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Benefits and barriers of public transparency in Rural Environmental Registry data

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Abstract: Public transparency is important for society to increase confidence in public authorities, democratically participate in decisions, and monitor governmental actions related to environmental control. This study aimed to analyze the benefits and problems/risks associated with information disclosure about private land conservation in the context of the Rural Environmental Registry (CAR, its Portuguese acronym). A systematic review about public transparency in private land conservation was performed. The selected articles went through Content Analysis, resulting in lists with public transparency benefits and problems, which based the questionnaires applied to CAR stakeholders. The main problem identified was the landowners' fear of declared information use, while the main benefit was the contribution to the effectiveness of conservation programs. Thus, the social function of private property justifies the hierarchical disclosure of information.

Keywords: Information access; Rural Environmental Registry; Private land conservation; Forest Legislation; Public transparency.

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INTRODUCTION

Environmental policies are the main instrument to restrain the growing exploitation of environmental resources and the ongoing biodiversity loss (ARSEL; BÜSCHER, 2012; MARQUES; RANIERI, 2012). Protected Areas (PAs) are instruments recognized in various international political contexts and represent the main global strategy to control ecosystem degradation and biodiversity loss (UNEP-WCMC, 2018).

However, the percentage of PAs in the form of parks and reserves is insufficient to guarantee the conservation of biodiversity, basins, and natural landscapes (BINGHAM et al., 2017; BUTCHART et al., 2015; GALLO et al., 2009). For this reason, researchers, managers, entities, and non-governmental organizations consider that the strategies for conservation of natural resources on private lands, in harmony with rural activities, are important to help achieve global conservation goals (GALLO et al., 2009; SILVA; RANIERI, 2014; BINGHAM et al., 2017; DRESCHER; BRENNER, 2018; MITCHELL et al., 2018).

Private land conservation can be performed involuntarily, voluntarily, or by a combination of both (KAMAL; GRODZI□SKA-JURCZAK; BROWN, 2015). Environmental policies in Latin American countries, such as Brazil, are traditionally based on the use of command and control instruments, which are characterized by direct regulation, such as sanctions, licensing, deforestation restrictions, and zoning guidelines (SWIFT et al., 2004; BARROS et al., 2012).

A controversy in countries where voluntary mechanisms predominate is the fact that rural landowners have more information on the costs and local impacts of conservation actions than the Government (OWLEY; RISSMAN, 2016; VERGAMINI; WHITE; VIAGGI, 2015). According to these authors, this fact may result in the information omission or its selective provision. It can be a problem, especially if such voluntary actions are encouraged through economic incentives, using public resources.

Accurate and timely information is essential for the decision-making process related to conservation issues to be effective (ROSE et al., 2015). Increasing the transparency level in government decision-making strengthens the commitment to democracy and citizen involvement. However, higher transparency can make negotiations longer and the communication process more difficult (BALL, 2009).

According to Rissman et al. (2017) and Rissman and Smail (2015), obtaining, processing, storing, and making available information about private rural properties can also generate a situation of potential conflict. On the one hand, there is pressure from landowners concerned about privacy and the use of data collected in planning and policies that affect their properties. However, on the other hand, there is a concern of funders and society in general with the effectiveness of instruments adopted to promote conservation and the accountability of governmental actions (RISSMAN et al., 2017; RISSMAN; SMAIL, 2015).

According to Turner et al. (2015), the main limitations to the availability and access to conservation-related data are due to the lack of effective strategies and distribution tools. The authors also pointed out that the training of end users (e.g., members of

civil society and public agents) is essential to improve access and treatment of raw data, when available.

Furthermore, according to Briske et al. (2017), the lack of documented information about the results of conservation actions may be due to: a mistaken perception that the benefits of conservation practices are considered a certainty, making documentation unnecessary; the lack of knowledge exchange between the Government and the scientific community; the scarcity of scientific data that prove the effectiveness of conservation actions; and also inadequate technical support for landowners after the implementation of conservation practices. Still according to these authors, overcoming these barriers is essential to increase the effectiveness and accountability of conservation programs on private lands.

In the Brazilian context, the Rural Environmental Registry (CAR, its Portuguese acronym), created with the enactment of Federal Law No. 12.651/2012 and later regulated by Normative Instruction No. 2/2014 of the Ministry of Environment (MMA), is an innovative instrument for the integration of publicly available data, environmental enforcement, and management of rural properties (BRASIL, 2012; 2014; FONSECA; SILVA, 2015; ROITMAN et al., 2018).

Complementarily, the National System of Rural Environmental Registry (SICAR, its Portuguese acronym) consists of a nationwide electronic system for the management of the information declared in CAR, as established by Federal Decree No. 7,830/2012 (BRASIL, 2012b). SICAR's public consultation module allows citizens to download information and georeferenced data by municipality (ROITMAN et al., 2018). According to these authors, it represents an advance in public transparency and allows verification of compliance with forest legislation. However, the publication of Normative Instruction MMA No. 3/2014, which instituted SICAR's Information Integration and Security Policy, raised discussions regarding the guarantee of the instrument's transparency by ensuring the confidentiality of personal and patrimonial information (FONSECA; SILVA, 2015; VALDIONES; BERNASCONI, 2019).

Few scientific studies have addressed the potential, defects, and implications of CAR and SICAR for nature conservation, as they are fairly recent instruments (COSTA et al., 2018; JUNG et al., 2017; OLIVEIRA et al., 2018; ROITMAN et al., 2018), mainly regarding their functions of increasing transparency through the disclosure of information of public interest (FONSECA; SILVA, 2015; IPAM, 2016; VALDIONES; THUAULT, 2019). Furthermore, environmental registration initiatives in Brazil are globally important because they cover millions of hectares of forest lands and serve as an example for programs in other countries (L'ROE et al., 2016).

Thus, this study aimed to analyze the benefits and problems/risks associated with information disclosure about private land conservation, in the context of CAR and SICAR, from the perspective of stakeholders and having as reference the scientific literature.

METHODOLOGICAL PROCEDURES

This research was carried out in two stages, firstly using the bibliographic survey method (GIL, 2009), through the Systematic Literature Review (SLR) and Content Analysis. The SLR stages were adapted from the recommendations set out in the Guidelines and Standards for Evidence Synthesis in Environmental Management, version 5.0 (CEE, 2018).

The search for scientific documents was carried out on the scientific platforms Sci Verse Scopus and Web of Science. The terms and research strategy adopted in this study are shown in **Chart 1**.

Chart 1 – Terms used in the search for relevant work

First word			Second word		Third word	
*Transparen**	*Accountability*	**AND**	*Environment**	**AND**	*Private area**	*Private land**
Public information	*Information technology*		*Restor**		*Private propert**	*Land trust**
Access to information	*Information access*		*Conserv**		*Landhold**	*Landowner**
Information asymmetry			*Forest**			

Notes:

1 The terms inserted in the columns were separated by the Boolean operator "OR" to perform the searches.

2 The searches were carried out on February 11, 2019.

Source: Prepared by the authors.

The results obtained went through three filtering steps to select the most relevant studies for analysis. Before the first filtering, the results obtained from each database were merged to exclude duplicated documents. The first filter consisted of selecting articles and book chapters in the English language, discarding the others.

Then, the title, abstract, and keywords of the selected studies were read. Documents that did not explicitly focus on private land conservation were excluded. Studies resulting from the second filtering were fully read, and those that did not have key elements for analysis and discussion were excluded.

The research synthesis was carried out through the combination of narrative and qualitative syntheses (CEE, 2018). The textual analysis of the extracted excerpts was performed using the Content Analysis technique. A spreadsheet to record the components

to be coded and extracted from the results and/or conclusions of each selected study, that is, benefits and problems/risks associated with public transparency, was established to reduce the possibility of errors and biases (TRANFIELD; DENYER; SMART, 2003). "Codable" phrases found in the introduction of the articles were not extracted, as they refer to other studies, often already incorporated in the SLR.

A first "floating reading" of the documents was carried out, followed by the material exploration through the coding of textual data, which involved the snippet (choice of units), enumeration (choice of counting rules), and classification (choice of categories) (BARDIN, 2011; FRANCO, 2007; GIL, 2009). The context unit, formed by the sentences extracted from the documents, was chosen for this research. The number of records in each category and subcategory was counted to support the next step of the methodology (preparation of questionnaires).

Considering that the snippet chosen in this research was the context units, semantic categorization was chosen, and emerging categories were used to organize and group the extracted phrases into thematic groups **(Chart 2)** (HSIEH; SHANNON, 2005).

Chart 2 – Description of the criteria used to create the categories of the analyzed content referring to the benefits and problems/risks of transparency in the management and disclosure of information about private land conservation

Category		Description
BENEFITS	General	Benefits applicable to more than one category or that improve the effectiveness of the conservation instrument
	Society	Benefits for all citizens
	Government	Benefits for the public functioning and accountability
	Landowners	Benefits for landowners involved with conservation instruments
	Economy	Financial benefits for any stakeholder
PROBLEMS/ RISKS	General	Problems/risks associated with information disclosure about private land conservation
	Economy	Problems/financial risks associated with information disclosure about private land conservation

Source: Prepared by the authors.

A list of benefits and problems/risks associated with public transparency in the management and disclosure of information about private land conservation was produced at the end of this stage. The interpretation of results allowed the underpinning of the questionnaire applied to CAR stakeholders.

According to Flick (2009) and Mattar (2012), theoretical sampling is adopted in quantitative research in which the population size is unknown, as it is not possible to

define probabilistic samples. In this study, theoretical sampling was adopted because the number of people involved with CAR is not known.

After consulting experts and based on the literature on the subject, five social groups were considered, according to their relationship with CAR, namely:

I) Civil society organizations: employees of institutions that make up the Forest Code Observatory.

II) CAR managing bodies: civil servants from the Brazilian Forest Service and the state and Federal District environmental secretariats.

III) Environmental consulting companies: employees and/or owners of environmental consulting companies. The selection of participants was carried out through a search on the Google search engine, using the term "Consultoria Ambiental CAR."

IV) Associations of rural landowners: employees of agricultural sector associations at the national level, Technical Assistance and Rural Extension Corporation (EMATER) in different Brazilian states, State Federations of Agriculture and Livestock, state National Rural Learning Services (SENAR), and local rural unions.

V) Scientific community: researchers linked to Brazilian institutions. The selection was carried out through a search for doctors in the CNPq Lattes platform using the terms: "Cadastro Ambiental Rural" and "Rural Environmental Registry." Researchers who have research projects or publications in journals whose search term appeared in the publication title were selected.

The final sample of each social group was randomly selected but seeking to maintain a balanced representation between Brazilian regions. Only one respondent was chosen per institution, except for the 'scientific community' group. All participants received the questionnaire together with the Informed Consent Form, which described the research and questionnaire objectives, the voluntary participation of respondents, and the guarantee of anonymity of answers[1]. The questionnaire was prepared on the Google Forms platform and sent by email after telephone contact with the participants.

Both the benefits and problems/risks identified in four or more documents were rewritten in the form of statements adapted to the CAR Brazilian context. This cut-off line was defined to reduce the number of questions so that the questionnaire was not too long, decreasing the answer probability (GIL, 2009). Four benefits fit this criterion, generating four statements. Only one problem/risk met this criterion, which generated three statements. Therefore, research participants were asked to rate the agreement level with each sentence, using a 5-point Likert scale, which ranged from 'strongly agree' to 'strongly disagree' (KNAPP; STUART CHAPIN; COCHRAN, 2015).

Questionnaires were sent to 68 individuals and 51 responses were obtained (75% return). The period for receiving responses was between October 14 and November 20, 2019. Ten responses were obtained in each group, except for Group V, from which 11 responses were obtained.

1 - The approval of the Research Ethics Committee of Universidade de São Paulo was requested and obtained under No. CAAE 20114719.2.0000.5422 before the questionnaire applications.

RESULTS AND DISCUSSION

Respondents profile

Professionals from all Brazilian regions participated as respondents in the survey, with the Southeast region concentrating more respondents (31%), followed by the Midwest (23%) and South (22%) regions. The Northeast region concentrated 18% of respondents, while the North region had the lowest rate of responses received (6%).

Regarding the age of respondents, 23.5% were under 30 years old at the time of participation, 33% between 30 and 39 years old, 20% between 40 and 49 years old, and 23.5% were over 50 years old. Regarding the length of professional experience of participants with the theme "private land conservation", 45% have worked in the area for more than 10 years, 41% had 3 to 10 years of experience, while 14% have worked for less than 3 years in the area.

Finally, regarding the level of education of respondents, 25% had a doctorate degree, 16% had a complete master's degree, 27% had a complete higher education with a specialization (lato sensu), 24% had a complete higher education, and 8% had an incomplete higher education.

Public transparency benefits

The search on scientific platforms captured 156 documents (the duplicates already excluded). The screening process resulted in the exclusion of 134 documents. A total of 118 excerpts were extracted, categorized, and analyzed from the remaining 20 articles and two book chapters, pointing to benefits and the problems/risks associated with the information disclosure about private land conservation and/or their transparent management (Appendix I). The content analysis allowed the identification of 14 benefits (**Chart 3**).

Chart 3 – Benefits indicated by the analyzed literature regarding the transparent management of information about private land conservation

Category	No.	Benefit	No. docs
General	1	Contributes to the integration and coordination of efforts, ensuring the viability and benefits of the long-term conservation	6
	2	Increases the efficiency of the instrument aimed at private land conservation	2
	3	Assists in monitoring and evaluating the progress of conservation actions and in monitoring social, environmental, and economic impacts	4
	4	Reduces illegal deforestation	1
Society	5	Increases the engagement of all stakeholders in initiatives and practices related to private land restoration and conservation	3
	6	Helps society to assess whether public resources earmarked for private land conservation are being effective	2
	7	Increases citizens' ability to learn about conservation-related projects and practices	2
	8	Increases public participation and social justice	2
Government	9	Improves accountability for government actions	3
	10	Contributes to the quality of environmental and financial planning of instruments aimed at private land conservation	4
	11	Helps public agents to make better decisions about priorities for conservation and management of natural resources	3
Landowners	12	Improves private sector compliance with environmental legislation	5
Economy	13	Increases profits for landowners and participants in financial incentive-based conservation programs	3
	14	Increases the cost-effectiveness of financial instruments aimed at private land conservation	2

Source: Prepared by the authors.

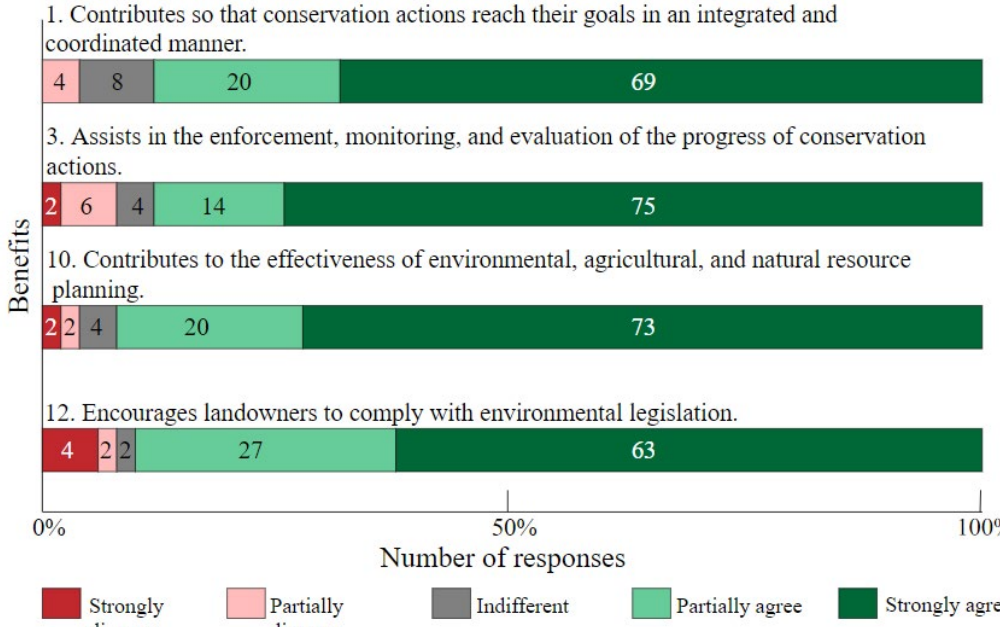
Janssen, Charalabidis, and Zuiderwijk (2012) researched the benefits of systems that use open data in the Netherlands and classified them as political-social, economic, and technical or operational. Similar to this study, the authors listed a series of benefits that, although not related to nature conservation, corroborate the obtained results. Democratic accountability, creation of trust in public authorities, increased society participation and engagement, equity, learning development, the possibility of use for different purposes, availability of information for investors, improvement and fairness in decision-making processes, and increased cost-effectiveness of systems are among the benefits listed in

both surveys.

Some benefits of public transparency are already very well established in the scientific literature. Higher transparency levels are positively correlated with the improvement in the financial management quality and the reduction of corruption levels in the public sector (CUCCINIELLO; PORUMBESCU; GRIMMELIKHUIJSEN, 2017). However, the benefits of public transparency in the environmental sphere and, specifically, nature conservation, are poorly documented and usually punctually discussed (MORRIS; RISSMAN, 2009; RISSMAN et al., 2017; CLEMENTS et al., 2018).

Thus, the answers obtained through the application of the questionnaires demonstrated the agreement of the participants with the benefits pointed out by the scientific literature in the CAR context (**Figure 1**).

Figure 1 – Answers to the question: "The main BENEFITS of public transparency applied to private land conservation, indicated by the scientific literature, are listed below. Indicate, in the CAR context, your degree of agreement with the listed statements"



Note:

The numbers preceding each statement correspond to the benefit rewritten from Chart 3.

Source: Prepared by the authors.

A higher frequency of responses was in line with the benefits suggested by the scientific literature, as the statements obtained a partial or total agreement from the ex-

pressive majority of respondents. Therefore, the results show that the benefits generated by public transparency, in the different contexts in which instruments aimed at private land conservation are applied, are also recognized by the vast majority of actors related to CAR.

Collaboration between state and private actors for more transparent and successful conservation initiatives is crucial for benefit 1 to occur, ensuring and protecting conservation benefits over time (BODIN, 2017; CLEMENTS et al., 2018; MORRIS, 2008; OWLEY, 2015; RISSMAN et al., 2017). Participatory strategies are essential for successful and socially fair environmental policies and, therefore, information disclosure has the advantage of increasing the instrument transparency, also leading to a positive long-term effect on society's participation and perception of justice (benefit 8) (CASTRO et al., 2006; GLEBE, 2013; MESSER et al., 2017).

Some studies also suggest that making as much information available as possible improves the identification of high-quality actions aimed at private land conservation, consequently improving the efficiency of the instrument in question (benefit 2) (CONTE; GRIFFIN, 2017; MESSER et al., 2017).

The simple disclosure of geospatial information allows any citizen to monitor private land conservations, making illegal deforestation almost automatically visible (benefits 3 and 4) (RAJÃO; VURDUBAKIS, 2013). Therefore, landowners are likely to reduce actions and behaviors related to illegal deforestation due to concerns about increasing visibility for monitoring and enforcement or also in response to incentives associated with being visibly compromised (L'ROE et al., 2016; RISSMAN et al., 2017).

Access to information culminates in increased engagement in actions related to conservation and restoration and the motivation to invest in environmental practices and programs (benefit 5). In the case of this benefit, data-driven transparency, when understood as a form of civic duty, allows the citizen to understand the social value in question and get involved in political affairs, resulting in the citizenship strengthening (BIRCHALL, 2015; MEIJER; 'T HART; WORTHY, 2015).

Opportunities generated by public transparency include the many ways in which maps and information on conservation efforts on private lands can facilitate environmental, agricultural, and natural resource planning (benefit 10) (MORRIS; RISSMAN, 2009; RISSMAN et al., 2017; RISSMAN; SMAIL, 2015). In addition, the right to information is necessary so that environmental decisions are made fairly (OKSANEN; KUMPULA, 2013).

Some studies have shown that the decision-making process on conservation priorities is of better quality, more strategic, and egalitarian when there is higher public transparency (benefit 11) (MORRIS, 2008; MORRIS; RISSMAN, 2009).

Transparent mechanisms for publicity and access to information are important to improve landowners' compliance with environmental legislation (benefit 12) (GLEBE, 2013; L'ROE et al., 2016; MESSER et al., 2017; OWLEY, 2015). Moreover, Federal Law No. 12,651/2012 amnesty illegal deforestation occurring before July 22, 2008 (BRASIL, 2012; IPAM, 2016; JUNG et al., 2017; COSTA et al., 2018; COSME; SILVA, 2019).

According to the aforementioned authors, the fact that the law has given this amnesty may generate the expectation that other will come in the future, which reinforces the need for CAR data transparency for public control of what is actually happening in properties over time.

According to Conte and Griffin (2017) and Glebe (2013), the cost-effectiveness of the instrument aimed at private land conservation will also be greater the higher the information disclosure (benefits 13 and 14). This is because landowners feel more motivated to participate in conservation programs the greater the information about these programs and the greater the perceived public transparency.

Strategies that aim to incorporate citizens' preferences are needed to increase transparency and make governments work better, which does not always mean just complying with the law (CUCCINIELLO; NASI, 2014). Transparency need not be a mere formality, but a tool at the service of the public administration to interact with stakeholders. Similarly, conservation needs to be based on a database that explains the rights, risks, and responsibilities of private land conservation for society (ANHALT-DEPIES et al., 2019).

The simple information disclosure does not guarantee that the benefits will be generated automatically and, similarly, the opening of the data does not imply unrestricted disclosure of all information. The public authorities must have the responsibility in the data management processes to guarantee their protection and also make processed and aggregated data available. Even so, the large amount and complexity of information will hardly make it easy for any member of society to understand (JANSSEN; CHARALABIDIS; ZUIDERWIJK, 2012).

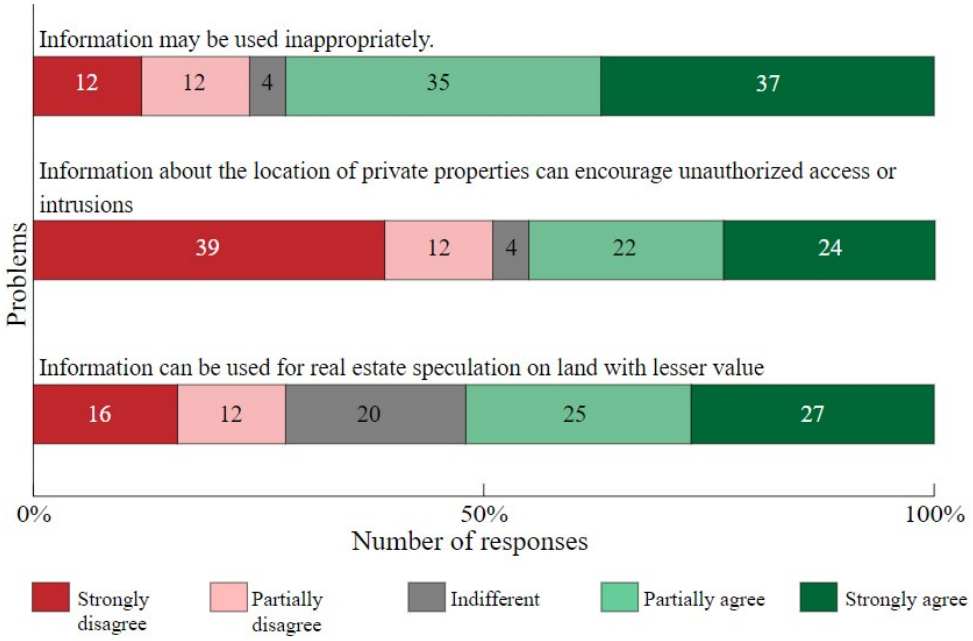
Problems/risks associated with information disclosure

Information disclosure has both benefits and problems and/or risks. Conservation-related institutions may not provide public access to information for a variety of reasons, including concerns on the privacy of landowners, low technical and institutional capacity, legal restrictions, concerns on the use for non-conservation purposes, preference for limiting public involvement, and concern on property invasions and vandalism. In addition, the resistance of landowners to provide and make available data may be related to the fear of higher monitoring and restrictions on their behavior (RISSMAN et al., 2017).

The main problem, mentioned in four documents, was the "Inappropriate use of information (e.g., manipulation of data to support a certain position, use for real estate speculation of lands with lesser value, and location data that may favor invasions)." Although information technology is indisputably useful, there is a risk that landowners will begin to feel that their privacy is being invaded as the collection and analysis of information increases in scope (HUFF, 2015). The result of this perception of invasion may be a decrease in the landowners' trust in assistance providers and, ultimately, the government.

For this question in the CAR and SICAR contexts, unlike the benefits, answers were less concentrated in the two agreement options (**Figure 2**).

Figure 2 – Answers to the question: "The main problems arising from the EXISTENCE of public transparency about private land conservation, indicated by the scientific literature, are listed below. Indicate, in the CAR context, your degree of agreement with the listed statements"



Source: Prepared by the authors.

Regarding the first problem, most respondents fully or partially agreed with the statement (n = 19; 37% and 18; 35%, respectively). One of the respondents from the 'Scientific community' group agreed with the statement, justifying that "*Data source is power, and we will never know if the government will use it for good or for actions that favor it and harm the farmer.*" In fact, concern about the privacy of landowners is reported as a primary impediment to making information about private land conservation available (CLEMENTS et al., 2018).

Landowners are concerned that the information can be manipulated (by the government or any stakeholder with an interest in conservation) to support a certain position or for commercial gain (CLEMENTS et al., 2018; HUFF, 2015; MORRIS; RISSMAN, 2009). However, another answer to this question emphasized that "*Information, when made available, can lead to misuse, but it does not diminish the importance of making environmental information public*" (individual from the 'CAR managing bodies' group).

Making data available in a transparent way can reduce, for example, situations of abuse of power (TEJEDO-ROMERO; ARAUJO, 2018), as access to information enables citizens to hold public officials accountable for their actions. Therefore, higher transpar-

ency in the SICAR database represents a greater opportunity for civil society to monitor, inspect, and, if necessary, report inappropriate use of these data.

The answers to the second problem are more inconclusive, as 51% of respondents (n = 26) disagreed to some degree, while 46% (n = 23) agreed. Some studies have reported that the availability of information and spatial data can lead society to wrongly assume that conserved areas on private land provide public access (CLEMENTS et al., 2018; EBERS; NEWMAN, 2014; MORRIS; RISSMAN, 2009). Conservation entities may also be concerned that public access to information could harm the security of conservation values, related to the collection of rare species and theft of cultural resources (RISSMAN et al., 2017).

However, Morris and Rissman (2009) studied a case in Massachusetts (USA), in which there was a map and publicly accessible information and, according to officials, there were never any complaints from landowners associated with this issue. According to the authors, although the risks of intrusion can be substantial, there is no reason to think that making information available will lead to a widespread demand for this problem.

The results do not allow us to state whether this is a problem applicable to the CAR and SICAR contexts. However, one of the respondents who disagreed with the statement mentioned the existence of legal means to guarantee the protection of property in the Brazilian context.

Regarding the last problem listed, there was a higher percentage of "indifferent" answers compared to the previous questions. Among the respondents, eight strongly disagreed (16%), six partially disagreed (12%), ten were indifferent (20%), 14 fully agreed (27%), and 13 partially agreed (25%).

The negative consequences for control bodies and the environmental services market (e.g., Environmental Reserve Quotas) were mentioned among those who agreed with the statement. In this case, it is not directly related to real estate speculation but financially affects the property. This last question is addressed in articles dealing with economic instruments. For instance, studies have suggested that providing complete information generally increases the efficiency of auctions and market performance (CONTE; GRIFFIN, 2017; GLEBE, 2013), while other studies have concluded that the disclosure of this information decreases their efficiency (MESSER et al., 2017).

The tension between the individual's right to privacy and society's right to obtain public interest information represents a conflict between two vital democratic values (MORRIS; RISSMAN, 2009). Although transparency has some adverse or perverse effects (and, inevitably, Governments end up losing some level of control when opening their data to the public), new types of governance mechanisms and policies are required (JANSSEN; CHARALABIDIS; ZUIDERWIJK, 2012). The concern of landowners involved with private land conservation instruments is legitimate and, therefore, Governments must recognize this issue and deal cautiously with the availability of data considered to be the most sensitive.

CONCLUSIONS

The systematic literature review carried out revealed that the disclosure of information related to private land conservation contributes to the efforts to be effective, integrated, and coordinated, as well as improves the compliance of the private sector with environmental legislation, ensuring the viability of conservation in the long term. On the other hand, transparency increases the risk of inappropriate use of publicly available data.

Although it is recognized that the information disclosure about private land conservation can cause problems and risks, the social function and benefits for the whole society justify the need for transparency provided that good practices in the management of the data entered and available in public databases. Governments must have access to data on private rural properties to formulate more consistent public policies aimed at nature conservation. No less important is to ensure that society participates in the formulation of such policies and monitors their execution, guaranteeing the full exercise of citizenship.

In this context, CAR and its database, the SICAR, can be instruments with the potential to increase the transparency of private land conservation information so that any citizen can monitor and inspect compliance with forest legislation. The response to the questionnaires suggests adherence to the benefits and problems/risks identified by SLR given the positive assessments for the statements. Other surveys with a larger number of respondents may be useful to confirm this result with higher statistical robustness.

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APPENDIX I

Table 1 – Amount of benefits and problems/risks extracted from the works captured by SLR and selected for analysis after the screening process.

Publication title	Citation	Benefits	Problems/ risks
Accounting for Results: How Conservation Organizations Report Performance Information	RISSMAN; SMAIL, 2015	1	1
Assessment of USDA- NRCS rangeland conservation programs: recommendation for an evidence- based conservation platform	BRISKE et al., 2017	2	0
Auction design for voluntary conservation programs	CASON; GANGADHARAN, 2004	1	1
Bridging the gap between forest conservation and poverty alleviation: the Ecuadorian Socio Bosque program	KONING et al., 2011	2	0
Concern for Information Privacy among Private Forest Landowners in Oregon	HUFF, 2015	0	1
Conservation auctions: Should information about environmental benefits be made public?	GLEBE, 2013	4	0
Easing conservation? Conservation easements, public accountability and neoliberalism	MORRIS, 2008	2	0
Economics of conservation easements[a]	EBERS; NEWMAN, 2014	2	1
Effects of Governance on Availability of Land for Agriculture and Conservation in Brazil	SPAROVEK et al., 2015	1	0
Environmental education programme with the community surrounding Una Biological Reserve, Bahia, Brazil	SANTOS; BLANES, 1997	1	0
Fairness and Transparency Are Required for the Inclusion of Privately Protected Areas in Publicly Accessible Conservation Databases	CLEMENTS et al., 2018	2	3

Grantocracy: Conservation grant-making and the territorialization of neoliberalism in Michigan's Keweenaw Peninsula	CLARKE-SATHER; SOLOMON, 2012	1	0
Keeping Track of Conservation	OWLEY, 2015	4	0
Mapping properties to monitor forests: Landholder response to a large environmental registration program in the Brazilian Amazon	L'ROE et al., 2016	2	0
Markets for Conserving Biodiversity Habitat: Principles and Practice[a]	CROCKER, 2005	3	0
Priority setting for scaling-up tropical forest restoration projects: Early lessons from the Atlantic Forest Restoration Pact	MELO et al., 2013	1	0
Public access to information on private land conservation: Tracking conservation easements	MORRIS; RISSMAN, 2009	10	2
Public access to spatial data on private-land conservation	RISSMAN et al., 2017	9	0
Public Accountability and Conservation Easements: Learning from the Uniform Conservation Easement Act Debates	KING; FAIRFAX, 2006	2	1
Quality information and procurement auction outcomes: Evidence from a payment for ecosystem services laboratory experiment	CONTE; GRIFFIN, 2017	4	0
Ranch Owner Perceptions and Planned Actions in Response to a Proposed Endangered Species Act Listing	KNAPP; STUART CHAPIN; COCHRAN, 2015	4	0
When Does Public Information Undermine the Efficiency of Reverse Auctions for the Purchase of Ecosystem Services?	MESSER et al., 2017	4	1

Note:

[a] book chapter.

Source: Prepared by the authors

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SciELO

Benefícios e barreiras da transparência pública nos dados do Cadastro Ambiental Rural

Stella Verdasca
Victor Eduardo Lima Ranieri

São Paulo. Vol. 24, 2021
Artigo Original

Resumo: A transparência pública é importante para a sociedade aumentar a confiança no poder público, participar democraticamente das decisões e acompanhar ações governamentais ligadas ao controle ambiental. Este trabalho teve como objetivo analisar benefícios e problemas/riscos associados à disponibilização de informações sobre conservação em terras privadas, no contexto do Cadastro Ambiental Rural (CAR). Foi realizada uma revisão bibliográfica sistemática sobre transparência pública envolvendo a conservação da natureza em terras privadas. Os artigos selecionados passaram pela Análise de Conteúdo, resultando em listas com benefícios e problemas associados à transparência pública, as quais serviram de base para questionários aplicados com as partes interessadas no CAR. O principal problema identificado foi o receio dos proprietários com o uso das informações declaradas, enquanto o principal benefício foi a contribuição para a efetividade dos programas de conservação. Concluiu-se que a função social da propriedade privada justifica a evidenciação hierarquizada das informações.

***Palavras-chave*:** Acesso à informação. Cadastro Ambiental Rural. Conservação em terras privadas. Legislação florestal. Transparência pública.

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Beneficios y barreras de la transparencia pública en los datos del Registro Ambiental Rural

Stella Verdasca
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São Paulo. Vol. 24, 2021
Artículo original

Resumen: La transparencia pública es importante para la sociedad aumentar la confianza en las autoridades, participar democráticamente en las decisiones y monitorear acciones gubernamentales relacionadas con control ambiental. Este trabajo tuvo como objetivo analizar beneficios y problemas/ riesgos relacionados con la divulgación de información sobre conservación en tierras privadas, en el contexto del Registro Ambiental Rural (CAR, siglas en portugués). Se realizó una revisión sistemática sobre transparencia pública en la conservación de tierras privadas. Los artículos seleccionados pasaron por Análisis de Contenido, generando listas con beneficios y problemas de transparencia pública, que basaron cuestionarios aplicados con las partes interesadas en el CAR. El principal problema identificado fue el miedo de los propietarios sobre el uso de la información declarada, mientras que el principal beneficio fue la contribución a la efectividad de los programas de conservación. Se concluyó que la función social de la propiedad privada justifica la divulgación jerárquica de información.

Palabras-clave: Acceso a la información; Registro Ambiental Rural; Conservación en terrenos privados; Legislación forestal; Transparencia pública.

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