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The contribution of the rural environmental registry to family farmers in the state of Amazonas, Brazil

Environmental issues continue to be on a growing agenda around the world. A large part of the global concerns is focused on the Amazon, even though it leaves aside almost the entire human contingent that inhabits that space. Except for the Indians. They disregard that many of the harmful environmental impacts are practiced by family farmers because fire is their greatest technology and, in many cases, the only one. Therefore, the management of this territory must create mechanisms and instruments capable of promoting the region's sustainable development, bringing together environmental and social interests, which only can be done through laws. The Rural Environmental Registry (CAR, acronym in Portuguese) aims to implement sustainable public policies. Thus, this literature review study aims to show CAR's contribution to family farmers operating in the State of Amazonas from a legal and environmental point of view. The results show that a) it is necessary to know the main legal aspects of the CAR to understand its environmental importance, b) knowing each of the steps in the preparation of the registry allows this instrument to fulfill its environmental mission as a result of legal discipline, c) the simplification of the regime granted to family farmers and similar populations allows the legal requirements to be fulfilled by this essential human contingent in the Amazon and d) the rigorous execution of the CAR allowed for several conflicts of overlapping rural areas to be resolved, which benefited family farmers and populations equivalent, pioneers in these areas. The conclusion states that implementing the Brazilian forest code is essential for family farming agribusiness, requiring technical support. The CAR emerges as a fundamental instrument.

Palavras-chave: Family farming; Rural Environmental Registry; Environmental licensing; Land regularization; Amazon family farmers.

A contribuição do cadastro ambiental rural para agricultores familiares no estado do Amazonas, Brasil.

As questões ambientais continuem em pauta crescente no mundo todo. Grande parte das preocupações globais têm seu foco na Amazônia, ainda que deixe de lado quase toda o contingente humano que habita aquele espaço, com exceção dos índios. Desconsideram que muito dos impactos ambientais nocivos são praticados por agricultores familiares porque o fogo é sua maior tecnologia, e, em muitos casos, a única. É preciso, portanto, que a gestão desse território crie mecanismos e instrumentos capazes de promover o desenvolvimento sustentado da região fazendo convergir interesses ambientais e sociais, o que só pode ser feito por via das leis. É para essa convergência que foi criado o Cadastro Ambiental Rural (CAR), como instrumento de efetivação de políticas públicas sustentáveis. Assim, este estudo de revisão bibliográfica tem como objetivo mostrar a contribuição do CAR para os agricultores familiares que atuam no estado do Amazonas sob o ponto de vista legal e ambiental. Os resultados mostram que a) é preciso conhecer os principais aspectos legais do CAR para entender sua importância ambiental, b) saber cada uma das etapas da elaboração do cadastro permite que esse instrumento cumpra a sua missão ambiental como decorrência do disciplinamento legal, c) a simplificação do regime concedido aos agricultores familiares e populações equiparadas permite que as exigências legais possam ser cumpridas por esse importante contingente humano amazônico e d) a execução rigorosa do CAR pode amenizar os conflitos de superposições de áreas rurais, o que beneficiará os agricultores familiares e populações equiparadas, pioneiros dessas áreas. A conclusão afirma que a implementação do código florestal brasileiro é essencial para os agronegócios da agricultura familiar e que, por isso, precisa ser apoiada tecnicamente, para o qual o CAR emerge como instrumento fundamental.

Keywords: Agricultura familiar; Cadastro Ambiental Rural; Licenciamento ambiental; Regularização fundiária; Agricultores familiares amazônicos.

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INTRODUCTION

The Brazilian Forest Code applies in urban and rural areas, both on properties and possessions and public lands and protected areas (PINTO et al., 2018). Created under the 2012 Forest Code, the Rural Environmental Registry (CAR) is a mandatory electronic registry of national scope that identifies and registers rural properties (VOLPATO et al., 2016). For the registration of properties belonging to family farmers, the legislator provided a differentiated treatment, granting various benefits. According to the Sustainable Agricultural and Forestry Development Institute of the State of Amazonas (IDAM), in the 2020 Activity Report, 99% of the rural population assisted by the Institute was made up of family farmers of the most diverse types: whether small farmers occupy areas with up to 4 fiscal modules and use family labor in their productive activities, extractivists, indigenous peoples, the riverside dwellers, among many others. The predominant use of family labor employed in subsistence and income-generating activities will always be standard.

The Analysis and Validation of the CAR in Amazonas (2019), in the analysis section of the records, the land profile of the registered properties was drawn up. The database of the National System of Rural Environmental Registration (SICAR), in December 2018, held 32,443 rural properties registered in the CAR, which added up to more than 40.5 million hectares in registered areas. The document highlights the registries classified as territories of traditional populations and communities (PCTs), with 49% of the entire registered area. Despite representing 2% of the rolls, the registrations referring to large properties represent 18% of the total area. The analysis continues by noting that most of these registers (85%) are properties with up to 4 fiscal modules and may belong to the category of family farming. However, this document also demonstrates that 47% of the evaluated entries overlap that established by Law in Amazonas state, classified as pending entries.

There is no consistent and effective public policy that leverages socio-environmental and economic gains to establish a rural development model with guidelines and goals geared to the peculiarities of this state. The social category of family farmers is decisive in establishing an alternative to the state's economy, which cyclically undergoes threats to the economic model based on the Industrial Pole of Manaus (PIM).

The CAR is a legal tool to enable environmental and land tenure regularization of rural properties in Amazonas. It is a public policy tool that mainly benefits family farmers from accessing existing policies. Precisely, a contingent of producers who do not have access to modern production technologies, fire is the only resource for soil preparation, such as the study by Cardoso et al. (2021). In this sense, this study aims to show the importance of the CAR to Amazon family farmers. Thus, the body of this article is organized into three parts, in addition to this introduction and final considerations: the First part shows the essential aspects, primarily legal and environmental, of the CAR, followed by the steps to prepare the register, then, the main ins and outs of the simplified CAR regime granted to family farmers and similar populations are described, and it concludes by reflecting on the importance of CAR for family farmers in the State of Amazonas, Brazil.

THEORETICHAL DISCUSSION

Rural environmental registry and family agriculture

The CAR emerged as a monitoring and control instrument to reduce deforestation in the Brazilian Amazon. This topic is currently the object of national and international attention at the COP26. For Pires (2013), CAR is the electronic record of georeferenced information on the rural property, with emphasis on the status of Permanent Protection Areas (APPs), Legal Reserve (RL), and Restricted Use Areas (AUR). Barroso and Alencar (2014) consider that with the publication of the Forest Code (Law 12,651/2012), it was possible to create the CAR as yet another instrument to control deforestation, especially those occurring in areas of rural settlements. Through this registry, it is possible to provide settlers with the regularization of the consolidated regions until July 22, 2008, the date of enactment of Decree No. 6,514, which deals with environmental infractions and administrative sanctions and the procedure for their investigation. Fonseca (2015) shows that the CAR is genuinely an instrument for monitoring the control of pollution and potentially polluting activities; it also provides the possibility of carrying out plans and actions to recover degraded areas.

Laudares et al. (2014) showed that the CAR aims to constitute a strategic database for controlling, monitoring, and combating deforestation in forests and other forms of native vegetation in Brazil. Costa and Vendrusculo (2018) identified that the CAR is an essential tool for territorial management because it allows obtaining information about rural properties and their environmental situation. On the other hand, Machado (2017) registers the regulatory character stating that the CAR is the first step towards regularizing rural areas without current records and should be the object of registration, especially given the current environmental status of rural properties.

Previous studies, such as Korting (2016), presented the CAR as a new strategy to solve environmental conservation and territorial planning conflicts, about rural properties/possessions, unlike other registers. Peters et al. (2014) add that it is also composed of georeferenced information, geographic coordinate information. The use of technology associated with governance gives more excellent reliability, transparency, and rationality to processes at the most different levels to ensure Brazilian environmental regularization. At the same time, Souza et al. (2016) emphasize the innovative bias of the CAR. The authors describe it as one of the main innovations in forest legislation, helping control and monitor deforestation. The authors showed that the CAR is a tool for operationalizing the Forest Code. According to Freire et al. (2019), CAR is the newest environmental monitoring and management tool in Ceará and Brazil. As for Pires et al. (2019), CAR is a revolutionary tool for managing environmental information in Brazil. Cosme (2019) highlights creating a nationwide electronic system for integrating and managing ecological data from rural properties across the country - the SICAR, provided in Decree No. 7,830/2012. As per Sá et al. (2019), the CAR must be composed of georeferenced maps and environmental diagnoses of the area. Therefore, before entering the information in SICAR, a diagnosis must be carried out.

For Oliveira et al. (2014), the CAR's final product is equivalent to a radiograph that exposes the forms of land occupation, the remnants of native vegetation, and the environmental liabilities subject to repair.

Note that it is not just about making the map. It is about understanding the socio-environmental and economic context to seek sustainability. According to Volpato (2016), the nature of CAR is not licensing. It is a declaratory act, following art. 6th of Decree No. 7,830/2012 (BRASIL, 2012a) says that all landowners, landowners, or legally constituted representatives must do so for an indefinite period (Law No. 13.887, of October 17, 2019). The numerical and cartographic registration of rural properties is carried out under the responsibility of each state in the Federation. The data are nationally unified in the National Rural Environmental Registry System (SICAR) by the Brazilian Forest Service (SFB). Each registered rural property has a registration number. As in the IBGE censuses, the CAR targets all rural areas in the national territory and follows homogeneous methods throughout the country, providing relevant information on family farmers and rural producers (MIRANDA et al., 2020). The self-declaratory model favored Brazilian agribusiness, medium and large rural producers, but family farmers have difficulty obtaining regularization, especially in Amazonian states.

For registration in the CAR, the rural producer moves towards a formalization determined by the state to comply with a legal requirement. It acts autonomously and proactively in defense of its economic activity. A producer reasonably integrated into markets, with a considerable part of its productive effort for commercial purposes, will be relatively well informed about the CAR and know that it could suffer harmful consequences if it does not register the required information. Its economic calculation introduces a new variable: CAR registration. Without it, the producer may find difficulties in economic and financial transactions over time. (MIRANDA et al., 2020)

Based on high-resolution satellite images, millions of rural producers have registered their properties, following the requirements established by legislation. And they continue to remotely record any change in native vegetation or land tenure transactions. Any partial or total sale of a rural property implies the generation of a new CAR. For this reason, thousands of rural properties enter and leave the CAR database every month. (DE MIRANDA et al., 2020). The legislator provided a differentiated treatment with a simplified procedure for the registration of properties belonging to family farmers, as determined by art. 55, of Law No. 12,651/2012. (BRASIL, 2012b; PETERS et al., 2014). Family farmers and populations similar to them must recognize the CAR as an environmental and territorial management tool. For this, it is necessary to know their mission and purpose.

Peters et al. (2014) highlight that the CAR integrates the environmental information on rural properties and possessions and compose a database for control, monitoring, ecological and economic planning, and combating deforestation. The CAR identifies and registers rural properties in Brazil, their owners, and possessors, gathering and unifying the environmental information of these properties (VOLPATO et al., 2016). The CAR is an administrative instrument for recording and controlling essential ecological obligations related to rural properties (ORTEGA, 2011). Unlike other existing registers, the CAR is made up of georeferenced information, that is, information on the geographic coordinates of landholdings and rural properties.

According to Miranda et al. (2020), until 2012, the analyzes and attempts to understand the rural

world on a national scale had only one homogeneous and comprehensive source of information: the Agricultural Censuses of the Brazilian Institute of Geography and Statistics (IBGE). Their merits and limitations are all tributaries, changed with the advent of the Rural Environmental Registry (CAR). The existence of two national databases on the Brazilian rural environment, one on agricultural establishments (IBGE) and the other on rural properties (SICAR), brings new elements to understand the rustic space more comprehensively. Table 1 shows this comparison.

Table 1: Agricultural establishments and rural properties by State in the North Region of Brazil.

	Agricultural establishments	Rural properties	Agricultural establishments outside rural properties	%
Amazonas	80.438	53.241	52.044	64,7
Amapá	8.459	5.572	4.572	54,0
Roraima	15.751	9.509	7.899	50,1
Pará	280.408	218.747	102.037	36,4
Acre	37.149	36.240	12.524	33,7
Rondônia	91.289	122.008	25.293	27,7
Tocantins	63.626	74.560	14.554	22,9
Total	577.120	519.877	218.923	37,9

Source: Miranda et al. (2020).

However, for Miranda et al. (2020), the two databases are organized based on different concepts. The IBGE Census uses the idea of "agricultural establishment." This concept encompasses a single factual description verified in one or more areas of a production unit, whether owned, owned, or occupied. If a person in charge jointly owns and manages more than one property, they will be aggregated as if they were just a single "agricultural establishment" in the census data. The IBGE Census introduces a unified notion of ownership, control, or administration of land parcels, even if geographically separated, not contiguous with each other. They will only be treated in isolation if they are administered separately.

The Census is not a database of "landowners." The notion of ownership does not define data collection but land parcel management. Each Rural Property Registration Certificate (CCIR), for example, must correspond to a CAR number, even if there are dozens of CCIRs linked to a single farm or just one agricultural establishment (MIRANDA et al., 2020). The CAR was established by the Forest Code, according to Law No. 12,651 of May 25, 2012 (BRASIL, 2012) as a mandatory electronic record, in fact, for all rural properties (i.e., each "unit," productive or no) and not for agricultural establishments.

The MMA (2017) points out that Law No. 12,651/2012 is regulated at the federal level by Decree No. 7,830/2012 and Normative Instructions No. 2 and 3/2014. The CAR is an essential instrument for the generation and integration of environmental information on rural properties in our country, launching new bases for actions aimed at protecting native vegetation together with incentives for sustainable agricultural production. Due to the data mentioned above, the study by Goi (2019) showed that the first impacts of the application of Federal Law No. 12,651/2012 by those who chose not to carry out the CAR resulted in the refusal of financial agents when hiring financing and authorization to contract agricultural insurance, by the various companies in the field. Therefore, the law established CAR's obligation for all rural properties. Still, CAR registration is a legal requirement for access to rural credit and agricultural insurance, as provided for in its art. 78-A.

According to the MAPA Information Bulletin (2020), to comply with this legal provision, the Brazilian

Forest Service (SFB) established technical cooperation with the Central Bank of Brazil (BACEN). This relationship allows access, sharing, processing, and generation of georeferenced information from the National Rural Environmental Registry System (SICAR), intending to monitor Rural Credit and Insurance and other strategic applications to formulate and execute policies that aim at sustainable rural development. The integration between the SICAR databases and the Rural Credit Operation System and Proagro (SICOR) has operated to meet article requirements 78-A of the Forest Code since January 1, 2019.

For Lopes (2018), the process of registering rural properties that are in progress at SICAR, which is nearing completion, has presented a series of deficiencies that be carefully analyzed. The online public database of the National Rural Environmental Registry System (SICAR) was consulted using search filters for the city of Ibiúna, and the information on the number of properties and the categories of data required for registration. As an example, Lopes (2018) highlights that until February 2018, in the State of São Paulo, there were 328,730 rural properties registered, with a total of 19,191,786 ha. For the municipality of Ibiúna, there were 2,224 rural properties with 105,639.08 ha. The analysis indicated that current records lack accuracy and integrity in recorded data. Overlaps between properties and all cadastre categories were verified, resulting in 29,895 ha of duplicated land area and 612 ha of overlapping permanent preservation areas. The presence of resting and mangroves that are not part of the local ecological dynamics was registered.

In summary, it is noteworthy that Pires (2013) published that the leveling from the bottom (without any requirement) would harm the other steps of the CAR system (analysis and validation), as discussed above. Volpato (2016) warned that the CAR would be required for any economic movement involving rural property, including obtaining credit. This fact currently affects the social category with the most minor regularized properties and most needs the family farmer's financing.

Steps of the car

Simon et al. (2018) describe two significant steps in the CAR processes. The first is declaratory. It includes the submission of information on the property and the current use of the land (total area of the property, cultivation areas, areas of native vegetation, hydrography, built-up area, etc.), which can be carried out by the owners or technical responsible persons trained for this purpose. Under the responsibility of the state agency responsible for the CAR, called validation, the second stage consists of verifying all the information declared in the previous step.

All information from CAR registrations supports policies, programs, projects, and activities for control, monitoring, environmental and economic planning, and combating illegal deforestation. According to the MMA (2017), registration in the CAR helps in the financial and ecological planning of the use and occupation of rural property, being the first step to obtaining the property's environmental regularity. However, the environmental information is valuable for constructing public policies for environmental protection and community awareness through free access to data involving rural properties (SILVA, 2015; COSME, 2019).

The set of information that makes up the CAR makes it a powerful tool since remote sensing is an

instrument of great relevance in one of the stages of the CAR. From the images captured by satellite, it is possible to have a quantitative assessment of the vegetation of a particular rural property. As a result of these assessments, it is possible to verify its total area and the number of permanent preservation areas and legal reserves (COSME, 2019).

Several techniques are used for validation, including the analysis of documents contained in the process, comparisons by images, and field inspection of the property when the need is identified. It requires geoprocessing to treat geographic information, with mathematical and computational techniques, according to Câmara et al. (2001). It uses geographic information systems as a robust set of tools for collecting, storing, quickly retrieving, transforming, and displaying real-world spatial data for a particular set of purposes (BURROUGH et al., 2015). However, for the MMA (2017), there are four stages of the CAR:

1) Registration in the CAR: Registration is mandatory for all rural properties in the country. It is the first step towards environmental regularization and gives access to benefits provided for in the Forest Code (Law 12. 651/2012).

2) Follow-up is the progress and results of the analysis monitoring when the CAR is rectified, documents are sent, the registration receipt and the CAR file is downloaded through the Owner/Possessor center.

3) Regularization is the formalization of environmental regularization by a Term of Commitment. The alternatives are restoration of vegetation remnants in APP, Restricted Use and Legal Reserve areas, and Legal Reserve compensation.

4) Negotiation: Rural properties with excess native vegetation characterized as Legal Reserve, Environmental easement, or Environmental Reserve Quotas may trade their assets with properties pending regularization.

When registering rural property in the CAR, owners and possessors must identify the property by georeferencing. In each registry, the location of Permanent Preservation Areas (APP), restricted use areas, Legal Reserve (RL), consolidated rural areas, remaining areas of native vegetation, and areas of social interest, public utility, and administrative easement. They rely on digital tools that allow the owner or owner to the georeferenced spatial representation of information using high-resolution satellite images (VOLPATO et al., 2016).

However, for the registration of properties belonging to family farmers, the law provides the different treatment. According to Volpato et al. (2016), art. 55 of Law 12.651/2012 (Forestry Code) and art. 8th of Decree No. 7,830/2012 determines that the registration in the SICAR of properties classified as small property or rural family ownership. They will observe a simplified procedure "in which only the identification of the rural owner or owner, proof of ownership or possession, and the presentation of a sketch that indicates the perimeter of the property, the permanent preservation areas, and the remnants that make up the Legal Reserve." Therefore, the need and relevance of free technical monitoring by the States are understood to family farmers to meet this legal requirement, sole paragraph, of art. 53, of Law No. 12,651/2012, as detailed in Table 2.

Table 2: Definitions according to Law No. 12,651 of May 25, 2012.

Legal Reserve Area	It is an area located within a rural property or tenure. It has the function of ensuring the sustainable economic use of the rural property's natural resources, assisting in the conservation and rehabilitation of ecological processes, promoting the preservation of biodiversity and shelter, and protecting wild fauna and native flora.
Permanent Preservation Areas	It is a protected area, covered or not by native vegetation, with the environmental function of preserving water resources, the landscape, geological stability, and biodiversity, facilitating the gene flow of fauna and flora, protecting the soil, and ensuring the well-being of humanity.
Restricted Use Area	They are wetlands, pantanal plains, and slopes between 25º and 45º. These are sensitive areas whose exploration requires good agricultural and forestry practices. These are areas with restricted uses but not considered Areas of Permanent Preservation.
Consolidated Rural Area	Area of rural property with human occupation preexisting on July 22, 2008, with buildings, improvements, or agroforestry activities, in the latter case, the adoption of the fallow regime is allowed.

Peters et al. (2014) emphasize that CAR registration is also necessary for joining the Environmental Regularization Program (PRA). Recently, Law No. 13,887 of October 17, 2019, which amends the Forest Code of 2012, inserts § 4th stating that properties registered in the SICAR until December 31, 2020, will be entitled to adherence to the PRA. It comprises the set of actions or initiatives developed by rural landowners and settlers to adapt and promote environmental regularization in rural areas not considered consolidated. It refers to the irregular removal of native vegetation in legal reserve areas, permanent preservation, and restricted use areas after July 22, 2008.

Simplified regime for family farmers

In Federal Law, the family farmer is "one who practices activities in rural areas" to access any public policy aimed at Brazilian family farming. It provides that he meets four requirements simultaneously: (i) he does not have an area larger than four fiscal modules; (ii) predominantly use family labor in the activities of the production unit; (iii) obtain a minimum family income from their activities in their rural establishment; and (iv) manage your establishment or business with your family (BRASIL, 2006).

In art 3o-V, of Federal Law No. 12,651/2012, small property or rural family possession is understood to be that exploited through the personal work of the family farmer and rural family entrepreneur, including settlements and agrarian reform projects, and that complies with the provisions of the Family Farming Law, described above. The sole paragraph extends the treatment given to properties belonging to family farmers, rural properties, and possessions with up to 4 (four) fiscal modules that develop agroforestry activities and indigenous lands, and other areas of traditional peoples and communities make collective use of their territory. Extractivists, settlers, indigenous people, and small producers are comparable to family farmers, as shown in table 3.

According to Peters et al. (2014), the size of the fiscal module mentioned in the Forest Code varies in each Brazilian municipality. According to the National Institute of Colonization table Agrarian Reform (INCRA), this unit of measurement is expressed in hectares. The size of the property is considered for registration in the CAR, and eventual adhesion to the PRA, as shown the table 4.

Table 3: Areas of family farmers and similar populations for CAR registration under the simplified regime.

Family farming and similar	Feature required	Required conditions	Legal forecast	Expected benefits
Small property or rural property with up to 4	Exploited through family	Identification of the holder	Art. 3rd, V, of federal law 12,651 / 2012	The government must provide technical and legal assistance

fiscal modules	labor	Proof of ownership of the property A sketch indicating the perimeter of the property, the APPs, and remnants of navigation that make up the legal reserve		to georeference the property Total free registration of the legal reserve
Small property or rural property with up to 4 fiscal modules	Agroforestry activities		Art. 8th §3 Decree No. 7830 / 2012	
traditional communities	collective use of territory			
indigenous lands	All			
Agrarian reform settlements	Exploitation through family labor		Art. 53rd of Federal Law 12651/2021; Article 8th of Federal Decree 7830/2012	

Table 4: Classification of rural property by size

Size	Legal support
Small rural property or possession: with an area of up to 4 fiscal modules, including those described under the terms of item V of art. 3 of Law No. 12,651/2012	Art. 2, I, a, Normative Instruction No. 2/2014
Medium property or possession with an area greater than 4 to 15 fiscal modules	Art. 2, I, b, Normative Instruction No. 2/2014
Large property or possession with an area greater than 15 fiscal modules	Art. 2, I, c, Normative Instruction No. 2/2014

Source: Adapted from Peters et al. (2014).

This classification is essential for outlining the path to be followed until the registry registration in the SICAR. According to art. 55 of Law 12.651/2012, the Forest Code (BRASIL, 2012b), and art. 8th of Decree No. 7,830/2012 (BRASIL, 2012a), the registration in the CAR of properties classified as small property or rural family ownership will use a simplified procedure. It will only be mandatory to identify the owner of rural property, the proof of ownership or possession, and the presentation of a sketch that indicates the perimeter of the property, the permanent preservation areas, and the remnants that make up the Legal Reserve.

It noted that art. 17 of the Forest Code says that the Legal Reserve must be preserved with native vegetation cover by the owner of the rural property, owner or occupant in any capacity, individual or legal entity, under public or private law. Paragraph 2nd establishes that, for Legal Reserve management on the small property or rural family ownership, the bodies that are part of the National Environmental System (SISNAMA) must also establish simplified procedures for the preparation, analysis, and approval of these management plans. As for the other properties, art. 29, § 1srt, provides that the registration of the CAR must be made, preferably, at the municipal or state environmental agency, which, under the terms of the regulation, will require the owner or rural owner:

I - identification of the rural owner or owner; II - proof of ownership or possession.

III - identification of the property using a floor plan and descriptive memorial, containing the indication of geographic coordinates with at least one mooring point on the perimeter of the property, informing the location of remnants of native vegetation, Permanent Preservation Areas, Areas of Use Restricted, from consolidated areas and, if any, also from the place of the Legal Reserve.

It is important to emphasize that § 2nd establishes that registration will not be considered a title to recognize the right of ownership or possession, nor does it eliminate the need to comply with the provisions of § 3rd of article 2nd of Law No. 10.267/2001. It determines the need to update the registration statement whenever there is a change in rural properties concerning the area of ownership and cases of preservation, conservation, and protection of natural resources.

The § 3 of art. 29th of the Forest Code of 2012, amended in 2019, establishes that registration in the

CAR is mandatory and will be for an indefinite period for all rural properties and possessions. However, according to § 4, only owners and holders of rural properties registered in the CAR until December 31, 2020, will be entitled to join the Environmental Regularization Program (PRA), referred to in art. 59 of this Code. Pinto et al. (2018) show that, six years after the law was in force, the deadline for carrying out the self-declaratory registration of rural property owners and squatters was postponed again. They continue to detail the extensions to complete the CAR application phase in May 2014. The initial deadline for its completion would be May 2015, but it changed successively. First, it was extended to May 2016. It was renewed again for another year and later expanded to December 2017. It was postponed to be completed at the end of May 2018. However, on May 30, Decree No. 9395 /18 again postponed the deadline to the end of December 2018. Moving to an indefinite period in 2019 makes it permanent and must be performed at any time.

With the creation of the CAR in 2012, registration in the Real Estate Registry became optional. However, there are still cases where registration is mandatory, as in issuing an Environmental Reserve Quota (CRA), provided for in art. 44th of the Code (VOLPATO, 2016). According to § 4th, the CRA was from native vegetation, existing or in the process of recovery, which integrates the legal reserve of properties belonging to family farmers and similar populations.

The text of the Brazilian Forest Code placed the beneficiaries of the Family Agriculture Law (No 11.363/2011) and populations similar to them in a prominent position by writing six articles in a whole chapter for this purpose. The visibility given to this rural social category in Chapter XII of the Law allows for several concessions, including the simplified procedure for registration of the CAR, and also determines, to the state government, the responsibility to provide technical and legal support, free of charge, for registration in the SICAR, and also technical support for the restoration of vegetation in the legal reserve, regulated following art 55th and the sole paragraphs of art. 53rd and 54th of Law 12.651/2012, respectively.

The art 52nd, part of Chapter XII of Forest Code, mentions the intervention and removal of vegetation in Permanent Preservation Areas (APP) and Legal Reserve (RL) for occasional or low-impact environmental activities. When developed in properties belonging to family farmers, these minor improvements in a rural property will depend on a simple declaration to the competent environmental agency, if the property is duly registered in the CAR. The art. 67th brings another concession to rural properties that held an area of up to four fiscal modules and had remnants of native vegetation in percentages below the 80% required in art. 12th for the Amazon. The Legal Reserve will be constituted with the area occupied with native vegetation existing on July 22, 2008, with new conversions for alternative land use prohibited (See ADC No. 42) (See ADIN No. 4901) (See ADIN No. 4902). Here it is verified that the property does not need to belong to a family farmer, but only to be an area with up to 4 (four) fiscal modules to benefit from this amnesty. The art. 68th § 2nd establishes that the owners or holders of rural properties and their necessary heirs who have a Legal Reserve index greater than 50% of forest cover and who have not carried out the removal of vegetation in the percentages provided for by the legislation in force at the time. They may also use the surplus area of the Legal Reserve to establish environmental easements and Environmental Reserve Quota (CRA). The SICAR will make CAR an attractive tool that will guarantee certain benefits, such as starting environmental

regularization, obtaining environmental licensing**,** and accessing rural credit. Art. 78th-A determines that after December 31, 2017, financial institutions will only grant agricultural credit, in any of its modalities, to rural property owners registered in the CAR (Wording given by Law No. 13.295, of 2016) (See ADC No. 42) (See ADIN No. 4902).

According to Pinto et al. (2018), there is an understanding that the delay in the registration of properties of up to four fiscal modules belonging to family farmers and populations equivalent to them should not imply penalties for their squatters or owners since the law established a sharing of responsibility between the state and the holders or occupants of these properties or territories. It is a fact that these farmers effectively depend on the technical support of the state.

The car for Amazonas family farmers

The State of Amazonas, with a territorial extension of 157.1 million hectares, is the Brazilian state that most conserves its forests and has 134 million hectares of public forests, according to MAPA (2020). In private areas, the analysis and validation of the CAR in Amazonas (2019) traced the agricultural profile of properties registered in Sicar until December 2018. It revealed that most of the 32,443 rural properties registered in CAR, around 85% were properties with up to four fiscal modules belonging to family farmers. In the same document mentioned above, a survey was carried out with managers and technicians to understand the organizational structure that the state must meet the demands generated by the CAR. It identified that the environmental agenda in Amazonas is the responsibility of two bodies: the State Secretariat for the Environment (SEMA), with the function of planning, coordinating, and implementing the state environmental policy and raising funds; and the Institute for Environmental Protection of Amazonas (IPAAM), the agency that executes the environmental policy. It also identified that the State Council for the Environment (CEMAAM) and the Sustainable Agricultural and Forestry Development Institute (IDAM), together with SEMA and IPAAM, form the composition of the Amazonas Environmental System. They are responsible for maintaining forests and conserving natural resources, including managing and implementing the Forest Code in the state.

Supported by the concurrent competence to legislate on the environment, established in the art. 24th of the Federal Constitution, the State of Amazonas Law No. 4,406/2016, and Decree No. 42,370/2020 shows the legal basis necessary for implementing the State PRA. With that, the State of Amazonas seeks to comply with the current Forest Code. See that art. 8th of Law No. 4.406/2016 establishes that the registration in the CAR of properties belonging to family farmers and properties with up to four fiscal modules that develop agroforestry activities will receive free technical support from the government. In contrast, art 36th-I says that it is up to the official ATER agency to register the CAR of family farmers.

According to the CAR Analysis and Validation document in the State of Amazonas (2019), a relevant CAR quality indicator refers to the classification of pending or active registrations based on the criteria established by legislation for the percentage of overlaps. Amazonas verified that 47% of the evaluated entries had overlaps above the set, classified as pending. The tolerance percentage for overlapping areas is on the

SICAR website under the questions and answers item, 10% for small properties, 5% for medium, and 3% for large properties. Of the 16,817 pending issues found, 73% were due to overlaps between two or more rural properties. About 23% referred to overlapping with conservation units, and 4% of cases were with indigenous lands.

As most rural properties registered in SICAR have up to four fiscal modules and that most of the overlaps occur between two or more properties, the solution to this imbroglio depends on the state agency of ATER, with responsibility established in art. 36th-I of State Law No. 4.406/2016. It is noteworthy that according to art. 52nd of Normative Instruction (IN) 2/2014-MMA, areas with settlements and plots entitled Terra Legal program are the responsibility of the competent land title agency. According to the CAR Analysis and Validation document in the Amazonas state (2019), Amazonas had and counts on some essential partnerships, such as the GIZ that supports the CAR registration activities of Traditional Peoples and Communities (PCTs). In addition to this support, the Sustainable Landscapes of the Amazon project has actions aimed at CAR in southern Amazonas. The National Indian Foundation indicated the Indigenous Lands that make up the SICAR database (FUNAI), determined in art. 59th of IN 2/2014-MMA.

The problems currently identified in the State of Amazonas could be minimized. Some organizational aspects were considered to reduce the existing overlaps. Some of these factors are technical-institutional strengthening of the body that executes the registration of the registry of small properties. It is the case of the lack of integration of the land bases used and the absence of a GEO protocol that builds the macro-zoning of properties. More than strengthening the body that analyzes the records, as mentioned in the main bottlenecks section of the CAR Analysis and Validation document in the State of Amazonas (2019), it will be necessary to support the body that enters the information with technicians and professionals trained to carry out the registration. Professionals need to be endowed with adequate managerial and technological support, granting owners and holders belonging to the family farmers' legal rights to free technical support so that the CAR achieves the results it proposes.

Currently, registration with the classification of "active" in the SICAR is a mandatory condition for access to environmental licensing, PRA, CRA, and rural credit. These are the primary service provided by the ATER agency, which is now considered a restrictive environmental regularization tool by the productive rural class of the State of Amazonas. However, the CAR's contribution to family farmers in Amazonas must: be a) environmental regularization and b) land title regularization. It must provide the state with an opportunity to experience a new moment in the history of rural Amazonas.

CONCLUSION

This study showed the importance of rural environmental registration for family farmers operating in Amazonas. This conclusion explains that the implementation of the Forest Code is so fundamental for businesses in the Amazon region, especially in times of a weak economy, that its performance needs to occupy a prominent place in sectorial public policies. Thus, the State of Amazonas should take advantage of the CAR registrations to resolve two substantially delayed issues: broad land tenure regularization and the

approval of economic-ecological zoning.

The environmental regularization proposed in Federal Law 12,651/2012 with the creation of the CAR in Amazonas necessarily involves qualified technical support from the government to family farmers and similar populations, as provided in art 53rd, sole paragraph. Since, for this, the role of the official ATER body with responsibility for registering the CAR of family farmers is established, assigned by art. 36th of State Law No. 4.406/2016, and on art. 8th, which determines that this service be provided free of charge.

The established legal frameworks allow for elaborating the equation to relate them and point out a possible solution to problems that are historically difficult to solve, such as the approval of the ZEE and land regularization. The following possibilities stand out, then, that may help to reduce the most significant bottleneck of CAR in the State of Amazonas, the excessive overlaps already identified in the registers of family farmers: a) integration/unification of cartographic bases used by state agencies - Creation of a Committee Permanent; b) customization of the SICAR to the reality of the state; c) adequate, sufficient and timely technological resources to structure a Digital ATER in Amazonas; and d) inclusion of a technical feasibility report for the environmental regularization of rural properties belonging to family farmers and similar populations in the current flowchart. It emphasized that after mapping the process followed by the ATER service in Amazonas to register the CAR of family farmers, it is necessary to improve it by including a technical feasibility report for environmental regularization. This report precedes the CAR registration at SICAR, seeking to minimize the most frequent errors.

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