection with land use, natural resources access and use	79,50%
Foster environmental education	74,40%
Create and implement environmental regulations and guidelines to protect the environment	69,20%
Coordinate the local environmental management system	64,10%
Manage the local environmental fund	56,40%
Carry out evaluations of the local environment, promote conservation programs and sustainable development	51,30%
Others	17,90%

Source: Created by the authors.

The size of the technical team working in the local EL system is shown in Figure 5a, and the form of hiring these workers is shown in Figure 5b. Of the 15 municipalities that implement EL by a consortium (see Table 1), only six mentioned consortia as a "modality of hiring EL professionals" (Figure 5 b). However, it is crucial to notice that each consortium has its scope of operation and management. Therefore, further studies are needed to understand the format, organization and functioning of the consortia established for local EL in Minas Gerais.



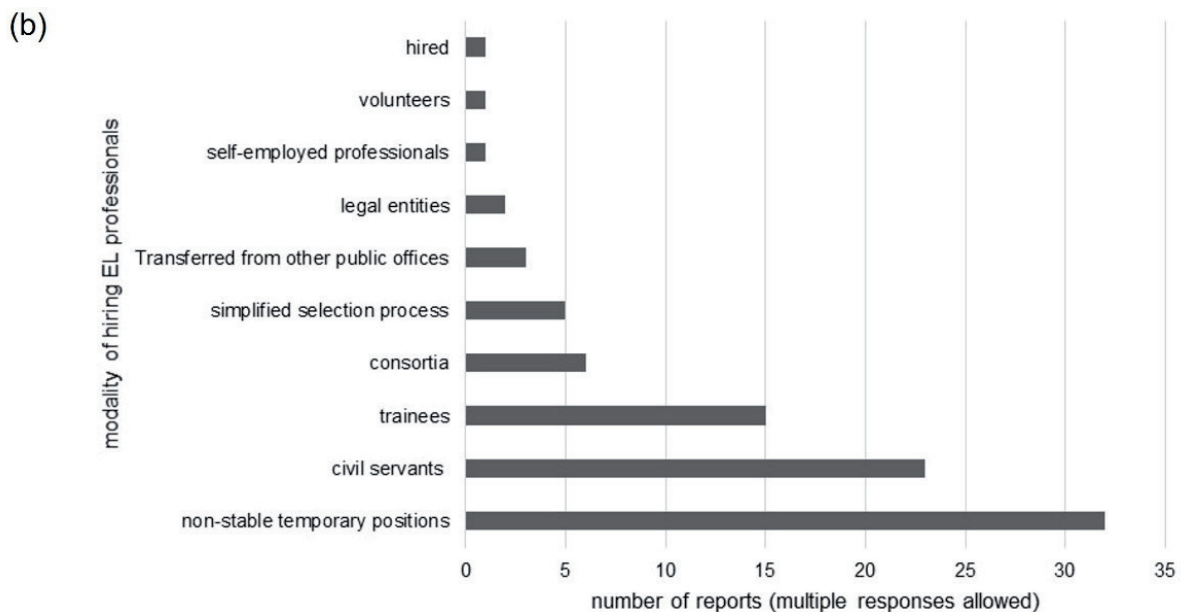


Figure 5 | Number of professionals working in the local EL (a) and their hiring method (b).

Source: Created by the authors.

It was observed that municipalities tend to have small technical teams, with a maximum of five professionals (71.8%) and a high rate of hiring professionals for non-stable, temporary positions (82.1%) (Figure 5). Respondents perceive small teams as the biggest challenge of the local EL (Table 7). These data reinforce the academic literature that points out that staff shortage often hinders the effectiveness of local EL (FONSECA *et al.*, 2017; LEME, 2010; SCARDUA; BURSZTYN, 2003; VERONEZ, 2018). However, the size of the team alone does not fully explain the potential quality of the local EL system; it is necessary to verify the context of each municipality, which in turn is related to their size and socioeconomic profile. According to Leme (2010), many environmental technicians at the municipal level have temporary commissioned positions, which is precarious and incompatible with the stability that is often needed in public environmental policies. For Agnes *et al.* (2009), having professionals in commission positions makes the local administration vulnerable to political pressures and high employee turnover rates, compromising the quality of services.

It could be seen that the number of technicians in the local environmental agencies was even lower before the municipalities decided to implement the EL system (Figure 6 a). Furthermore, few civil servants were hired after the local EL. Only one municipality indicated hiring 12 to 15 civil servants and another of 16 to 19 (Figure 6 b). Both municipalities have more than 300 thousand inhabitants and implemented the EL systems individually, agreeing with the state administration to license large projects (in Minas Gerais, classified as classes 5 and 6).

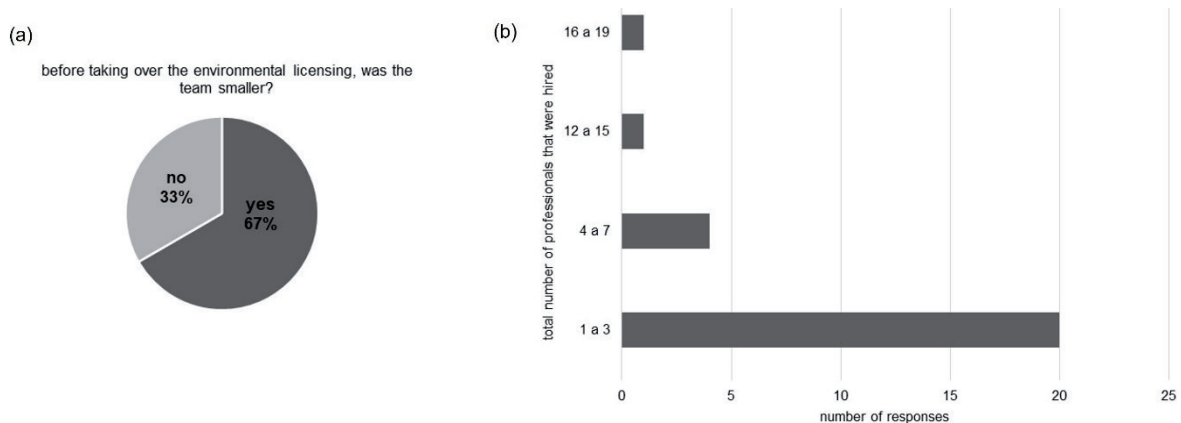


Figure 6 – Percentage of municipalities that hired more technicians to implement the environmental licensing system (a) and a total number of hired professionals (b).

Source: Created by the authors.

Of the 39 surveyed municipalities, 76.9% created specific laws for EL. According to Oliveira *et al.* (2019, p. 422), this finding can be a positive one for municipal management - "municipalities that have their licensing legislation can develop activities more precisely and effectively, respecting their characteristics without overriding the standards already established by the State and Union". In addition to having specific municipal laws, other local environmental management instruments were identified (Table 4).

Table 4 | Legal instruments used by municipalities for environmental management and protection

<i>Policy tools used by local governments</i>	<i>% of the 39 municipalities</i>
Local Environmental Council	97,4% (38)
Municipal Environmental Fund	87,2% (34)
Municipal Sanitation Plan	61,5% (24)
Land-use Plan	61,5% (24)
Local system of inspections and audits	51,3% (20)
Municipal Environmental Policy	43,6% (17)
Municipal Plan for Solid Wastes	28,2% (11)
Local environmental information system	28,2% (11)
Ecological and economic zoning	20,5% (8)

Source: Created by the authors.

According to the Brazilian legislation, environmental councils are a mandatory condition for implementing local EL. However, one of the respondents claimed that its municipality did not have such a council. This is probably due to the respondent's lack of attention (Table 4). On the other hand, less than half of the responding municipalities (43.6%) have a Municipal Environmental Policy that guides their environmental management.

It was found that 87.2% of the 39 municipalities that responded to the questionnaire have a Municipal Environmental Fund (whose acronym in Portuguese is FMMA) (Table 4), responsible for capturing and managing the financial resources allocated to the local. This is a positive finding, considering that in 2015 the IBGE included the existence of the FMMA as an indicator of sound governance structure. For Ávila and Malheiros (2012, p. 43), the FMMA "constitutes an incentive for the implementation of a local environmental structure and brings to the environmental arena the possibility of establishing action and strategies to address environmental issues at the local level in a more autonomous way".

It was found that the FMMAs receive contributions mostly from: fines (79.5%), environmental compensation (59%), ecological taxation (33.3%), transfers from the municipality's budget (17.9%), donations (17.9%) and others (7.8%). Only 10.3% of respondents said that there is no other source of revenue for FMMA besides the EL-related revenue. An open-ended question asked the respondents to complement this analysis: "Describe how and where the financial revenues from environmental licensing are applied". The answers were grouped according to their similarities and arranged in the following descending order: (i) maintenance of the Municipal Environment Department; (ii) maintenance of the inter-municipal consortium; (iii) structuring of the environmental licensing system; (iv) maintenance of protected areas and municipal ecological parks; (v) acquisition of equipment; (vi) reimbursement of the local public budget; (vii) implementation of the Municipal Solid Waste Policy and (viii) environmental education.

3.4 STRUCTURE AND PROCEDURES OF THE MUNICIPAL ENVIRONMENTAL LICENSING SYSTEM

When notifying the state government of its intention to take up EL, municipalities can choose which types of projects (classes 1 to 4) they will license, according to DN Copam N° 217/2017. This study found that all municipalities opted for smaller projects listed under classes 1 and 2; 82% under class 3, and 74% under class 4. Only two municipalities were found to have agreements with the state government to license projects that may have more regional impacts, listed as classes 5 and 6, as shown in Figure 7.

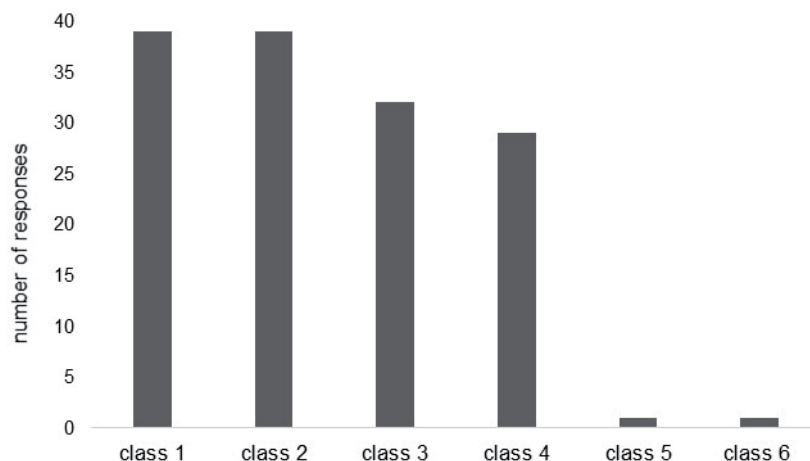


Figure 7 | Classes of environmental licensing assumed by the sampled municipalities.

Source: Created by the authors.

Of the responding municipalities, 57.9% said they license more activities than those listed in DN 213; 39.5% stick to those suggested by the state and 2.6% did not know what to respond. The following list of undertakings and activities were frequently mentioned as being subject to EL at the local level: auto repair shops, car washes, laundries, construction material deposit, bars and restaurants with music and live shows, collection and transport of non-hazardous waste, printers, sawmills, lumber mills, carpentry, sawmills and waste sorting and transshipment area (none of them is listed in DN 213). Therefore, municipalities are expected to create local regulations to include these projects in the EL system.

As for EL procedural demand, almost 70% of respondents stated that between 1 and 10 EL processes are filed per month (Figure 8 a). The municipalities also reported the most frequent types of licensing procedures (Figure 8 b).

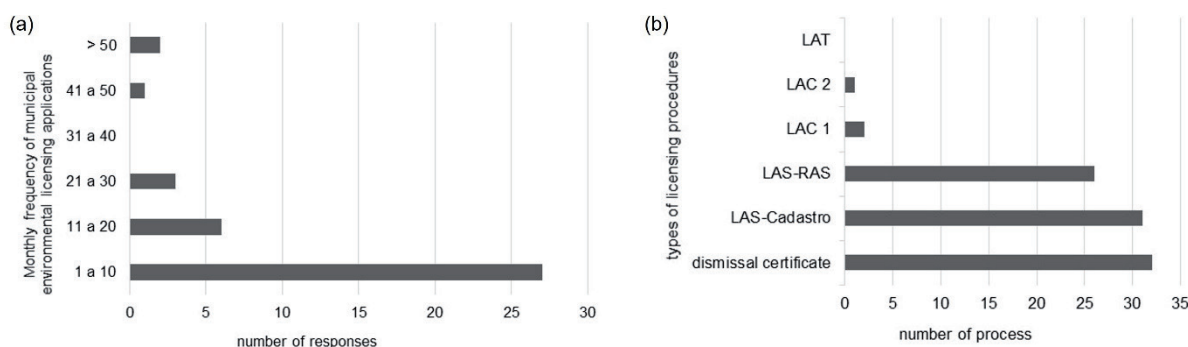


Figure 8 | Monthly frequency of municipal environmental licensing applications (a) and most frequent types of licensing procedures (b).

Source: Created by the authors. According to Art 8 of DN Copam 217/2017, the licensing procedures are LAS-Cadastro: Simplified Environmental License with Registration. LAS-RAS: Simplified Environmental License with Simplified Environmental Report. LAC: Concurrent Environmental License. LAT: Three-Phase Environmental Licensing. LAC 1: preliminary, installation and operating licensing (LP + LI + LO) in a single phase. LAC 2: two phases (LP + LI) + LO or LP + (LI + LO).

The data obtained in the questionnaires corroborate Nascimento and Fonseca (2017). They conclude that environmental licensing at the local level tends to address small-scale activities or ventures with low environmental impacts. In most cases, comprehensive impact assessments (known in Brazil as EIA/Rima) are not required. Only municipalities with agreements with the state government to license Classes 5 and 6 require EIA reports. Thus, it was found that the environmental studies most requested by municipalities in Minas Gerais during the EL process are: Simplified Environmental Report (RAS) (89.7%), Environmental Control Report (RCA) (64.1%), Degraded Area Recovery (Prad) (28.2%) and Environmental Performance Assessment Report (Rada) (17.9%).

Concerning the procedures adopted by the municipalities after the issuance of environmental licenses, all respondents (100%) claimed to follow up on environmental conditions, 59.5% said they request entrepreneurs to file frequent monitoring reports, and 45.9% said that they carry out inspections of licensed enterprises. It should be noted that license conditions can be understood as “commitments and guarantees that the entrepreneur must assume based on the licensed project and the mitigating programs and measures provided for in environmental studies” (BRANDT; AVELAR, 2017, p. 38).

Another aspect addressed in the research refers to the digitalization of the EL system, remembering that Minas Gerais implemented its digital and electronic EL system in 2019 through the ‘EcoSistemas Portal’. The purpose was to investigate whether the municipalities are following this path. Data analysis (Table 5) identified that 48.7% of the municipalities physically carry out all the licensing stages, and only 15.4% have a fully digital procedure. Despite this, the EL in the municipalities follows a trend of digitalization. For most of them, at least one of the licensing stages is already online. In addition, almost all municipalities use digital tools and technologies in the EL system (Table 5).

Table 5 | Percentage of the municipalities that adopt digital procedures and tools.

<i>Digital environmental licensing procedures</i>	<i>% of the 39 municipalities</i>
No digitalization – only paperwork	48,7% (19)
Digitalization of the whole process	15,4% (6)
Digitalization of Terms of Reference and scope decisions	28,2% (11)
Digitalization of project characteristics forms	23,1% (9)
Digitalization of systems for application fees	23,1% (9)
Digitalization of application forms	20,5% (8)
Digitalization of document filing and register	10,3% (4)
Digital environmental license issuing	7,7% (3)
<i>Digital tools and technologies</i>	<i>% of the 39 municipalities</i>
GPS (Global Positioning System)	89,7% (35)
GIS portal and web-maps	87,2% (34)
Photographs	87,2% (34)
Remote sensing	82,1% (32)
Dados do SICAR (Sistema Nacional de Cadastro Ambiental Rural)	71,8% (28)
Metadata from Brazil’s Statistical Agency	61,5% (24)
Mining GIS system (known in Brazil as SIGMERE-ANM)	53,8% (21)
Drones	23,1% (9)
Sound decibel meter	2,6% (1)
Portable water quality testing equipment	2,6% (1)

Source: Created by the authors.

The research also sought to understand the Municipal Environmental Councils' role in the municipality's licensing processes. The results are described in Table 6.

Table 6 | Roles of the Municipal Environmental Councils in the EL processes.

<i>Roles of the municipal environmental councils in the EL process</i>	<i>% of the 39 municipalities</i>
Vote for approval or rejection of environmental licensing applications	89,7% (35)
Evaluate license application review reports	69% (27)
Represent the interests of civil society	61% (24)
Propose local environmental policies	46,2% (18)
Deliberate the use and application of local funds	43,6% (17)
Propose environmental bills to the local legislative body	25,6% (10)
Write review reports	12,8% (5)
Carry out site inspections	12,8% (5)
Others	5,1% (2)

Source: Created by the authors.

In addition to the participation of civil society in the local councils, transparency in the licensing process is a legal prerequisite for EL in Brazil. Ferreira (2015) pointed out that the lack of transparency of the more complex procedures of EL is often criticized in Brazil's EL systems. In this sense, we sought to identify the means used by the municipalities to publicize the EL processes: 71.8% (28) responded that the information about the EL processes is available on the websites of the municipalities; 33.3% (13) that information is disclosed in council meetings, which are open to the population; 25.6% (10) that information is published in local newspapers; 20.5% (8) mentioned the Official Gazette of Minas Gerais, and 5.1% (2) local radios. None of the municipalities mentioned using social networks, internet video channels, or local TVs to publicize EL-related information, except for one respondent who indicated the use of Instagram, among other potential responses.

3.5 INTERCITY EL PUBLIC CONSORTIA

The possibility for municipalities to organize themselves into consortia is provided in Art. 241 of the Federal Constitution, regulated by Law 11,107/2005. In the environmental field, LC 140 considered the public consortium one of its cooperation instruments, allowing the implementation and integration of actions. For this, the consortia must have qualified technicians and some professionals that are compatible with the workload of the local EL system (BRASIL, 2011; CORRALO; BOANOVA, 2017).

The state of Minas Gerais regulated in DN 213, in its Art. 5, paragraph 2, the possibility of implementing EL through inter-municipal consortia. About half of the 121 municipalities implementing EL until December 2020 did so by the consortium. There are 60 municipalities divided into three consortia. The Environmental Consortium of the North of Minas (Codanorte), based in Montes Claros, bringing together 28 municipalities; the Vale do Aço Intermunicipal Multipurpose Consortium (Cimva-Leste), in Ipatinga, has 25 municipalities and the Intermunicipal Public Consortium for Sustainable Development (Cispar), in Patos de Minas, aggregates 7 municipalities (Table 1).

This study found that, for the Government of Minas Gerais, consortia are considered the most viable way for municipalities with less than 20 thousand inhabitants to implement EL – “It works as a technical, legal and administrative support for municipalities that individually cannot absorb this demand” (Interviewee 1). In this sense, Farias (2017) and Rezende (2013) consider that due to the

lack of financial and personnel resources reaching most municipalities, inter-municipal consortia are a solution for the decentralization of public environmental policies. In the same direction, Leme (2010, p. 47) analyzes that by joining together in consortia, small municipalities are strengthened and gain "the strength of dialogue with other entities [...], in addition to solving regional problems".

According to Semad's data (2020), of the 60 municipalities that had implemented EL through consortia by December 2020, 46 had a population of fewer than 20,000 inhabitants – Cimva-Leste (21), Codanorte (20) and Cispar (5). These numbers indicate that 76% of the municipalities that had implemented EL through consortia are small, with less than 20,000 inhabitants. Among the 61 municipalities that implemented EL individually, only 22.95% have a population of less than 20 thousand inhabitants. It was also observed that none of the 60 municipalities implementing EL through consortium signed an agreement with the state government to issue environmental licenses for larger projects listed under classes 5 and 6.

It was also found that, regardless of how municipalities implement EL, most municipalities have specific laws for licensing (Fisher's exact test, $p = 0.14$), with 88% for those who joined a consortium and 68% for those who did so by individual membership.

Among the 39 municipalities studied here, 46.6% responded that all revenues from the EL system go to the Municipal Environmental Fund (FMMA); 23.1% that part of them and 33.3% that the revenues are not directed to the fund. It was possible to identify that the form of adherence to the EL procedure is likely to influence the allocation of revenues to the FMMA ($\chi^2 = 23.289$; $p < 0.001$). When a membership is made with a consortium, 53% of the respondents indicate revenue is not directed to the FMMA, and 47% indicate a share goes to the fund. None of the consortium municipalities has all the revenue allocated to this fund (Figure 9b).

On the other hand, when EL is implemented individually, 76% of respondents indicate that all the revenue goes to the FMMA, 10% indicate that part of the revenue and only 14% indicate that none of the revenue goes to the fund (Figure 9a), which is related to the percentage of municipalities that do not have an FMMA (12.8%).

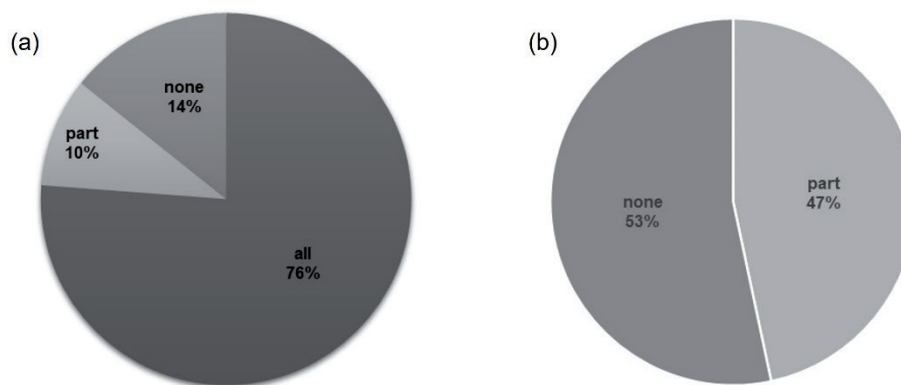


Figure 9 | Comparison between the destination or not of the EL-related revenue to the local environmental fund (FMMA) in municipalities with individual EL (a) or among those who adhere to consortia (b).

Source: Created by the authors.

The EL membership modality was not related to the inclusion by the municipality of activities and undertakings not listed in DN 213 ($\chi^2 = 2.901282$; $p = 0.08851$). Of the consortium municipalities, 25% do not license activities out of the scope of the DN 213, and 75% do. Among the municipalities implementing EL individually, 52.38% do not include a license for activities other than those listed in the state regulation, while 47.62% do so.

3.6 DIFFICULTIES, STRENGTHS AND PERSPECTIVES OF THE LOCAL EL SYSTEM

When questioned, "What are the difficulties encountered in the process of implementing the local EL?" the most marked responses were: shortage of technical staff (71.8%), low salaries of the technical staff (46.2%) and lack of infrastructure (43.6%) (Table 7). Since all respondents said they monitor the license conditions, it is noteworthy that 14 (35.9%) of them have difficulty in this monitoring, which may be related to the shortage of staff. The data obtained corroborate the academic literature, pointing out these difficulties in the decentralization of EL in Brazil (ABREU; FONSECA, 2017; AGNES *et al.*, 2009; NASCIMENTO; FONSECA, 2017; SCARDUA; BURSIZITYN, 2003). Azevedo *et al.* (2007, p. 51) also pointed out these deficiencies and consider that the success of decentralization processes lies in "institutional sustainability" (the financial and administrative capacity of municipalities).

Concerning the positive aspects of the decentralization of EL (Table 7), two aspects were pointed out by 87.2% of the respondents: knowledge of the local environmental conditions and the proximity between government, community and developers. These points had also been found by Nascimento and Fonseca (2017) as positive aspects of local EL systems, in dialogue with Schmitt and Scardua (2015, p. 1126), who consider "that local knowledge makes it possible to know how to manage natural resources better".

Table 7 | Implementation difficulties faced by local governments and positive aspects of the local EL system

<i>Implementation difficulties</i>	<i>% of the 39 municipalities</i>	<i>Positive aspects</i>	<i>% of the 39 municipalities</i>
Shortage of staff	71,8% (28)	Knowledge of local environmental conditions	87,2% (34)
Low salaries of those working in the EL system	46,2% (18)	Proximity of local governments, communities and developers	87,2% (34)
Lack of adequate infrastructure	43,6% (17)	Dedication and effort of environmental staff	64,1% (25)
Difficulty to follow up on license conditions	35,9% (14)	Participation of local citizens in environmental issues	61,5% (24)
Lack of state support to the decentralization	28,2% (11)	Environmental awareness of the local population	59% (21)
Political interference in the licensing decision-making	20,5% (8)	Subsidies for local public policies	53,8% (21)
Developer's interference in the licensing decision-making	15,5% (6)	Increased government revenue	53,8% (21)
Lack of procedural standardization	12,8% (5)	Easier information access	33,3% (13)
Slow and cumbersome licensing procedures	7,7% (3)	No positive aspects	2,6% (1)
No difficulty	7,7% (3)		

Source: Created by the authors.

It can be seen that the difficulties "political interference in licensing decision-making" (20.5%) and "developer's interference in licensing decision-making" (15.5%) contradict the positive aspects of the "proximity of government, communities and developers" (87.2%) and "approaching the population to the challenges of environmental and territorial management" (61.5%). The frequencies observed arguably indicate that the positive aspects of the proximity of developers outweigh the potential negative impacts of hidden interests.

When asked, "What recommendation would you give to a municipality that is considering the implementation of environmental licensing?", 27 of the 39 respondents provided responses which were

grouped into the following suggestions and recommendations, in descending order of occurrence: (i) Having a competent technical and legal team in constant training and capacity-building, as well as the necessary infrastructure for the EL system – present in almost all responses; (ii) Be aware of the local EL system’s responsibilities and difficulties, as well as patience and persistence with the process; (iii) direct recommendation for municipalities to implement EL, highlighting that there are more advantages than disadvantages; (iv) Create specific municipal laws for EL; (v) Plan and implement the local EL gradually and in a staged manner, attentive to the potential lists and classes of projects that the municipality can work with; (vi) Monitor the EL demand and its implementation and (vii) Learn from municipalities that are already implementing EL.

4 CONCLUSIONS AND FINAL REMARKS

This study sought to explore the experience of the municipalities of the state of Minas Gerais that took up local environmental licensing. The results indicate that after the DN 213/2017 regulation, there was a significant growth of local EL in Minas Gerais, even though less than 15% of the municipalities had taken over this responsibility by the end of 2020. It is noticed that inter-municipal consortia have been a path adopted mainly by small municipalities in Minas Gerais. The data obtained reinforce the importance of this strategy. New studies are needed to understand further the scope, format, organization and functioning of each consortium established for EL in Minas Gerais.

The most significant difference that could be detected between the municipalities that implement EL via consortia compared to those that do so individually was related to the allocation of revenues collected in the licensing procedures. Municipalities that act individually use more frequently the Municipal Environment Fund (FMMA). Almost all consortium municipalities stated that they were not using the FMMA to implement the local EL system. However, more specific studies are needed to analyze and monitor how municipalities manage and apply these funds, considering their potential relevance for projects, actions and socio-environmental improvements in the municipal territories.

While 84% of the municipalities have municipal environmental secretariats, they also face difficulties such as lack of organizational infrastructure – small technical teams and low salaries. Perhaps this is why the consortium modality has been sought after, and the decentralization process has been slower in Minas Gerais state than in other Brazilian states.

On the other hand, decentralized EL plays an essential role in the environmental management of municipal territories, with greater participation of local actors, through municipal councils, in decision-making. Added to these good points is the observation that the agility and reduction of red tape are the main motivations for implementing EL at the local level. Future studies should verify respondents’ perceptions and investigate whether local EL systems are, in fact, faster and more efficient than those carried out by state and federal governments.

Overall, this study found that while the decentralization of EL in Minas Gerais to the municipal level has been growing, implementation has been complex, challenging, and heterogeneous. Therefore, scholars should continue to investigate the effectiveness of EL in Minas Gerais’ municipalities.

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