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10 ESSENTIAL FACTS ABOUT LAND TENURE REGULARIZATION IN THE BRAZILIAN AMAZON

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Introduction

The significant increase in deforestation observed in 2018-2019, which exceeded 10,000 km² for the first time since 2008, shed light on the topic of land tenure regularization in the Amazon. Representatives of the federal government, states and the National Congress claim that the lack of land tenure regularization is one of the main causes for the loss of forests in the region. They also argue that it is necessary to issue a land title to those who deforest, so the government can identify those responsible for such environmental crimes and punish them. There was even an unsuccessful attempt to make the federal legislation on the subject more flexible in 2020. However, changes to federal rules related to land tenure regularization would be an insufficient measure and would stimulate new occupations of public land in the expectation of obtaining a title.

To discuss the problems related to land tenure regularization in the Amazon and possible solutions, we must learn some basic facts about the issue. For example, the federal government and states share responsibility for land tenure regularization in the Amazon. State governments are responsible for areas that have already been registered in the name of each state and for the undesignated areas outside the federal areas. The federal government, on the other hand, manage

public lands that were registered as federal by the Federal Government. For this reason, the solution to the land tenure problem cannot be solved with a revision in the federal law, since each state has its own rules on the subject.

Furthermore, Brazilian legislation lists other priority means for recognizing land rights and designating public lands that are more effective in combating deforestation. One example is the recognition of Indigenous and Quilombola Territories[1] and the creation of Protected Areas. Titling private occupations on public land is only one of the existing options for land tenure regularization and the one with the lowest legal priority. There is also evidence that this practice of land privatization can lead to further destruction of the forest. This is because the land laws end up stimulating deforestation as proof of occupation to receive the title; or even because the title allows access to credit for expanding production, with associated deforestation[2].

In order to contribute to a more qualified discussion of this problem in the Amazon and to support solutions, this study makes a comparative assessment of state land tenure laws and practices in the Brazilian Amazon.

[1] Quilombolas are descendants of runaway slaves.

[2] PROBST, Benedict et al. Impacts of a large-scale titling initiative on deforestation in the Brazilian Amazon. Nature Sustainability, 2020. Available at: <https://doi.org/10.1038/s41893-020-0537-2>.

By practices, we mean how the governmental agencies implement the legislation. We also analyzed if these laws and practices at the federal and state levels are aligned with goals for reducing deforestation and recovering illegally deforested areas in rural properties; or whether they end up encouraging the continuation of the occupation of public land based on deforestation.

This study is the result of evaluations that we carried out between 2016 and 2020, in three stages:

I. Face-to-face interviews with representatives of state land tenure agencies and institutions working on the topic in all nine states of the Brazilian Amazon, held in 2016 and 2017.
II. Evaluation of state land tenure legislation in the nine states of the Brazilian Amazon, covering laws, decrees and administrative norms (such as normative rulings) approved as of 2020.
III. Survey of information from federal and state agencies on undesignated areas in the Amazon.

This publication highlights the most common problems we found regarding land laws and practices in the Amazon. We have also published nine separate reports detailing the assessment from each Amazon state.

We present the results based on ten facts that incorporate the main findings of our analysis. They can be read sequentially or individually to facilitate the search for information of interest. The facts are:

- **Fact 1**: 28.5% of the Amazon territory lacks information on land tenure designation.
- **Fact 2**: State governments are primarily responsible for the areas that lack land tenure definition in the Amazon, but there is an absence of planning for the control and designation of this territory.
- **Fact 3**: 43% of the territory lacking land tenure definition has priority for conservation, but current procedures do not guarantee the land designation for this purpose.
- **Fact 4**: There are at least 22 agencies tasked with some type of land tenure regularization in the Amazon.
- **Fact 5**: The lack of organization of land tenure databases and the low level of technology adoption makes it difficult to organize a single or shared land tenure registry.
- **Fact 6**: Most state laws encourage continued invasion of public lands.
- **Fact 7**: No state prohibits the titling of illegally deforested areas, and most do not require a commitment to recover environmental liabilities before titling.
- **Fact 8**: The Brazilian population subsidizes land privatization in the Amazon with no guarantee that the property will be used sustainably.
- **Fact 9**: There is a lack of transparency and social control over the privatization of public land assets.
- **Fact 10**: There were changes to seven land tenure laws in the Amazon between 2017 and 2020 to facilitate the privatization of public lands.

At the end, we present a summary conclusion of the main common problems and the actions that should be prioritized so that the laws and practices of land tenure regularization can, in fact, contribute to the deforestation reduction.

Fact 1.
28,5% of the Amazon territory lacks information on land tenure designation

The lack of definition of land rights encompasses 28.5% of the Brazilian Amazon (Figure 1). These are areas for which there is no disclosed information on public land designation, either as protected areas, settlements or as private property, for example. There may possibly be land titles already issued for such territories, but the maps of such properties are not digitized or included in the databases of land tenure agencies. This occurs, for example, for land titles issued before 2002, when the georeferencing of rural properties was not yet mandatory[3].

Part of this area without land tenure definition, equivalent to 9% of the Amazon, is registered in the Rural Environmental Registry (CAR)[4] (Figure 2). However, due to the self-declaratory nature of CAR and the undisclosed information on the land tenure situation of these properties (whether or not titled), it is

[3] Georeferencing of rural properties has become mandatory as of Law No. 10,267/2001, regulated by Brazilian Federal Decree No. 4,449/2002.

[4] The CAR is a mandatory registry for all rural properties in Brazil for environmental management purposes. It requires the georeferenced data on property's borders and information about the property's compliance with the forest code. Each landholder or landowner must submit CAR information to the environmental agency, but most of such self-declared data has not been verified by authorities, raising concerns about data reliability.

not possible to consider them as private properties. In fact, many parcels in CAR may be untitled occupations on public lands and they should be a priority area for land tenure agencies in three ways: i) regularize the properties that meet the legal requirements for titling; ii) reclaim illegally invaded areas; iii) confirm the location of titled properties, whose maps are not yet available in the land agencies' digital databases.

Regarding the undesignated areas, we also identified 2% of the Amazon mapped for receiving a land title from the federal government and 0.2% with possible claims for Indigenous Land (IL) recognition, according to data from the Technical Chamber for Designating and Regularizing Federal Public Lands in the Brazilian Amazon[5]. There are also one million hectares of interest for creating Protected Area (PA), according to data obtained in 2016 from the Chico Mendes Institute for Biodiversity Conservation (ICMBio) (Figure 2).

Furthermore, between 2013 and 2020, a period in which deforestation increased in the Amazon, 40% of forest loss occurred in this area with undefined land tenure situation[6]. Almost half of this total occurred in areas registered under CAR in 2020, equivalent to 18% of deforestation in the Amazon in the period.

The area on which land tenure information is available (71.5% of the region) is largely composed of Indigenous Lands (23% of the region) and Protected Areas (18.5%), without considering

[5] The Chamber was created to establish a consultation process with different federal agencies on the appropriate designation of public lands. Extinguished in June 2019, such a Chamber was recreated a few months later by Federal Decree No. 10,165/2019. It consists of seven bodies: Special Secretariat for Land Tenure Affairs; Brazilian Forest Service; Secretariat for Coordination and Governance of the Federal Government's Land Assets, the Special Secretariat for Privatization, Divestment and Markets; Ministry of the Environment; Incra; Chico Mendes Institute for Biodiversity Conservation (ICMBio) and the Indigenous National Foundation (Funai) (Art. 11, §1 of Federal Decree No. 10,592/2020).

[6] Considering PRODES data from 2013 to 2019 and the 2020 estimate released in November 2020.

the Environmental Protection Areas (APAs)[7]. Private properties occupy 21% of the Brazilian Amazon (without considering properties registered under CAR)[8], Agrarian Reform Settlement Projects are at 8% and Military Areas are at 0.5% (Figure 1). These data disregard overlaps between the different land tenure categories[9].

We also found 2 million hectares of designated public forests, which encompass two situations: i) data from the Brazilian Forest Service (SFB) indicating they are designated forests that did not coincide with protected areas consulted for our analysis; and ii) forests reserved by state decrees in Pará for forest concessions or for land tenure regularization of communities[10]. Finally, there are at least 969 thousand hectares of recognized Quilombola Territories (Figure 1).

Even in this area with defined land tenure situation (71.5% of the region), there are pending regularization issues, in addition to conflicts related to land invasions and fraud. For example, many communities that live in PAs have not received documents that ensure their right to live in these territories. There are also pending issues regarding the removal of private land occupations from PAs. Such an eviction must take place with due compensation when

[7] Environmental Protection Area (APA) is a type of Protected Area that does not exclude the possibility of land tenure regularization for private occupations. Thus, we do not consider APAs when we calculate the area that already has a definition of the right to land.

[8] Only properties included in the National Property Certification System (SNCI) and in the Land Management System (Sigef), both from Incra, under the assumption that these cases would already be under regular private land ownership. However, there is not always a verification of the land documentation of the properties registered in these systems. Therefore, there is a risk that part of these properties originated from fraudulent documents.

[9] Data from designated areas disregarding any overlaps according to the following order of priority: Indigenous Lands, Protected Areas, Agrarian Reform Settlement Projects, Public Forests, private properties. More information in Appendix 1.

[10] Pará State Decree No. 2,560/2010 and Pará State Decree No. 354/2012.

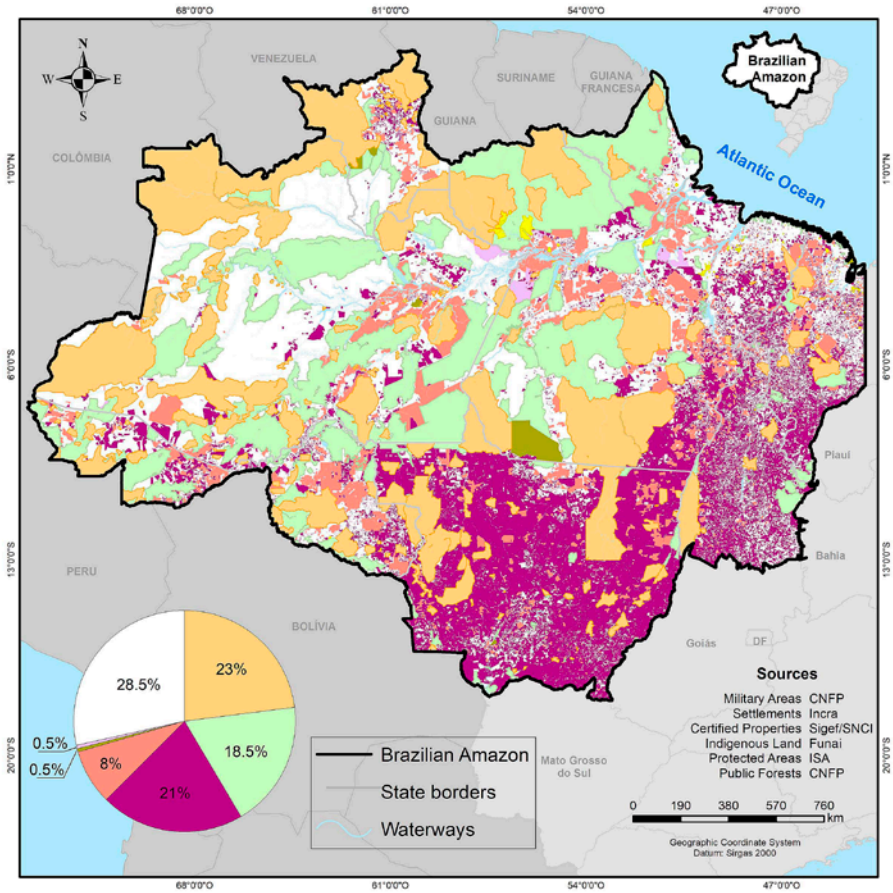
dealing with regularly titled properties, or without compensation in the case of illegal landholdings[11].

Other pending issues are related to the delay in removal of non-indigenous people from homologated ILs. There are also cases of fraudulent property registrations, which may have been included in land agency records as if they were valid properties[12]. These situations also favor the continuity of land conflicts in the region, prevent investments and hinder the development of conservation policies.

Appendix 1 presents the methodology used to identify the results presented in this section, as well as the data sources.

[11] According to Precedent No. 619 of the Superior Court of Justice (STJ), "the improper occupation of a public property is considered a mere detention, of a precarious nature, insusceptible to withholding or indemnity for accessions and improvements". Therefore, there would be no compensation to remove occupants from public land, inside or outside of PAs. However, this understanding is not yet widely adopted by all instances in the Judiciary. Source: Araújo, E. & Barreto, P. 2015. *Estratégias e fontes de recursos para proteger as Unidades de Conservação da Amazônia* (p. 40). Belém: Imazon. Available (in Portuguese) at: https://imazon.org.br/publicacoes/estrategias-e-fontes-de-recursos-para-proteger-as-unidades-de-conservacao-da-amazonia/. Accessed on Oct. 29, 2020.

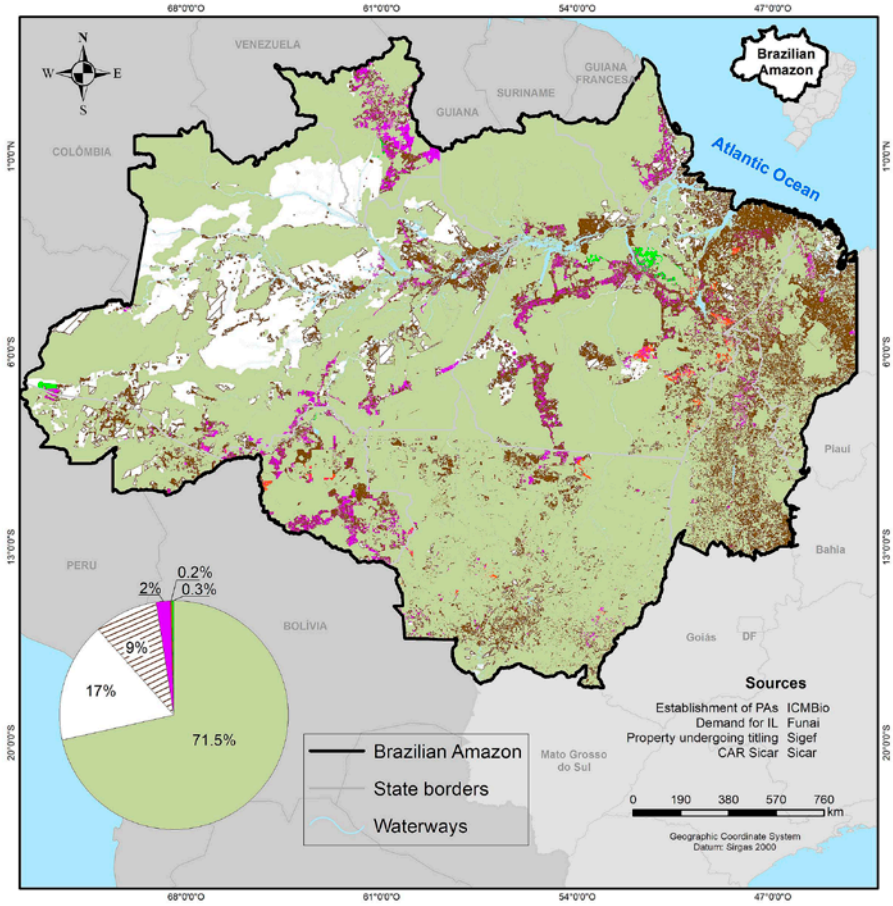
[12] The Federal Court of Auditors (TCU) identified 738 irregular properties occupying 657.9 thousand hectares inserted in Sigef. Source: TCU. 2020. Judgment 727/2020. Brasília: TCU.



Land tenure situation	Color on the map	Hectares	Percentage of Brazilian Amazon (%)
Indigenous Land		115,092,052	23
Private Property		105,324,702	21
Protected Area (Except Environmental Protection Area)		92,543,383	18.5
Settlement project		39,219,596	8
Military Area		2,669,359	0.5
Public Forest		2,039,035	0.5
Quilombola Territory		969,208	*
Total undesignated areas or areas lacking information on designation		**143,649,502**	**28.5**
Total designated areas (eliminating overlaps)		**357,857,335**	**71.5**
Total area of the Brazilian Amazon		**501,506,837**	**100**

* Percentage below 0.2%

Figure 1. Distribution of designated areas in the Brazilian Amazon according to land tenure situation



Land Tenure Situation		Color on the map	Hectares	Percentage of Brazilian Amazon (%)
Total designated areas (eliminating overlaps)			357,857,335	71.5
Total undesignated areas or areas lacking information on designation	Without CAR		85,717,341	17
	With CAR		45,073,212	9
Properties mapped for titling [i,ii]			10,938,186	2
Area with possible demand for Indigenous Land[i]			1,333,024	0.2
Area for the establishment of a federal Protected Area[i]			1,094,783	0.3
Total area of the Brazilian Amazon			**501,506,837**	**100**

[i] With overlaps

[ii] 46% of this area is undergoing regularization w ith Incra. The remaining areas have only property georeferencing, w ith no formalization under administrative process.

Figure 2. Distribution of undesignated areas undergoing regularization and undesignated areas registered in the Rural Environmental Registry in the Brazilian Amazon

Fact 2.

State governments are primarily responsible for the areas that lack land tenure definition in the Amazon, but there is an absence of planning for the control and designation of this territory

We estimate that state governments are responsible for deciding on the designation of 86.1 million hectares or 17% of the Brazilian Amazon. This area corresponds to 60% of the undesignated areas or areas that lack information about designation in the region (Figure 3). In other words, it is up to the state governments to solve a large part of the problem of the lack of definition of land rights in the Amazon.

However, most of the state areas, equivalent to 10% of the Brazilian Amazon, have not been registered in a public notary office in the name of state governments (in Portuguese *arrecadadas* and *matriculadas*). To do so, state governments must first "collect" (*arrecadar*) the land, a formal procedure for identifying the exact location of such areas, and then register them. Collecting and

registering are the first steps in the designation of the area, whether for private titling or other forms of designation. For this reason, land tenure agencies need to be proactive in carrying out these procedures.

But no state land agency in the Amazon had a planning process for land collection and registering as of 2020 (Table 1). In most cases, such procedures occur through individual demands based on each land regularization request received. In other cases, the agencies register part of larger state tracts. There are also situations of areas registered before 2002 that do not have georeferencing, since there was no legal requirement to do so. For this reason, part of the area identified in this study as unregistered may have been formally registered, but its georeferencing is missing. Therefore, these data should be used with caution.

Pará state may be one of the first in the Amazon to register land in a more planned manner due to a recent change in legislation. In November 2020, the government of Pará established by Decree that it will carry out a survey of state areas, aiming to register all of them. In this process, the Land Institute of Pará will annually publish the list of state plots with priority for collection, registering and designation[13].

The land collection process is generally time-consuming and complex, as it requires precisely identifying which areas have not yet been regularly titled, so that they can be registered in the name of the state. This involves notary research, research in archives of land tenure agencies and public calls for possible holders of titles to manifest themselves. In some cases, it is necessary to verify the validity of titles found in this process, which can be false. If this occurs, it is necessary to cancel the title to proceed with the registering of the area in question to the state. However, this cancellation can involve lengthy court proceedings. In view

[13] Art. 21 of the Pará State Decree no. 1,190/2020.

of this complexity, it is essential that the agencies have teams and resources dedicated to this task in order to proceed with the collection.

Federal areas, on the other hand, do not have the same level of problem, because they have already been registered. They are limited to those areas that were registered in the name of the Federal government up to 1987[14]. In other words, areas that were not duly registered with the Federal Government until that date are considered state-owned. However, this distinction between federal and state areas has not been completely resolved, either because not all federal areas are georeferenced or even because some areas considered federal have not undergone the entire formal registering procedure for the Federal government. In this case, they would legally be state areas.

For example, in 2011, a joint action between federal and state governments in Pará identified that about 90% of the municipality of Paragominas belonged to the state, contrary to what was previously thought. To arrive at this diagnosis, the land agencies verified that the formal acts required for the registering of the area by the federal government were not fulfilled. For this reason, the state regained control of the area and enrolled it in its name. The State of Rondônia has also verified this type of situation and is awaiting the transfer of plots for its control (Table 1). These cases illustrate the need for a careful assessment of land registering procedures by the Federal government.

[14] In 1987, Federal Decree-Law No. 2,375 revoked Federal Decree-Law No. 1,164/1971, which had federalized unoccupied lands located one hundred kilometers from each side of federal highways that had already been built, were under construction or were projected.

Also, regarding areas of the Federal Government, a portion equivalent to 6% of the Amazon has no decision on how it will be designated (Figure 3). This definition must pass through the Technical Chamber for Designating and Regularizing Federal Public Lands in the Brazilian Amazon, which will be discussed in more detail in the following section. In 4% of the Amazon, this Chamber had already indicated that the designation will be land tenure regularization (Figure 3), i.e., titling of private occupations on federal lands.

Finally, there are cases in which the Federal government must transfer areas already registered to the states by force of law[15]. This occurs in Amapá and Roraima (Table 1). However, this transfer process has lasted almost 20 years, with several legal problems and conflicts. Much of this delay occurred due to the need to georeference the areas that should be excluded from the transfer, either because they will remain under the control of the Federal government or because they have already been privatized. State agencies understood it was not necessary to carry out this step before the transfer, but that was not the understanding of the federal government. Judicial decisions on the matter confirmed that georeferencing was required for such a detachment prior to the transfer[16].

[15] Federal Law n. 10,304/2001.
[16] For example, Process n. 0004653-70.2012.4.01.4200 – TRF 1 – 1st Branch – Boa Vista.

However, in 2020 there was a change in the legislation, which will allow the transfer of land to the state governments without prior georeferencing of the areas that will remain under federal government control or that were already designated[17]. This new rule establishes that the federal government will have one year to georeference the areas to be excluded from the transfer. If the deadline is not met, the states will exclude such areas from the transfer procedure based on their limits contained in the Incra cartographic base[18]. The problem is that this database does not always have georeferenced information and, therefore, may be inaccurate. It is thus possible that in the coming years, conflict situations will arise in these regions based on cases that have inadequately come to be considered as state land.

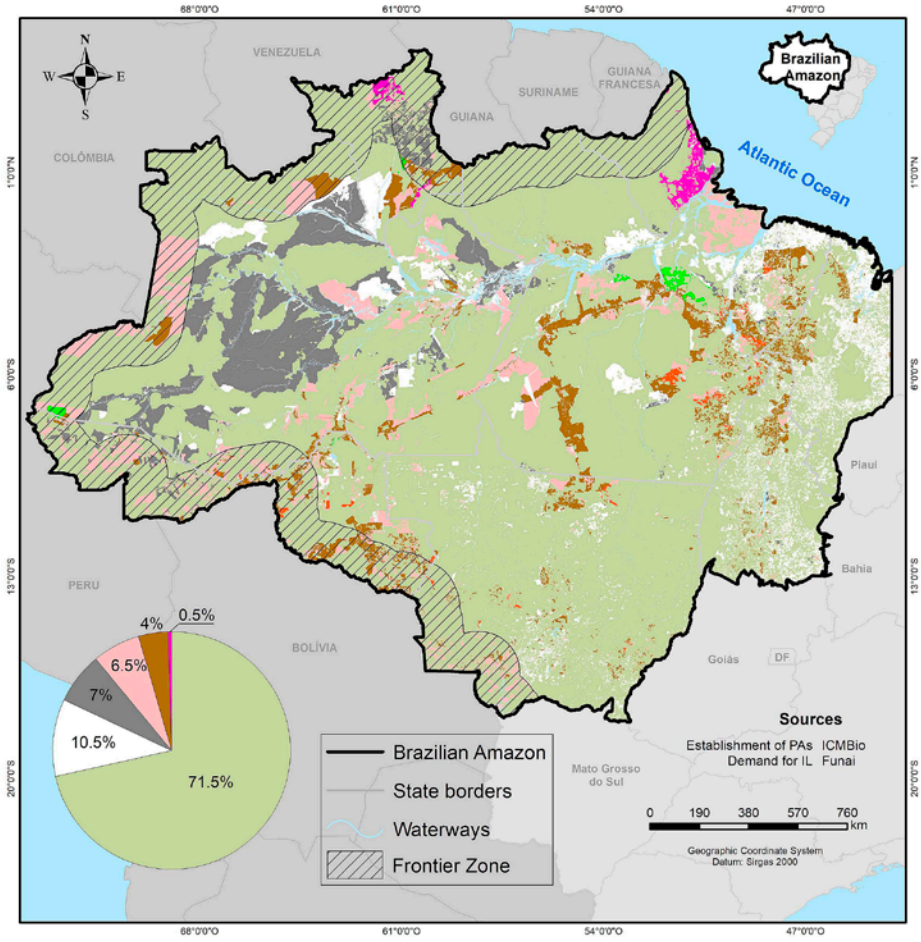
Table 1. Land collection and registering practices by states of the Brazilian Amazon as of 2020*

Practices	AC	AM	AP	MA	MT	PA	RO	RR	TO
By demanded property		●			●				
By land tracts or portions of tracts				●		●			
No planning	●	●		●	●	●		●	●
Transfer of federal land to the states			●				●	●	

*Translator's Note: States from left to right are Acre, Amazonas, Amapá, Maranhão, Mato Grosso, Pará, Rondônia, Roraima, and Tocantins

[17] Federal Law No. 14,004/2020 brought additional rules for removing land titles already issued by the Federal Government from areas to be transferred to the states. In such cases, the titles registered in a notary office and that have a descriptive memorial will have priority in this exclusion. This is because there are titles that were regularly issued by the Federal Government, but were not registered in a notary office and do not have a descriptive record or even georeferencing, making it difficult to locate them. Another change promoted by this 2020 law was the withdrawal of environmental conservation activities as one of the priorities for the use of areas transferred to the states.

[18] Art. 2, § 4, of Federal Law no. 10,304/2001, inserted by Federal Law no. 14,004/2020.



Land Tenure Situation	Color on the map	Hectares	Percentage of Brazilian Amazon (%)
Total designated areas (eliminating overlaps)		357,857,335	71.5
Area that is possible state-owned, but is not registered as such		51,511,233	10.5
State-owned area registered as such		34,627,835	7
Federal area waiting for designation		31,508,654	6.5
Federal area to be used for future land tenure regularization		20,972,901	4
Federal area being transferred to the states		2,601,073	0.5
Area with possible demand for Indigenous Land		1,333,023	*
Area for establishment of a federal Protected Area		1,094,783	*
Total area of the Brazilian Amazon		**501,506,837**	**100**

* Percentage below 0.5%

Figure 3. Distribution of areas that are undesignated or lack information on designation in the Brazilian Amazon according to government branch responsible

Fact 3.

43% of the territory lacking land tenure definition has priority for conservation, but current procedures do not guarantee the land designation for this purpose

Of the total area of the Amazon lacking land tenure definition, equivalent to 143 million hectares, 41% (or 61 million hectares) have priority for conservation, according to a survey coordinated by the Ministry of the Environment[19]. Most are areas classified as having extremely high biological importance (43.6 million hectares), followed by 9.2 million hectares with high priority and 8.4 million hectares with very high priority (Figure 4). These public lands necessary for environmental protection cannot be

[19] Ministry of the Environment Ruling (*Portaria*) n. 463/2018.

privatized, according to the Federal Constitution of 1988[20]. In addition, the Constitution and current legislation indicate other priorities for the allocation of these areas: recognition of Indigenous Lands[21], Quilombola Territories[22] or areas occupied by traditional communities[23], creation of environmental conservation areas[24] and land access for family farming[25]. Assigning public lands to medium and large private occupations without a bidding process can occur only when there is no overlap with priority demands and when the landholders meet the legal requirements for receiving the land title.

The federal law on land tenure regularization prohibits the titling of occupations in the following areas[26]:

I. reserved for the federal military administration and other purposes of public utility or social interest under the responsibility of the federal government;
II. traditionally occupied by indigenous people;
III. public forests, Protected Areas (PAs) or areas that are subject to a process for the creation of PAs;
IV. containing accessions or federal improvements;
V. lands occupied by quilombola or traditional communities that make collective use of the area, which will be regularized according to specific norms.

[20] Article 225, Paragraph 5 of the 1988 Federal Constitution.
[21] Article 231 of the 1988 Federal Constitution.
[22] Article 68 of the Transitional Constitutional Provisions Act.
[23] Article 3, II of Federal Decree No. 6,040/2007.
[24] Article 225, Paragraph 5 of the Federal Constitution of 1988 and Federal Law No. 9,985/2000.
[25] Article 2, Paragraph 2 and Paragraph 3 of Federal Law No. 4,504/1964.
[26] Article 4 of Federal Law No. 11,952/2009.

However, despite such provisions in the constitution and legislation, the procedures for land tenure regularization at the federal and state levels do not ensure that such priorities will be met. This increases the risk of privatization of areas that should be kept public or intended for collective regularization[27] and drives conflicts and deforestation.

At the federal level, there was an attempt to improve the identification of these priority areas to avoid their incorrect privatization. In 2013, the government created the Technical Chamber for Designating and Regularizing Federal Public Lands in the Brazilian Amazon[28]. This Chamber, extinguished in June 2019 and recreated in December of the same year[29], establishes a consultation process with different federal agencies to decide on the designation of the lands. By 2018, the Chamber had evaluated the allocation of 94.2 million hectares in the Amazon. Of this total, 47.5 million had previously been allocated prior to the group's work. Of the 46.7 million undesignated hectares, the Chamber allocated most of them to land privatization: 32.5 million hectares to the Special Secretariat for Family Agriculture and Agrarian Development (Sead), which was responsible for issuing land titles as of 2018, and 93,500 hectares to Incra. Another 7.9 million hectares were allocated to the Ministry of Environment (MMA, in Portuguese) for the creation of Protected Areas (Figure 5).

It is noteworthy that only 2 thousand hectares were allocated to Funai, but there were another 6 million hectares under study for this agency[30]. This was due to the way the Technical Chamber

[27] An example of collective regularization is the recognition of Quilombola Territories, in which community associations receive a collective private title, with prohibition of the land sale to third parties.
[28] The Technical Chamber was created by Administrative Ruling No. 369/2013.
[29] Article 11, Paragraph 1 of Federal Decree No. 10,592/2020.
[30] The shape files collected for this study have not yet indicated the location of these 6 million hectares, which are included in federal areas that are awaiting designation as shown in figure 3.

operates: each evaluation round deals with a specific area, for which the agencies must indicate whether they have an interest in designation and send the spatial data to delimit the area. If there is no demonstration of interest, it is assumed that the area is available for regularization of occupations (privatization)[31]. In the case of Funai, most areas of interest did not have accurate data on the location of indigenous territories, which would still be in the study phase. For this reason, the areas were reserved, waiting for this definition. Even so, in the data that we consulted for this assessment, we found 1.3 million hectares identified as areas already designated by the Chamber for land tenure regularization, in which there was an indication of partial interest by Funai (See Figure 2 in Fact 1). This indicates that this reservation procedure might not work for all cases.

In fact, we identified two main deficiencies in the operation of this chamber. The first, illustrated in the previous paragraph, is the presumption of priority for land tenure regularization of occupations, which does not comply with the Federal Constitution and current laws. As already explained in this section, privatization of public land should only occur when there are no other legal priorities in the area. In addition, public forests should be used for conservation, concession for sustainable logging or recognition of territorial rights of indigenous peoples and of traditional communities[32]. There is no provision in the law for the sale of public forests.

However, the regulation applied by the Technical Chamber adopts a definition of public forests that is restricted and at odds with the law, favoring the decision to privatize the areas. This is because, under federal law the public forests are all areas of natural or planted forests, located in properties under the domain

[31] Article 11, Paragraph 3 of Federal Decree n. 10,592/2020.
[32] Article 11, Paragraph 3 of Federal Decree n. 10,592/2020.

of the Federal Government, the States, the Municipalities, the Federal District or the entities of the indirect administration[33]. However, the decree that guides the chamber's work considers as public forests only those areas for which the Brazilian Forest Service expresses direct interest[34] for forestry concessions.

The second deficiency in the Technical Chamber is the absence of consultation with the state governments and civil society, which limits the type of information that federal agencies obtain about the situation and characteristics of the areas. There is no procedure to ensure the disclosure of the areas under consultation in the Chamber so that institutions not participating in this collective can submit data to assist in decision making. For this reason, part of the land designated for privatization may be territories with other legal priorities.

Furthermore, the Technical Chamber does not actually promote the formal allocation of public lands. It is an instance that indicates the form of designation, which must go through the due process in order to be concluded. For example, the first case decided by the Technical Chamber in 2013 took 2.9 years to achieve the final designation as a Protected Area in the Amazon[35],[36]. However, some parliamentarians pressured the government to reduce and extinguish part of these newly created PAs[37]. This example demonstrates the challenge in complying with the legal priorities for regularizing public lands that can occur even after the designation has been accomplished.

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[33] Article 3, I of Federal Law n. 11,284/2006.

[34] Article 13 of Federal Decree n. 10,592/2020.

[35] Brito, Brenda. 2017. *Market mechanisms to compensate for illegal deforestation in the Brazilian Amazon and their connection to land tenure governance*. 130f. PhD Thesis (in Science of the Law) - Stanford University, Palo Alto - USA.

[36] Environmental Protection Area of Campos de Manicoré, Acari National Park, Manicoré Biological Reserve and National Forests of Urupadi and Aripuanã.

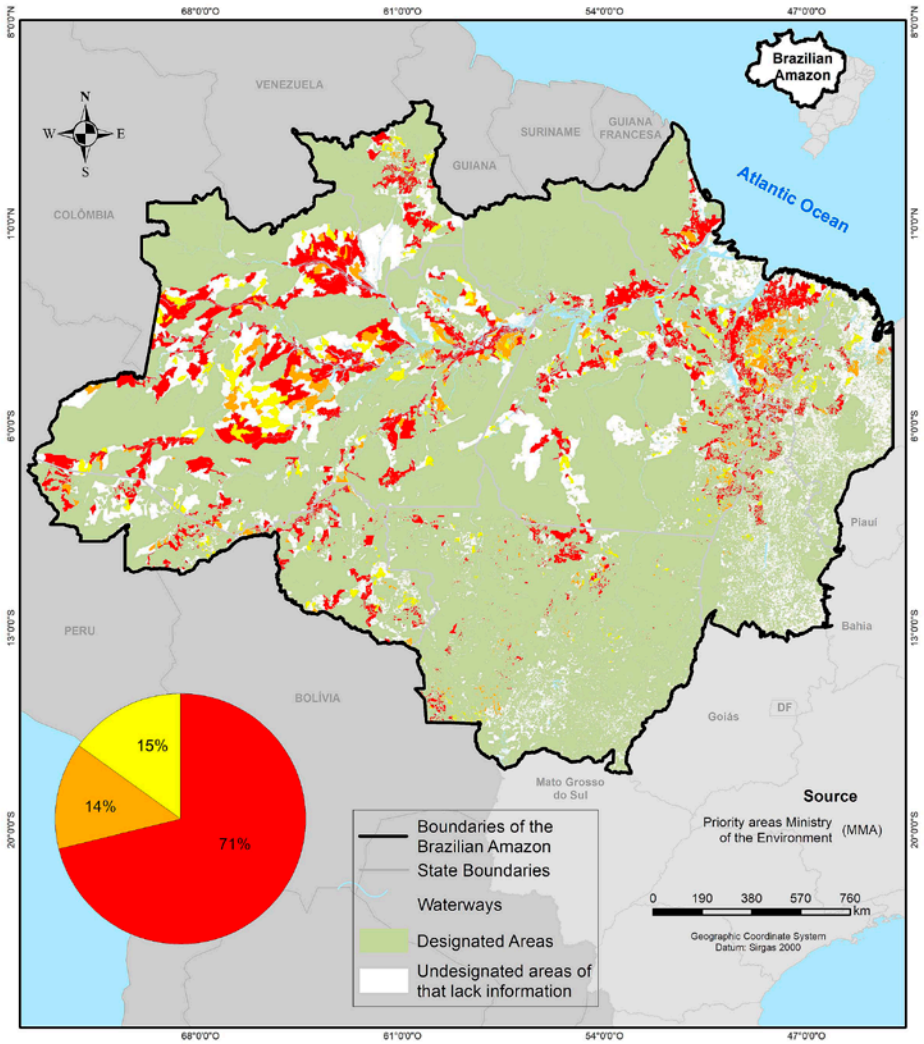
[37] Rodrigues, Sabrina. 2017. Environmentalists speak out against the reduction of protected areas in the Amazon. O Eco. Available (in Portuguese) at: https://www.oeco.org.br/noticias/ambientalistas-se-manifestam-contra-a-reducao-de-areas-protegidas-na- amazonia/. Accessed on: Oct. 30, 2020.

At the state level, Pará is the only state that has recently created a consultation platform for deciding on the designation of its public areas. The Technical Chamber for the Identification, Designation and Land Tenure Regularization of State Public Lands (Land Tenure TC) was created based on suggestions from civil society institutions[38]. It has nine seats for state government institutions and eight seats for civil society institutions, including representatives of traditional communities, quilombolas and indigenous peoples[39]. The role of this Chamber is to assist the Land Institute of Pará in the territorial management and allocation of state land assets in alignment with sustainable development policies[40]. However, the State Land Tenure TC does not have a seat for civil society organizations that work on the forest conservation agenda. This additional seat would be important, considering the chamber's role in deciding on the allocation of state public forests. In addition, the decree does not provide for public consultation on the areas under assessment by the Land Tenure TC. Disclosing such information and creating a procedure to receive contributions would make it possible for any institution to present technical subsidies for more informed decision-making by the chamber.

[38] Imazon presented to Iterpa and Ideflor-Bio the suggestion of creating a Technical Chamber for the allocation of state land tracts during the installation meeting of the Permanent Forum on Agrarian and Land Tenure Issues of the Agrarian Prosecution Office of the 1st region, on September 30, 2019.

[39] The following are part of the Land Tenure TC: Iterpa; Attorney General of the State; State Secretariat for Economic Development, Mining and Energy (Sedeme); State Secretariat for Agricultural Development and Fisheries (Sedap); State Secretariat for the Environment and Sustainability (Semas); State Secretariat for Planning and Administration (Seplad); Institute of Forest Development and Biodiversity of the State of Pará (Iderflor-Bio); Pará State Technical Assistance and Rural Extension Company (Emater); and the Agricultural Defense Agency of the State of Pará (Adepará). The following civil society sectors will participate in the Land Tenure TC: agriculture and ranching, industry, agricultural sciences from the academia, family farming, traditional communities, quilombola communities and indigenous peoples. Article 20 of the Pará State Decree 1,190/2020.

[40] Article 19 Pará State Decree n. 1,190/2020.



Category of Biological Importance	Color on the map	Hectares	Percent of area (%)
Extremely high		43,641,931	71
High		9,242,903	15
Very high		8,445,607	14
Total		**61,330,441**	**100**

Figure 4. Priority areas for conservation on undesignated lands or areas that lack information on designation in the Brazilian Amazon

In the other states, the absence of consultation procedures on the allocation of public lands increases the risk of privatization of areas with other priority interests. There is also the case of Roraima, whose State Constitution establishes a more bureaucratic procedure for designating areas for conservation: a two-thirds majority of the Legislative Assembly has to approve the creation and expansion of any area of environmental reserve or preservation[41]. By comparison, the head of the Executive Branch (President or Governors) can create Protected Areas by Decree at federal level and other states, without the need for legislative approval[42].

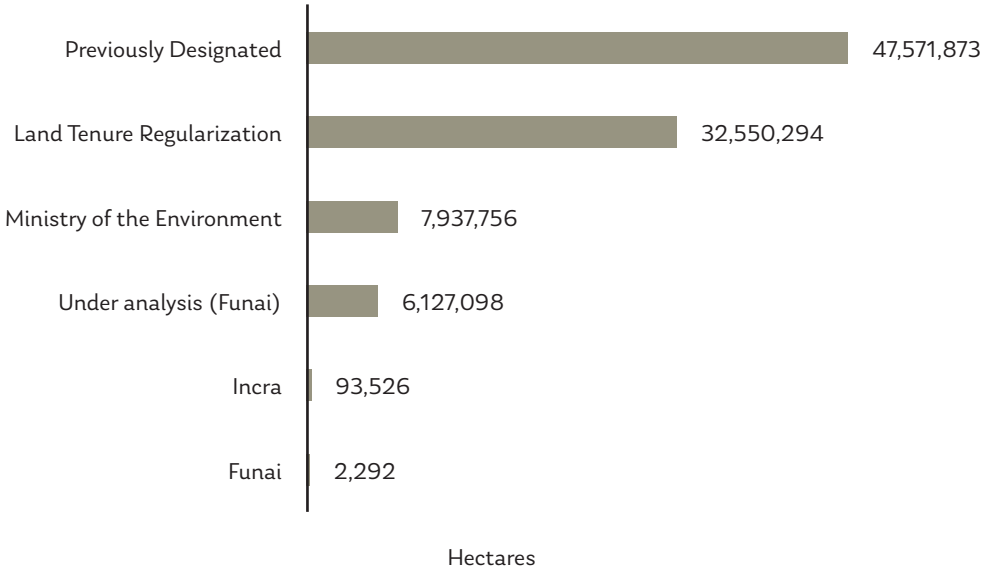


Figure 5. Allocation of public lands after consultations with the Technical Chamber for Designating and Regularizing Federal Public Lands in the Brazilian Amazon until 2018

[41] Article 12-A of the Roraima State Constitution.
[42] Article 22 of Federal Law n. 9,985/2000.

Fact 4.
There are at least 22 agencies tasked with some type of land tenure regularization in the Amazon.

Although most undesignated areas in the Amazon belong to the states, the responsibility for designating the areas is divided between at least 22 agencies at the federal and state levels (Table 2)[43]. In general, two criteria determine which is the responsible institution: land jurisdiction (federal or state) and type of occupant or intended use of the land. This is because the Brazilian land law considers who the occupant is in order to determine how (and if) the land occupation can be legalized (Table 2)[44].

For some types of occupants, there is more than one possible option for land regularization and the responsible institution. For example, governments can regularize territories of traditional communities by creating sustainable use PAs or via special Settlement Projects, such as Sustainable Development Projects (at the federal level). In other cases, only federal agencies have

[43] Considering each land and environmental agency in the states and the federal institutions.

[44] Brito, B. & Cardoso Jr., D. 2015. Regularização fundiária no Pará: Afinal, qual o problema? (p. 104) Belém: Imazon. Available (in Portuguese) at: https://imazon.org.br/publicacoes/regularizacao-fundiaria-no-para-afinal-qual-o-problema/. Accessed on October 29, 2020.

attributions such as the recognition of territories of indigenous populations, which is a responsibility of the Indigenous People's National Foundation (Funai) (Table 2)[45].

Even for regularizing small, medium and large landholdings, there are differences among states regarding the legal requirements, types of land occupation recognition and of documents issued (Appendices 2 and 3). There is also variation in the possibility of issuing titling to women and in the case of same-sex marriages (Appendix 4). The difference in land jurisdiction (federal or state) often also results in differences in procedures for territorial recognition and amounts charged in cases of sale of public land[46].

In addition to agencies of the Executive Branch, the Legislative Branch also participates in some types of regularization. For example, in most states, the titling of state land above a certain size of property can only occur with prior authorization from the State Legislative Assembly (Table 3). This requirement does not apply for titling on federal land. However, all cases (federal or state) of privatization over 2,500 hectares require authorization from the National Congress[47].

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[45] An exception to this rule occurred in 2020 in Piauí, which carried out the first demarcation of Indigenous Land led by the state government. This was possible due to the provisions of Piauí State Law No. 7,294/2019, which determines the designation for indigenous peoples, quilombola and traditional populations of public and vacant state lands that they occupy. Next, Piauí State Law No. 7,389/2020 recognized the existence of indigenous peoples in the state. This law also recognizes in its Art. 4 the right to self-determination of ethnic identity, which can be proven by minutes of the community assembly or by registration with Funai. This means that the state can make the demarcation even without documents issued by Funai. Source: Segalla, Vinícius. 2020. How Piauí dodged the Federal Government and demarcated its first indigenous land. São Paulo: Brasil de Fato. Available (in Portuguese) at: https://www.brasildefato.com.br/2020/09/11/como-o-piaui-driblou-a-uniao-e-demarcou-sua-primeira-terra-indigena. Accessed on Nov. 5, 2020.

[46] Brito, B. & Cardoso Jr., D. 2015. Regularização fundiária no Pará: Afinal, qual o problema? (p. 104) Belém: Imazon. Available (in Portuguese) at: https://imazon.org.br/publicacoes/regularizacao-fundiaria-no-para-afinal-qual-o-problema/. Accessed on Oct. 29, 2020.

[47] Article 49, XVII of the 1988 Federal Constitution.

The multiplicity of institutions responsible for different types of land tenure regularization is not necessarily a negative fact. It can be considered as a polycentric governance arrangement, in which there is a diversity of actors that operate independently at different levels, sometimes with some overlap[48]. An advantage of such a model is that different target audiences are supported in a manner that is more specific and adapted to their characteristics. Even so, this arrangement requires some level of coordination to be efficient, which is not the case when it comes to land regularization issues in the Amazon. For example, there is no instance for dialogue and cooperation shared among the federal government, states and representatives of different groups that demand land tenure regularization. The next section indicates one of the problems that impair greater coordination between these actors.

[48] Ostrom, Vincent; Tiebout, Charles M. & Warren, Robert. 1961. The Organization of Government in Metropolitan Areas: A Theoretical Inquiry, 55 Am. Polit. Sci. Rev. 831– 842. Available at: http://www.jstor.org/stable/1952530; Ostrom, Elinor. 2010. Beyond Markets and States: Polycentric Governance of Complex Economic Systems, 100 Am. Econ. Rev. 641–672. Available at: http://www.jstor.org/stable/27871226; Andersson, K. P. & Ostrom, Elinor. 2008. Analyzing decentralized resource regimes from a polycentric perspective, 41 Policy Sci. 71–93; Capelari, Mauro; Calmon, Paulo; Araújo, Suely. 2017. Vincent and Elinor Ostrom: duas confluentes tragetórias para a governança de recursos de propriedade comum. Ambiente & Sociedade, v. 20, p. 203–222. Available at: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1414-753X2017000100203&nrm=iso. Accessed on Nov. 5, 2020.

Table 2. Forms of territorial recognition and agency responsible according to the type of occupant or use and jurisdiction in the Brazilian Amazon[49]

Type of occupant or use	Federal jurisdiction		State jurisdiction	
	Type of regularization	Agency responsible	State	Agency responsible
Indigenous Peoples	Recognition of Indigenous Land	Funai	Lacks legal standing[50]	
Quilombola population	Titling of Quilombola Land	Incra	Titling of Quilombola Land	State land agencies or delegate to Incra[51]
Traditional communities	Creation of a Protected Area for sustainable use; creation of special Settlement Projects	ICMBio, Incra, President of Brazil[52]	Creation of a Protected Area for sustainable use; creation of special Settlement Projects	State environmental agencies[53], State land agencies, State governor[54]
Riverbank communities	Issuance of Land Use Authorization	Federal Property Management Secretariat (SPU)	Lacks legal standing[55]	

[49] Adapted from Brito, B. & Cardoso Jr., D. 2015. Regularização fundiária no Pará: Afinal, qual o problema? (p. 104) Belém: Imazon. Available (in Portuguese) at: https://imazon.org.br/publicacoes/regularizacao-fundiaria-no-para-afinal-qual-o-problema/. Accessed on Oct. 29, 2020.

[50] See note 45 about a legal precedent in Piauí.

[51] Only Amapá, Maranhão and Pará have state legislation and procedures for titling Quilombola Territories. In other states, governments can delegate this assignment to Incra. This occurs, for example, in Mato Grosso.

[52] The President is responsible for signing a decree to create the Protected Area.

[53] In Pará, the Institute for Forestry and Biodiversity Development (Ideflor-bio) is the agency in charge of the recognition of territorial rights of traditional communities through the creation of PAs. In other Amazon states, that role belongs to the state environmental agency.

[54] The governor is responsible for signing the decree to create the PA. In Roraima, the Legislative Assembly needs to authorize the creation of PAs by a majority of two-thirds.

[55] These territories are generally in federal jurisdiction areas known as *terreno de marinha*.

▸ Continuation of Table 2

Type of occupant or use	Federal jurisdiction		State jurisdiction	
	Type of regularization	Agency responsible	State	Agency responsible
Environmental conservation	Creation of a Protected Areas	ICMBio	Creation of a Protected Areas	State environmental agencies[56]
Forest concession within or outside a Protected Area	Concession contract through a bidding process	Brazilian Forest Service (SFB)	Concession contract through a bidding process	State agency for forest development[57]
Family farmer (individual family or in groups)	Creation of a Settlement Project; issuance of individual land title; granting of the right to use the land	Incra	Creation of a Settlement Project; issuance of individual land title; granting of the right to use the land; other documents covered by state law[58]	State land agencies
Small, medium and large-scale occupant of public land of up to 2,500 hectares	Issuance of individual land title	Incra	Issuance of individual land title. In some cases, requires authorization for the State Legislative Assembly	State land agencies, Legislative Assembly
Large-scale rural producer over 2,500 hectares	Issuance of individual land title via bidding, with prior authorization from the National Congress	Incra, National Congress	Issuance of individual land title via bidding, with prior authorization from the National Congress (bidding process not always required)	State land agencies, Legislative Assembly, National Congress

[56] In Pará, the creation of PAs is the responsibility of Ideflor-bio. In other Amazon states, such role belongs to the state environmental agency.
[57] Only Pará implements forestry concessions in state areas, through Ideflor-bio.
[58] Some state laws allow the issuance of documents on a provisional basis, when other requirements for issuing definitive land titles are not met. Examples of these documents include the occupation permit or license (in Roraima and Tocantins) or provisional recognition (in Acre).

Table 3. Requirement of prior authorization from the Legislative Assembly for the titling of state public lands according to size of property in the Brazilian Amazon*

Property size	AC	AM	AP	MA	MT	PA	RO	RR	TO
Larger than 100 hectares	●								
201 to 1,000 hectares[59]				●					
Larger than 1,000 hectares		●					●		
Larger than 1,500 hectares						●			
Larger than 15 fiscal modules[60] and up to 2,500 hectares			●						
Larger than 2,500 hectares								●	
No reference									●
Properties of any size regularized through sales					●				

*Translator's Note: States from left to right are Acre, Amazonas, Amapá, Maranhão, Mato Grosso, Pará, Rondônia, Roraima, and Tocantins.

[59] We have not found a legal provision in the State of Maranhão for the titling of public lands over 1,000 hectares.

[60] "Fiscal Module" originated from "Modulo Fiscal" in Portuguese, which corresponds to the minimum area required for a rural property to be economically viable. The size of the fiscal module for each municipality is established through Special Instructions issued by INCRA. Source: http://www.oeco.org.br/dicionario-ambiental/27421-o-que-sao-modulos-fiscais/. Accessed March 28, 2021.

Fact 5.
The lack of organization of land tenure databases and the low adoption of technology makes it difficult to organize a unified land registry

The creation of a single or integrated land registry in the country is essential for improving land management in Brazil, as advocated by several studies[61]. However, the country has been unable to achieve this objective, even with laws providing for the integration of databases of government agencies and real estate registries in notary offices.

For example, a decree in 2016[62] created the National Territorial Information Management System (Sinter), managed by the Federal Revenue Service. It provides for the integration of spatial and legal data from notary offices, the Federal Revenue Service and from urban and rural property registers managed by the Federal Government, states and municipalities[63]. However, for the

[61] For example: Reydon, B. P.; Fernandes, V. B.; Telles, T. S.. 2015. *Land tenure in Brazil: The question of regulation and governance*. Land Use Policy, v. 42, p. 509–516. Available at: http://dx.doi.org/10.1016/j.landusepol.2014.09.007; Chiavari, J. et al. 2016. Panorama dos direitos de propriedade no Brasil rural: legislação, gestão fundiária e Código Florestal. Rio de Janeiro: CPI.
[62] Federal Decree 8,764/2016.
[63] Article 1 of Federal decree 8,764/2016.

moment Sinter is operating in a pilot phase and in municipalities outside the Brazilian Amazon[64] .

The poor cooperation between the institutions responsible for land management contributes to the delay in implementing of Sinter in the Amazon. But the lack of database organization of these institutions also prevents further data integration. Even if a state land agency wants to share its information, it will be very difficult to do so in the short term, since none of the Amazon states has a complete digital database locating all the titles they have already issued on a map. In addition, the information in these digital databases is not entirely reliable, resulting in the need to check the information in paper-based files (Table 4). This occurs for two main reasons.

First, some states, such as Pará, began issuing land titles in the 19th century. In other cases, such as in Acre, titles originated when the territory was still part of Bolivia. This history of land titles largely lacks digitization, organization and vectoring. In other words, it is necessary to transfer the documents to digital format, organize them in a system that allows an efficient data search, and, most difficult, upload the location of these titled properties into a digital database. However, these old titles have a vague description of their location, which makes this task more complex.

In some cases, such old titles were used illegally in locations other than the original (so-called 'flying titles', títulos voadores). In other situations, they ended up generating real estate records with areas larger than indicated in the titles. The State of Pará, for example, has a specific procedure to deal with this situation,

[64] Municipalities operating Sinter on a pilot basis: Belo Horizonte (MG), Fortaleza (CE), Caucaia (CE), Campinas (SP) and the Federal District (DF). Source: CNM News Agency. 2019. CNM participates in International Seminar on the National Territorial Information Management System. CNM. Available (in Portuguese) at: https://www.cnm.org.br/comunicacao/noticias/cnm-participa-de-seminario-internacional-sobre-o-sistema- nacional-de-gestao-de-informacoes-territoriais. Accessed on Nov. 5, 2020.

rectifying titles to include their precise location. In these cases, the Land Institute of Pará needs to investigate the history of the title and the region in which it is located, and conduct a field survey to decide whether it is possible to rectify the title with the description of the correct location. If the case does not meet the criteria for rectification, two alternatives remain: i) its occupant can request a new land title (i.e., the land institute considers that the occupied land has never been titled); or ii) the government must reclaim the area if there is no new titling request or if the occupant does not meet the legal requirements for titling.

A second factor that makes the databases of land agencies unreliable is that even the information on properties that are already in the bases is incomplete. When receiving a request for regularization, the agency needs to verify if the area is available for privatization or if it has already been titled. Considering the Land Institute of Pará as an example, it is common for the technician in charge of this analysis to identify several property polygons overlaid on the digital land tenure database, without an appropriate identification of each case: whether the polygons are titled properties, or other titling requests still under analysis, or even requests already rejected. In this case, the technician needs to locate the paper file corresponding of each polygon to make this assessment and be able to issue an opinion on the feasibility of the new titling request. This type of problem requires updating and organizing the digital database in different layers of information, making it possible to separate properties that are already titled, rejected or under analysis.

States such as Amazonas, Pará and Mato Grosso reported they already have actions in progress to organize and update their databases, but there is no forecast of when they will be completed or information on the schedule and phases of this process. In these cases, the states also seek to update the databases according to technical specifications required by the Brazilian Institute of

Geography and Statistics (IBGE)[65]. According to the current rules, Sirgas 2000 is the National Coordinate Reference Systems, replacing the SAD 69 system.

Another factor that contributes to the disorganization of data from state land agencies is the low level of adoption of technology and lack of standardization in their procedures. Up to 2019, requests for land tenure regularization were processed through paper files in all states. The analysis of these requirements relied almost entirely on the technician's assessment, with no automated steps. Many agencies lacked technical manuals or administrative rules with more objective criteria for technical and legal analyses. As a consequence, procedures that could be standardized would gain different versions and formats, often requiring additional explanations and steps between sectors. The result is a delay in responding to land title requests and the existence of different decisions on similar matters[66].

Even when the state land agencies had specific software for managing information, these products were insufficient because they provided only partial support (Table 5). For example, some land institutes have a system used only for issuing the land title, but in which the agency's technician must manually enter all information about the property and the title. Even the systems in place to record the phase of each case requesting land titles were not fully reliable, as the information they provided did not always reflect the actual stage of analysis.

In Pará, the State Land Institute has four systems containing data on titles issued in different periods, but they do not connect. Thus, technicians need to consult each system to verify if the

[65] Established by a Resolution of the President of IBGE n. 01/2015.

[66] Brito, B. & Cardoso Jr., D. 2015. Regularização fundiária no Pará: Afinal, qual o problema? (p. 104) Belém: Imazon. Available at: https://imazon.org.br/ publicacoes/ regularizacao-fundiaria-no-para-afinal-qual-o-problema/. Accessed on Oct. 29, 2020.

applicant has benefited from land tenure previously. Often, in addition to checking such systems, they still need to consult the paper records to be sure of the analysis. This type of difficulty was diagnosed in 2015 with a technical partnership to design a new system that could cover all procedural flows of the agency[67]. At the end of 2018, the State Land Institute launched the first phase of the State Land Registration and Regularization System (Sicarf), which also intends to partially automate some analyses, as well as organize and manage land data from the State agency[68]. In 2020, the government of Amapá also adopted the same system Sicarf. However, a system developed for one state will not necessarily be ready to be adopted by another and will require adaptations, considering the differences between state laws and procedures for land tenure regularization.

At the federal level, during the Terra Legal Program, which operated federal land tenure regularization between 2009 and 2018, there was an investment in technology to process, organize and analyze land regularization requests. During this period, the program developed technological solutions (such as the Land Management System - Sigef) and simplified procedures, especially for small properties with up to four fiscal modules. One of the most recent results was a system module for organizing the flow and analyses f title requests (Sigef Titulação), has been available for Incra since the beginning of 2019. This new system allows the

[67] Between 2015 and 2017, Imazon worked in partnership with Iterpa through a Technical Cooperation Agreement to support the improvement of the land regularization process by the agency. Among the objectives of the Agreement was the design of a system to manage and analyze the regularization data, the Sicarf (Land Registration and Regularization System of Pará). The assessment and recommendations were used by Iterpa in the preparation of Sicarf by an outsourced company. Source: Costa, S. 2018. Activities Report 2017 (p. 55). Belém: Imazon. Available at: https://imazon.org.br/publicacoes/relatorio-de-atividades-2017. Accessed on: Sept. 29, 2020.

[68] Agência Pará. 2018. Iterpa lança sistema fundiário pioneiro no Brasil. Belém: Iterpa. Available at: https://agenciapara.com.br/noticia/3263/. Accessed on: Sept. 29, 2020.

automation of several stages of the regularization processes that, until that period, had been processed in paper records[69].

These investments in digitizing information, structuring the database and developing information management and analysis systems are essential for increasing the efficiency of state land agencies. However, these tasks are complex and will not be solved in the short term. This is because even in the states that have new systems operating, it will be necessary to organize the data before uploading it on the new platforms. There will also be a transition period from paper-based processes to digital formats, in addition to the demand for training of technicians. New job openings for technology professionals will also be necessary in order to meet the demands.

Therefore, the topic of technology, innovation and data organization requires continuous and medium-term investment. The result of this investment will also make it possible to assess the extent to which the areas that have already been occupied in the region for decades need a land title, or whether it would be a case of clarifying situations of already issued titles that are used in an irregular or illegal manner.

[69] Brito, B. 2020. *Nota técnica sobre o Projeto de Lei n.º 2.633/2020*. Belém: Imazon. Available (in Portuguese) at: https://imazon.org.br/publicacoes/nota-tecnica-pl-2633-2020/. Accessed on Nov. 16, 2020.

Table 4. Situation of the digital land database in state land agencies in the Brazilian Amazon

Situation	AC	AM	AP	MA	MT	PA	RO	RR	TO
Not reliable[70]	●	●		●	●	●	●	●	●
Incomplete[71]	●		●		●	●	●	●	●
Undergoing process of organization		●			●	●			
Adopts SAD 69 geographic coordinate system		●			●	●		●	
Adopts Sirgas 2000 geographic coordinate system	●		●	●			●		●
Land titles files only in paper format	●							●	●
Partially digitized land titles files		●	●	●	●	●			

Table 5. Situation of information management systems in state land agencies in the Brazilian Amazon

Situation	AC	AM	AP	MA	MT	PA	RO	RR	TO
Insufficient	●	●		●	●	●		●	●
New system being prepared			●	●				●	●
New system launched by 2019						●			
The system only informs the status of cases		●							
No system							●		
Sigef (Incra system) only for data consultation			●		●				
Sigef to upload data	●	●					●	●	

[70] Land agency technicians need to consult paper records to confirm information.
[71] The digital database does not include maps of all the titles the agency already issued.

Fact 6.
Most state laws encourage continued invasion of public lands

The current land laws in force in the Amazon reflect a view that public land is available for occupation and appropriation, which is a stimulus for the continuation of invasions in the territory. This is because few state laws determine the deadline by which an individual can initiate an occupation in public land to receive a land title (Table 6). Even those laws with a deadline end up being changed and postponed. This occurred, for example, in 2017, when the National Congress revised Federal Law 11,952/2009[72] and granted another seven years for the beginning of these occupations on federal lands: an extension from 2004 to 2011[73]. In 2019, Roraima changed its state law, expanding the time limit from 2009 to 2017, for cases of public land sale.

There are at least two negative consequences of these laws. First, in the absence of an occupation deadline, land occupations that occur at any time, including in the future, can be privatized through low land prices and without bidding (See Fact 8 for discussion on land values). Without a bidding process, these laws do not favor those who have the best proposals for the land use or who offer the greatest value for their acquisition, creating a barrier

[72] Amendment made with the conversion of Provisional Measure No. 759/2016 into Federal Law No. 13,465/2017.
[73] Article 5, IV and Art. 38, Sole Paragraph, I, of Federal Law 11,952/2009.

to free competition[74]. The second consequence is that the change in deadlines generates the expectation that the laws can always be changed in the future to favor new occupations.

In these two cases, the result is the maintenance of a cycle of legalization of public land theft (known as land grabbing), associated with deforestation (Figure 6). This cycle begins with the identification of undesignated public areas and their deforestation (total or partial) to signal land use and occupation. In some cases, this type of occupation causes conflicts with more vulnerable groups that previously inhabited the area, such as indigenous populations, but whose land rights were not yet recognized. The following steps involve registering the occupied area in self-declaring public land registers, such as the Rural Environmental Registry (CAR), and filing a request for the land title. If the law in force does not permit the titling of this occupation (for example, the request does not fall within the legal deadlines), the land grabbers press for the change of laws to their benefit in order to obtain title to the invaded land (Figure 6)[75].

This characteristic of land tenure laws causes a great contradiction between environmental and land tenure laws in the Brazilians legal framework. The Public Forest Management Law (Federal Law No. 11,284/2006) does not provide for the sale of these areas. Public forests are supposed to be designated for conservation, concession for sustainable logging or for the recognition of indigenous peoples' and traditional community land rights[76]. However, the absence of a time limit for the occupation of public land or the modification of existing terms allows the privatization of forests that were occupied and deforested after

[74] The principle of free competition is provided for in Article 170, IV of the 1988 Federal Constitution.
[75] Brito, B. & Barreto, P. 2020. *Nota técnica sobre Medida Provisória n.º 910/2019*. Belém: Imazon. Available (in Portuguese) at: https://imazon.org.br/publicacoes/nota-tecnica-sobre-medida-provisoria-n-o-910-2019/. Accessed on Nov. 13, 2020.
[76] Article 4 of Federal Law n. 11,284/2006.

2006 (year of publication of Federal Law 11,284). In other words, the law prohibits selling public forest; but if the area is deforested, even if partially deforested, then privatization is allowed.

There is also an inconsistency with the 2006 Forest Management Law when the land tenure rules allow the privatization of properties occupied after 2006 that are still slightly deforested, i.e., with a predominance of public forests. This is due to the recognition of extractive activities and forest management as proof of agrarian use for land tenure regularization. More recently, environmental services have started to be included in the list of activities considered to be an actual use of the area[77].

Furthermore, the practice of changing deadlines for legalizing the occupation of public land represents a violation of the principle of non-regression in environmental law. It is applicable for preventing the reduction of environmental protection that affects essential ecological processes, as well as fragile or collapsing ecosystems[78]. In the case of land tenure legislation, postponements of this type of deadline directly affect the protection of the Amazon rainforest, since they encourage new occupations with deforestation, in the expectation of future flexibilities in the land laws. For example, a study by Imazon estimated that extending the land occupation deadline in federal laws threatens at least 19.6 million hectares of undesignated federal areas in the Amazon, which can be occupied and deforested in anticipation of regularization. If this entire area

[77] At the federal level, Federal Decree No. 9,309/2018 was the first to consider that the income obtained through environmental services related to forest conservation should be considered as an effective cultivation system for the purpose of land tenure regularization. This same provision was included in Art. 4, Paragraph 2 of Federal Decree No. 10,592/2020, which revoked the decree of 2018. In Pará, Art. 5, III of State Law No. 8,878/2019 includes environmental or ecosystem services in the concept of agricultural activity for land tenure regularization.

[78] Benjamin, Antônio Herman. 2012. *Princípio da Proibição de Retrocesso Ambiental. In: Princípio da vedação do retrocesso ambiental. Comissão de Meio Ambiente, Defesa do Consumidor e Fiscalização e Controle do Senado Federal. Princípio da Proibição de Retrocesso Ambiental*. Brasília: Senado Federal. p 55-72.

is to be privatized, estimates show that an additional deforestation between 11 thousand square kilometers and 16 thousand square kilometers will occur by 2027 due to the expansion of the agricultural frontier in this area[79]. The new property owners can legally clear up to 20% of their parcels upon authorization. These scenarios represent an evident setback in forest conservation.

Furthermore, this change in terms or absence thereof ends up promoting an amnesty to the crime of invasion of public land with the intention of occupying it, provided for in Article 20 of Federal Law No. 4,947/1966. This is because the laws allow the legalization of occupations that occurred at any time or with extensions of time, instead of punishing those who carried out the invasion.

It is a fact that, in some states, the laws require a minimum occupation time of an area before its occupant can receive the land title. For example, Acre and Amazonas require five years of occupation. In Mato Grosso, the minimum term is one year for the sale mode and five years for donation[80] (Table 6). However, in the absence of a deadline for the beginning of these occupations, this deadline can be met for occupied areas in any year, including in the future.

Other states have this time requirement for some types of regularization, but not for all. In Pará, for example, properties that have already implemented agricultural activity can only be regularized for sale if the occupation started by l 2014 and if five

[79] Data referring to a study that considered two scenarios of risk of future deforestation on the federal area of 19.6 million hectares in the Amazon:
i) deforestation would follow the average for the period 1988–2016; and ii) deforestation would follow the average for the 2000-2016 period. Source: Brito, B.; Barreto, P.; Brandão, A.; Baima, S. & Gomes, P. H. (2019). Stimulus for land grabbing and deforestation in the Brazilian Amazon. Environmental Research Letters, 14 (6), 064018. https://doi.org/10.1088/1748-9326/ab1e24. Accessed on: May 24, 2020.

[80] In Mato Grosso, this requirement for sale appears in Service Standard (*Norma de Serviço*) No. 02/2002 of the Land Institute of Mato Grosso (Intermat). In the case of a land donation, the requirement is in Art. 9 C, II of Mato Grosso State Law n. 3,922/1977, included by Mato Grosso State Law n. 10,863/2019.

years of this activity can be proven[81]. However, there is no time requirement for the sale of properties with no ongoing agricultural activity. In this type of regularization in Pará, the applicant must submit a sustainable economic development plan, describing the agricultural activities planned for the property. Such activities must be implemented within five years after the issuance of the title[82]. However, there is no competitive process for selecting the best plans for these public areas.

Historically, the Land Institute of Pará has failed to monitor this type of economic development plan, which had already been required for regularizing real estate in the past. Nor does the state government have the practice of taking over areas that do not meet the conditions for maintaining this type of title. Thus, the main risk in this type of sale is that it may allow legalization of occupied areas for speculative purposes, without any investment in agricultural activities. In other words, occupants of public lands who present the required plan, never implement it after obtaining the title and sell them for a higher price than that paid to the government. In addition, this rule may encourage the occurrence of new occupations in the state due to the absence of a time frame for its beginning.

Finally, we highlight Rondônia state law that provides for regularization for properties occupied until July 22, 2008 (State Law No. 4,892/2020). This law prevents titling if the occupant or spouse has committed the crime of land grabbing. However, as this crime does not explicitly exist in Brazilian law, the state government still needs to regulate which criminal types can be considered in the assessment of this requirement, e.g.,, the crime of invading public land with the intention of occupying it, mentioned above.

[81] Art. 10, I of Pará State Law n. 8,878/2019.
[82] Art. 10, §2 of State Law n. 8,878/2019.

Table 6. Minimum time or maximum deadline requirements for occupation of public land for land tenure regularization in the Brazilian Amazon

Minimum time or maximum deadline for occupation	AC	AM	AP	MA	MT	PA	RO	RR	TO	Federal
Does not specify a time frame for one or neither form(s) of sale and donation of land	●	●		●	●	●		●	●	
Up to July 2008							●			
Up to December 2011			●							●
Up to July 2014 for some categories						●				
Up to November 2017 for sale								●		
At least one year for one or all regularization categories				●	●	●				
At least five years for one or all regularization categories	●	●			●	●				
Does not specify minimum deadline for one or neither of the regularization categories						●			●	

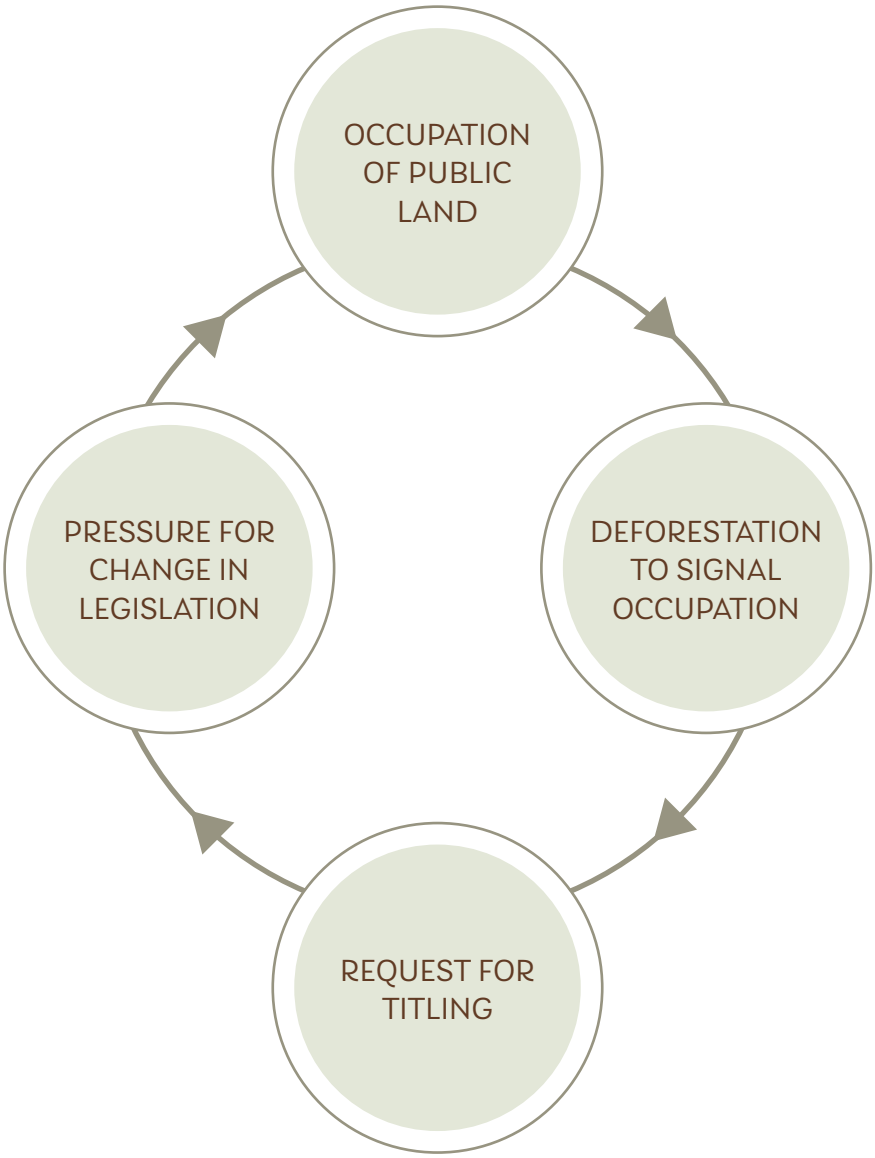

Figure 6. Cycle of legalization of land grabbing and deforestation in the Brazilian Amazon

Fact 7.

No state prohibits the titling of illegally deforested areas, and most do not require a commitment to restore environmental liabilities before titling

Most state land tenure laws do not require properties with illegal deforestation to join environmental regularization programs before titling (Table 7). Only Acre requires the signing of a Conduct Adjustment Term (TAC in Portuguese) before issuing the land title[83].

In Rondônia, properties that have received an infraction notice or environmental embargo, with proceedings in progress at environmental agencies, cannot be the object of donation or sale of public lands without bidding (Art. 10 of State Law No. 4,892/2020). However, the state law does not indicate what happens in cases where deforestation is prosecuted: e.g., if the government reclaims the area or if a bidding process is carried out. Furthermore, the law requires an updated CAR of the property before titling but does not require that it be used to verify its environmental regularity. For

[83] Art. 10 of Acre State Law n.1,957/2007.

example, an area may have illegal deforestation and not have been prosecuted.

In Pará, one of the requirements for regularization for sale is that the property must be maintained in accordance with current environmental legislation or in the process of environmental regularization[84]. However, the requirement to comply with environmental regularization prior to titling occurs in only one case: in properties above four fiscal modules that had 100% of their forest cover up to July 2008 but deforested any percentage of the area without authorization up to July 8, 2014. In this situation, in addition to requiring compliance with environmental regularization prior to titling, Iterpa may choose to issue a contract for granting the right of use instead of a definitive title of property[85]. In other cases of illegal deforestation up to 2014 in areas of the State of Pará, the applicant is granted a period of two years after the issuance of the title to comply with some form of environmental regularization provided for by law[86].

In general, there is also no prohibition in state or federal land laws to provide titling for more recently deforested properties. In Pará, there is a specific situation in which the regularization process is suspended due to deforestation: when the property had 100% of its forest cover up to July 2014 but was deforested after that date[87]. Even so, there is no prohibition on titling in this case, leaving the decision on designation of the area to the Technical Chamber for Identifying, Designating and Regularizing State Public Lands. Thus, legislation in Pará continues to allow the regularization of deforested properties at any time.

On the federal level, the government requires signing of TACs with the environmental agency or compliance with the

[84] Art. 10, IV of Pará State Law n. 8,878/2019.
[85] Art. 73, IV of Pará State Decree n. 1,190/2020.
[86] Art. 73 of Pará State Decree n. 1,190/2020.
[87] Art. 73, V of Pará State Decree n. 1,190/2020.

Environmental Regularization Program before titling only when two factors occur at the same time[88]:

I. properties with embargo or environmental infraction assessed by the federal environmental agency; and
II. if the requirements for regularization are met based on environmental damage proven during inspection - for example, if illegal deforestation is the only indication of occupation and there is no productive use in the area.

In some states, laws require that environmental liabilities be restored after the land title is issued, under penalty of the government reclaiming the property (Table 7). In the case of Roraima, the state law prohibits irregular deforestation in areas of permanent preservation or legal reserve after the issuance of the title[89].

Such post-titling obligations are part of the resolution clauses, which are rules that must be fulfilled by the title holders in order to maintain their property. In some states, these clauses also include a ban on the sale of real estate for a specified period or a ban on the exploitation of labor in conditions that are analogous to slavery (Appendix 5). However, neither the states nor the federal government monitor compliance with these clauses. For example, in two audits, the Federal Audit Court (TCU) pointed out that the federal government did not monitor resolutive clauses and did not reclaim properties that failed to comply with them[90]. In the audit published in 2020, the TCU revealed that more than half of the titled properties analyzed had illegal deforestation after 2008, without any measure adopted by the government[91].

[88] Art. 5, §3 of Federal Decree n. 10,592/2020.
[89] Art. 36, §1 of Roraima State Law n. 976/2014.
[90] TCU. 2015. Ruling 627/2015. Brasília: TCU; TCU. 2020. Ruling 727/2020. Brasília: TCU.
[91] TCU. 2020. Ruling 727/2020. Brasília: TCU.

In addition, in the federal case, the law allows the tenant who breached environmental rules to remain on the property if he/she signs a TAC to remedy the problem[92]. In other words, it already accepts that environmental damage will occur in the future, which ends up being a stimulus to post-titling deforestation.

In fact, demanding a commitment to environmental regularization after titling is not the best strategy for promoting environmental regulation, if we consider the delay in implementing the Forest Code. Eight years after the law was passed, implementation of environmental regularization programs for rural properties is still slow[93]. For this reason, this requirement should be made before granting the land title, especially with TAC commitments. Thus, in the event of non-compliance, governments can legally enforce these agreements, imposing fines and initiating lawsuits for reclaiming properties.

[92] Art. 18, §7 of Federal Decree n. 10,592/2020.

[93] Chiavari, Joana & Lopes, Cristina Leme. 2019. *Onde estamos na implementação do Código Florestal? Radiografia do CAR e do PRA nos estados brasileiros*. Rio de Janeiro: Climate Policy Initiative. Available at: https://www.inputbrasil.org/publicacoes/onde-estamos-naimplementacao-do-codigo-florestal. Accessed on Nov. 16, 2020.

Table 7. Legal requirement for restoring illegal deforestation in land tenure regularization

Requirement of a commitment of recovering environmental liabilities	AC	AM	AP	MA	MT	PA	RO	RR	TO	Federal
Does not require commitment before granting land title			●	●	●		●	●	●	●
Does not halt titling if there has been recent deforestation	●	●	●	●	●	●	●	●	●	●
Titling only occurs after TAC is signed with the environmental agency	●									
Titling only occurs after TAC is signed with the environmental agency under certain circumstances detailed in the legislation						●				●
Send information on liability to the environmental agency, which decides on the signing of a TAC		●								
Donation or sale without bidding only if there is no notice of violation or environmental embargo in the property's name							●			
Post-titling: restore liabilities or undergo environmental regularization so as not to lose the title	●					●				
Post-titling: respecting the environmental law so as not to lose the title			●		●					●

Fact 8.
The Brazilian population subsidizes land privatization in the Amazon with no guarantee that the property will be used sustainably

State and federal governments sell public land at prices well below what is charged for properties on the market (Figure 7). On average, state governments charge 15% of the market value and the federal government charges 26%, considering the values used as the basis for calculating the final price (Figure 8). Among the states, Tocantins has the lowest Value for Bare Land (VTN), charging on average only BRL 4.00 per hectare (Figure 7). However, properties with up to four fiscal modules pay only BRL 1.00 per hectare for the land title issued by the Land Institute of Tocantins[94].

[94] The Annex to Tocantins State Decree No. 4,832/2013 defines values for land regularization in Palmas and its surroundings (from BRL 10.00 to BRL 300.00), in addition to values for the rural portions of the state (varying from BRL 1.00 to BRL 5.00). The amount of BRL 4.00 per hectare represents the weighted average obtained based on the location of the undesignated areas in the state and the respective values attributed by law.

Different discount rates are also applied to these amounts, which reduce the final price and vary according to each legislation. At the federal level, most properties pay 10% to 50% of the minimum VTN established by Incra. That is, the values shown in Figure 7 will still undergo this reduction.

In the states, we highlight as an example, cases of reduction in the value of a property that has forest areas. For example, the law in Roraima applies a 10% discount to areas of ecological interest for the preservation of ecosystems, assuming that they would be of less value than areas without these characteristics[95]. In Pará, the state grants a 20% discount to properties that comply with environmental legislation, considering the legal reserve and permanent preservation areas, or that are in the process of environmental regularization[96]. Mato Grosso, on the other hand, adopts the basic value of land for areas of legal reserve[97] and applies rates that increase the value of areas without forests. On the one hand, these low values of forest attempt to encourage their conservation. On the other hand, because many of these laws allow the regularization of occupied areas at any time without providing a deadline, they end up being a stimulus for more occupations of public forests in the expectation of profiting from obtaining the land.

There are also situations of discount for payment in cash or through installments, with annual payments in the long term. Under federal law, there is still a three-year grace period for the titleholder to pay the first installment (Table 8).

The combination of low VTN and discounts generates a high loss of revenue in the sale of public land. In the federal case, if the

[95] Annex to Roraima State Law No. 976/2014, amended by Roraima State Law No. 1,351/2019.
[96] Art.10, Paragraph 8, I of Pará State Law No. 8,878/2019 and Art. 56, Paragraph 3 of Pará State Decree No. 1,190/2020.
[97] Art. 1, Paragraph 3 of Mato Grosso State Decree No. 294/2019.

federal government privatizes 19.6 million hectares of undesignated public land in the Amazon for the amounts charged in the current legislation, Brazilian society will lose anywhere between BRL 62 billion and BRL 88 billion, reaching a quarter of the value of the Petrobras market share in 2019[98]. In Pará, this difference between market value and the amount charged by the state reaches BRL 9 billion in 8,053 properties that could be subject to onerous land tenure regularization by Iterpa[99].

In fact, this difference between the amount charged by the government and the market value represents a subsidy for those who occupy public land and who receive land titles with no bidding. This subsidy occurs under the justification of facilitating the regularization of the occupants, whose properties would not have adequate productive conditions, partly due to the government's omission and delay in providing a land title for the occupation[100]. In this sense, governments argue that titling is what would enable more efficient and sustainable productive practices on the property[101].

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[98] Brito, B. & Barreto, P. 2020. *Nota técnica sobre Medida Provisória n.º 910/2019*. Belém: Imazon. Available at: https://imazon.org.br/publicacoes/nota- tecnica-sobre-medida-provisoria-n-o-910-2019/. Accessed on Nov. 13, 2020; Brito, B.; Barreto, P.; Brandão, A.; Baima, S., & Gomes, P. H. (2019). Stimulus for land grabbing and deforestation in the Brazilian Amazon. Environmental Research Letters, 14(6), 064018. https://doi.org/10.1088/1748-9326/ab1e24.

[99] Cardoso Jr., Dário et al. 2018. *O Estado da Amazônia: Potencial de Arrecadação Financeira com a Regularização Fundiária no Pará* (p. 14). Belém: Imazon. Available at: https://imazon.org.br/publicacoes/potencial-de-arrecadacao-financeira- com-a-regularizacao-fundiaria-no-para/. Accessed on Sept. 1, 2020.

[100] Incra. 2020. *Relatório de Análise do Custo de Obtenção de Imóveis Rurais - Pauta de Valores de Terra Nua para fins de titulação de projetos de assentamento e regularização fundiária*. Brasília: Incra. Available at: http://www.incra.gov.br/ media/docs/pauta-titulacao/relatorio_analise_2020.pdf. Accessed on Nov. 16, 2020.

[101] Mapa. 2020. *Regularização fundiária–Cenário e legislação*.Brasília: Mapa. Available at: https://www.gov.br/agricultura/pt-br/assuntos/noticias/cartilha-explica-processo-de-regularizacao-fundiaria-na-amazonia/regularizacaofundiariacenariolegislacao.pdf. Accessed on Nov. 16, 2020.

However, there is no guarantee that these areas will in fact be used for production, creating jobs or even complying with environmental rules. The low values can in practice be another stimulus for the continued occupation of public lands with deforestation. This is because after the titling, the property can be sold at values above what was paid in its purchase, contributing to a land speculation market.

Even if some land laws applied in the Amazon determine the fulfillment of socioenvironmental obligations after the titling (Appendix 5), the states or the federal government do not monitor what happens with these properties (See Fact 7). Thus, eventual breaches of these obligations, such as illegal deforestation, do not result in the loss of the property. In the federal case, audits by the Federal Audit Court have already indicated illegal deforestation on titled properties without any government measures for reclaiming the areas (See Fact 7).

In practice, this subsidy for the value of the land does not guarantee a socioenvironmental payback to society. Therefore, if the purpose is to encourage sustainable production, it should be replaced by others actions linked to land use after titling. This could occur by charging the market value of the properties but granting discounts on annual installments if the holders comply with the Forest Code or adopt low-carbon agriculture practices. For example, in 2020 the United Kingdom was discussing the change of subsidies on the order of 3 billion euros destined for the agricultural sector to stimulate practices that bring climatic and environmental benefits[102].

[102] Stokstad, Erik. 2020. United Kingdom to embark on 'agricultural revolution' in break from EU farm subsidies. Available at: https://www.sciencemag.org/news/2020/01/united-kingdom-embark-agricultural-revolution-break-eu-farm-subsidies. Accessed on Nov. 16, 2020.

Even when governments have tried to increase the figures, the counter-pressure from the rural sector in the states has been stronger. For example, in February 2019, Mato Grosso published a decree that increased the final value of the properties[103], as it eliminated the reduction of the value in areas of legal reserve in the properties. According to the Federation of Agriculture and Livestock of the State of Mato Grosso (Famato), this new methodology increased the value of the hectare in the Amazon biome from BRL 514 to BRL 1,029[104]. After pressure from the sector, the government revoked this February decree and published another one in November[105], which applies lower values to legal reserve areas. Thus, the value of BRL 1,029 fell to BRL 570 per hectare[106].

In Pará, in September 2020, the State Agricultural, Agrarian and Land Policy Council (Cepaf) approved a proposal to reduce bare land values (VTN) presented by the Federation of Agriculture and Livestock of Pará (Faepa)[107]. The normative ruling with the new values was not published until November 2020. However, according to the document presented by Faepa to Cepaf, the new approved methodology consists of replacing the VTN charged by Iterpa with the minimum VTN of the Incra price list[108]. For the final calculation

[103] Mato Grosso State Decree n. 31/2019.
[104] Famato. 2019. *Governo atende setor produtivo e revoga decreto que eleva preços de terras*. Cuiabá: Famato. Available at: https://www.sistemafamato.org.br/portal/famato/noticia_completa.php?codNoticia=238786. Accessed on Dec. 10, 2020.
[105] Mato Grosso State Decree n. 294/2019.
[106] Famato. 2019. *Governo atende setor produtivo e revoga decreto que eleva preços de terras*. Cuiabá: Famato. Available at: https://www.sistemafamato.org.br/portal/famato/noticia_completa.php?codNoticia=238786. Accessed on Dec. 10, 2020.
[107] Faepa. 2020. *Cepaf aprova proposta de tabela de preços de referência do Valor de Terra Nua para fins de Regularização Fundiária e de estímulo à atividade de desenvolvimento florestal sustentável*. Belém: Faepa. Available at: http:// sistemafaepa.com.br/faepa/conselho-de-politica-agricola-agraria-e-fundiaria-cepaf-aprova-proposta-de-tabela-de-precos-de-referencia-do-valor-de-terra-nua-para-fins- de-regularizacao-fundiaria-e-de-estimulo-a-atividad/. Accessed on Nov. 18, 2020.
[108] Faepa. 2019. Letter n. 279/2019 – Faepa. Belém: Faepa.

of the property, the average of this minimum VTN per region of the state would be considered, from which 10% to 50% of this value would be charged per hectare, depending on the number of fiscal modules of the property. Considering the values practiced in 2020, the reduction may imply, for example, a decrease in the standard VTN per hectare from BRL 1,133.00 to BRL 612.22 in the region of Marabá, in southeastern Pará[109]. This reduced amount would also include the additional discounts proposed by Faepa.

In addition to the low values and the pressure not to increase them, another serious problem is the lack of effective payment collection. For example, the federal government has never structured itself to collect the amounts due for land titles issued above one fiscal module. According to TCU, even the titleholders who seek to make their payments are unable to do so, due to the lack of administrative routines for collecting the amounts[110]. The total that was not collected adds to BRL 7 million, but it can reach BRL 58 million if there is no structuring of collection procedures[111]. The same type of problem occurs in the states.

Therefore, governments should consider other institutional arrangements for this task, such as delegating this role to banking institutions. One possibility would be to collect payment of the land titles in cash and to offer, rural property financing programs through banks, as is the case with urban financing. Thus, the land agency would receive the amounts due quickly and would not need to allocate its scarce human resources to develop a structure for collecting amounts[112].

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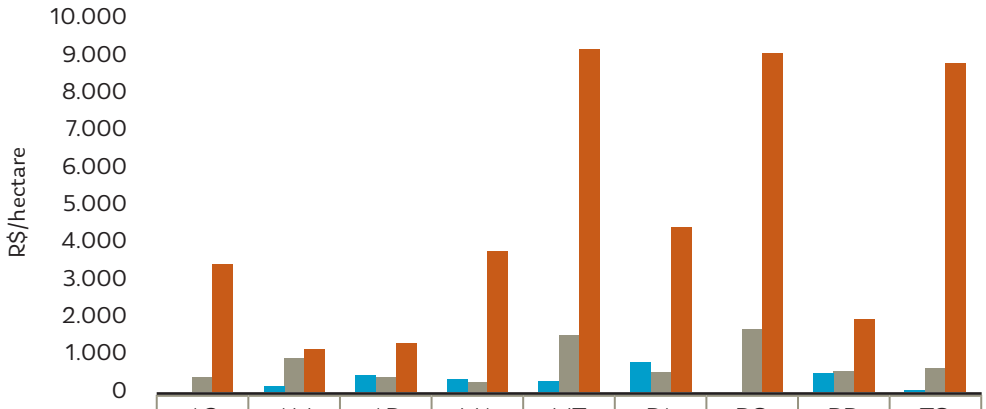
[109] To find these values, we considered the average value of the ITERPA VTN of 2020 in the municipalities of the Marabá region and the average of the minimum VTN of the Incra price list in 2020 for the same locations (Água Azul do Norte, Banach, Conceição do Araguaia, Cumaru do Norte, Araguaia Forest, Ourilândia do Norte, Pau D'Arco, Redenção, Rio Maria, Santa Maria das Barreiras, Santana do Araguaia, São Félix do Xingu, Sapucaia, Tucumã, Xinguara).

[110] TCU. 2020. Ruling 727/2020. Brasília: TCU.

[111] TCU. 2020. Ruling 727/2020. Brasília: TCU.

[112] Brito, B. 2020. Nota técnica sobre o Projeto de Lei n.º 2.633/2020. Belém: Imazon. Available at: https://imazon.org.br/publicacoes/nota-tecnica-pl-2633-2020/. Accessed on Nov. 16, 2020.



	AC	AM	AP	MA	MT	PA	RO	RR	TO
Estadual	-	180	464	320	278	789	-	487	4
Incra	463	951	464	347	1.562	596	1.694	634	698
Mercado	3.390	1.158	1.312	3.704	9.090	4.387	8.941	1.917	8.715

Figure 7. Comparison between average market values per hectare and bare land values (VTN) used as a basis for land sales by states in the Brazilian Amazon and the federal government (minimum VTN)[113]

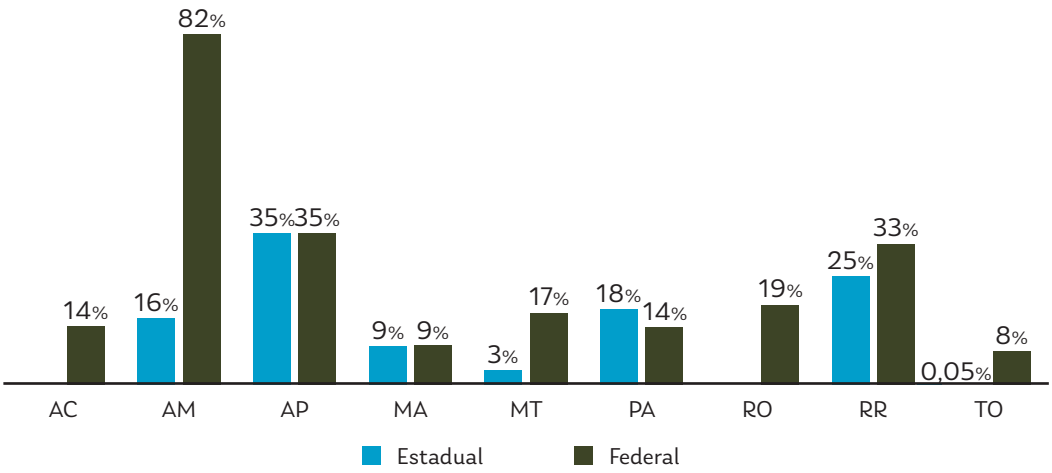


Figure 8. Percentage of the value of bare land charged by states of the Brazilian Amazon and the federal government in relation to the average value of the hectare in the land market

[113] Acre did not provide the amounts charged by the state government. Amapá applies the same amount as Incra. For Tocantins, see note 94. The land laws of Rondônia determine a charge of 10% of the VTN, but do not indicate whether the calculation will be based on the minimum, average or maximum VTN. For the federal government, we consider the average minimum VTN per state, based on the INCRA table available at: https://bit.ly/3loJbOC, accessed on: 11 Feb. 2020. Market value obtained by calculating the average land values by state based on FNP. 2019. Anualpec 2019. Informaecon: São Paulo.

Table 8. Payment methods for regularized properties in the states of Brazilian Amazon

Payment methods for land titles	AC	AM	AP	MA	MT	PA	RO	RR	TO	Federal
In cash with a 20% discount		●		●	●	●	●			●
In cash with a 50% discount								●		
Twelve months for the first payment							●			
Three years for the first payment			●					●		●
Installments throughout 10 years		●				●				
Installments throughout 20 years			●					●		●
Five installments per year, with a down payment of 20% of the total price					●					
Value reduction if: i) forest conserved in accordance with legislation; ii) is in the process of being regularized					●	●		●		
iii) area of ecological interest	●								●	
No reference										

Fact 9.
There is a lack of transparency and social control over the privatization of public land assets

State land agencies do not publish most of the data required by the Law on Access to Public Information, the LAI (Federal Law No. 12,527/2011). On average, up to 2018 the agencies disclosed only 22% of the information that should be publicly available. Another 56% of the data were absent and 22% were partially disclosed[114]. In practice, society does not know which public areas are being privatized and who is receiving land titles issued by the states.

There are more serious cases, such as Tocantins, which did not disclose 69% of the data required by law. Even Pará, which obtained the best assessment, reported only 29% of the data satisfactorily (Table 9). Mato Grosso, which had the second-best evaluation, has a state decree that unlawfully determined the secrecy of information of the state's Land Institute land tenure base[115]. In

[114] Cardoso Jr. D.; Oliveira, R. & Brito, B. 2018. Transparência de Órgãos Fundiários Estaduais na Amazônia Legal. Belém: Imazon. Available at: https://imazon.org.br/PDFimazon/Portugues/livros/Transparencia Orgaos Fundiarios Amazonia Legal.pdf. Accessed on May 24, 2020.

[115] State Decree No. 1,813/2013 established that access to information from the digital land database is done by means of a justified request and that the data in the database is confidential.

other words, there are no exemplary cases of compliance with LAI in the states of the Brazilian Amazon, even when one state was better rated compared to the others.

The lack of data disclosure is aggravated by the absence of opportunities for public participation to monitor actions by these agencies. At the state level, only Acre has a panel in this regard, but with limited participation (see below). Other states have spheres for discussing land issues, but which are not coordinated by the land agency and do not directly monitor land tenure regularization actions (Table 10).

I. **Acre:** the State Land Governance Commission (CGF/Acre) was created in 2016[116], with the role of providing advice and opinions. It is coordinated by the Land Institute of Acre and its attributions include: i) promoting dialogue between land agencies, audit agencies, public notaries, the Judiciary and Legislative Powers; ii) identifying and presenting a proposal for solving land tenure issues; and iii) providing an opinion on urban and rural land tenure regularization actions in the state. However, it does not include representatives from organizations linked to traditional peoples and communities, defense of the environment, the private sector and academia.

II. **Amazonas:** the Amazonas Dialogue Forum was created in 2012 as a result of articulation led by the International Education Institute of Brazil (IEB), the National Council of Extractive Populations (CNS) and the Pastoral Land Commission (CPT). The group is coordinated by the Federal Prosecutor's Office (MPF), has participation by the Secretariat of Land Policy (SPF), Federal Property Management Secretariat (SPU), Incra and ICMBio. This forum can be a mechanism for interlocution between society

[116] Created by State Decree No. 5,658/2016.

and the state, aiming at land regulation of communities in thirteen Conservation Units in the state[117]. Among the results achieved by the forum, we highlight the regularization via the Concession of Use Rights (CDRU) in 60% of Extractive Reserves (Resex) in Amazonas.

III. **Maranhão:** State Commission for the Prevention of Violence in the Countryside and in the City (COECV), linked to the Secretariat for Human Rights and Popular Participation (Sedihpop)[118]. This Commission works in collective cases classified as 'consolidated', i.e., conflicts that last at least a year and a day, and that are in areas of state jurisdiction. Its aim is to conduct mediation so that the abusive use of police force does not occur and that human rights demands are respected. COECV performs a screening of cases analyzing whether they are in accordance with the scope of the commission's activities. COEVC was also working in 2017 on the elaboration of a state conflict map in Protected Areas.

IV. **Mato Grosso:** the Commission for Land Tenure Affairs and Public Records was created by the Judicial Administrative Department (CGJ, in Portuguese) of Mato Grosso in 2011[119]. Among its objectives are: i) the identification of problems related to property registers; ii) qualification of professionals working on land issues and iii) facilitation of communication between the three powers and participating institutions[120].

[117] IIEB. 2015. *Fórum Diálogo Amazonas: regularização fundiária urgente!* Brasília: IIEB. Available at: http://arquivo.iieb.org.br/index.php/publicacoes/livros/forum-dialogo-amazonas-regularizacao-fundiaria-urgente-mobilizacao-social-e-inovacao-processual-para-garantia-de-direitos-territ/. Accessed on Oct. 9, 2020.

[118] Maranhão State Law n. 10,246/2015.

[119] Created by State Ordinance No. 70/2011 of the Judicial Administrative Department of Mato Grosso.

[120] Ruling No. 35/2015 from the Mato Grosso State Court.

V. **Pará:** Permanent Commission for Monitoring, Investigating and Advising on Issues Related to Land Grabbing, created in 2007 and coordinated by the Pará Court of Justice. This Commission has the participation of eleven entities[121] and aims to[122]: i) monitor processes related to land grabbing; ii) develop studies on the agrarian issue in the state; and iii) propose measures for land management and fraud prevention. Studies by the Commission led to the decision by the National Council of Justice to cancel more than 5,000 false property registrations in 2010[123].

At the federal level, between 2009 and 2019, there was the Intergovernmental Executive Group (GEI, in Portuguese), which monitored the implementation of land tenure regularization actions by the Terra Legal Program. Federal agencies, all state land agencies in the Amazon and representatives of civil society participated in this group[124]. However, it was extinguished in 2019[125]. Law 11,952/2009 also provides for the creation of a committee for this function, with the participation of civil society[126]. However, by the end of 2020 it had not been reestablished.

[121] Participating in the Commission: the State Attorney General's Office, Iterpa, Incra, the Federal Public Prosecutor's Office, the State Public Prosecutor's Office, the Federal Attorney's Office, the Brazilian Bar Association, the Federation of Agricultural Workers of the State of Pará, the Pará Human Rights Society, Pastoral Land Commission, Federation of Agriculture and Livestock of Pará.
[122] Ordinance No. 271/2007 of the Office of the President of the Court of Justice of Pará.
[123] Seligman, F. & Angelo, C. 2010. CNJ cancela 5,5 mil registros de terra irregulares no Pará. Folha de São Paulo. Available at: https://www1.folha.uol.com.br/fsp/ poder/po2008201029.htm. Accessed on Nov. 17, 2020.
[124] Brito, B. & Barreto, P. 2010. Primeiro ano do Programa Terra Legal: Avaliação e Recomendações (p. 60). Belém: Imazon. Available at: https://imazon.org.br/publicacoes/1824-2/. Accessed on Oct. 16, 2020.
[125] Terminated by Federal Decree n. 9,784/2019.
[126] Art. 35 of Federal Law n. 11,952/2009.

Table 9. Overall ranking of state land agencies in the Brazilian Amazon with the worst performance with regards to active transparency

Ranking	Estado	Absent	Partial	Satisfactory
1º	Tocantins	79%	9%	12%
2º	Amapá	70%	11%	19%
3º	Acre	62%	23%	15%
4º	Roraima	57%	23%	20%
5º	Maranhão	54%	29%	17%
6º	Amazonas	52%	22%	26%
7º	Mato Grosso	39%	25%	36%
8º	Pará	37%	34%	29%

Table 10. Social control mechanisms on land tenure issues in the states of the Brazilian Amazon

Control mechanisms	AC	AM	AP	MA	MT	PA	RO	RR	TO	Federal
Sporadic public hearings or meetings		●	●			●				
Has an interinstitutional committee or forum that is not coordinated by the land agency		●	●	●	●	●	●		●	
Has an interinstitutional committee or forum that is coordinated by the land agency	●									
Commission that works as a court of appeals for decisions								●		
Commission or forum provided for by law, but has not been implemented										●

Fact 10.

There were changes to seven land tenure laws in the Amazon between 2017 and 2020 to facilitate the privatization of public lands

Since 2017, there have been seven more significant changes in land laws applied in the Brazilian Amazon. Most of them went unnoticed by a good part of Brazilian society. In most of these changes, the justification is the need to modernize land tenure regularization and eliminate bureaucracy. However, in practice, the new laws can favor those who have illegally appropriated public land and who often deforested these areas to signal their occupation.

The first major change occurred in 2017, when the National Congress changed the main federal law for land tenure regularization (Federal Law No. 11,952/2009), after converting Provisional Measure No. 759/2016 into law. There are three lawsuits in the Federal Supreme Court questioning the constitutionality of this change in federal law. Among the changes to this new rule are:

I. expansion of the area eligible for land titling to 2,500 hectares (one thousand hectares more than the previous standard)[127];
II. amnesty for those who invaded public land between 2005 and 2011 (See Fact 6);
III. definition of values far below the market in the privatization of these areas (See Fact 8);
IV. possibility of renegotiating defaults until December 2021[128] for those who received a title until December 22, 2016.

Two years after this change, the federal government published Provisional Measure (MP) No. 910/2019 aiming at a new amendment to Federal Law No. 11,952/2009. After pressure from various sectors of society and lack of agreement on the final text[129], the National Congress did not convert this MP into law, and it lost its validity on May 19, 2020. Among the main points of this measure were[130]:

I. Possibility of issuing titles for those who illegally invaded public land between 2011 and 2018;

[127] Art. 6, §1 of Federal Law n. 11,952/2009.
[128] Art. 19 of Federal Law n. 11,952/2009.
[129] Rodrigues, L. & Baião, B. 2020. Após pressão nas redes, Câmara fecha acordo para deixar caducar MP sobre terras. Brasília: CNN. Available at: https://www.cnnbrasil.com.br/politica/2020/05/12/apos-pressao-nas-redes-camara-fecha-acordo-para-deixar-caducar-mp-sobre-terras. Accessed on Jan. 8, 2021.
[130] Brito, B. & Barreto, P. 2020. Nota técnica sobre Medida Provisória n.º 910/2019. Belém: Imazon. Available at: https://imazon.org.br/publicacoes/nota-tecnica- sobre-medida-provisoria-n-o-910-2019/. Accessed on Nov. 13, 2020.

II. exemption from inspection prior to the titling in properties of up to 15 tax modules, which would increase the risk of titling areas in conflict or with other allocation priorities[131];
III. possibility of renegotiation for noncompliance with mandatory clauses of titles issued up to 2019, but without setting a deadline. In practice, this change would lead to the discredit that the obligations would be enforced.

Part of the text of MP No. 910/2019 was used in Draft Bill (PL) No. 2,633/2020, which is being processed by the National Congress. Even though this Draft Bill has excluded some problematic items from the provisional measure, it still contains provisions that can weaken the safeguards necessary for the land tenure regularization policy[132].

In addition to the change in federal law in 2017 and the attempt at subsequent changes, there has also been a wave of changes in state land rules. As in the federal case, these changes in the states ended up allowing the regularization of occupations that were considered illegal, with the risk of stimulating more invasion of public land and deforestation in the future. Table 1 presents a summary of these changes by each state.

[131] The order of priority for recognizing territorial demands is as follows: indigenous territories, quilombola territories, traditional communities, environmental conservation, family farming and, finally, small, medium and large properties on public land occupied by private individuals.
[132] Brito, B. 2020. Nota técnica sobre o Projeto de Lei n.º 2.633/2020. Belém: Imazon. Available at: https://imazon.org.br/publicacoes/nota-tecnica-pl-2633-2020/. Accessed on Nov. 16, 2020.

It is noteworthy that the legislative procedure occurs through Provisional Measures classified as urgent or without any broader public discussion. The most emblematic case in this regard was the approval of the Pará land law in 2019, undergoing a process of only 33 days, with no public hearing and with voting in two rounds in a single day. In Amapá, the new law also went through on an emergency basis, in 50 days, and there was only one public hearing. These accelerated procedures that lack sufficient public debate also demonstrate the low level of transparency in the State Legislative Assemblies. In Pará, for example, the text of the Draft Bill was not available for consultation on the internet.

Such cases demonstrate the difficulty in asserting the interest of society instead of favoring private interests when discussing land and forest in the Amazon. Federal and state governments prioritize the sale of society's assets, replicating a model that historically has generated deforestation and conflicts and does not bring social progress to the region's population. In view of the low transparency in the designation of public areas, it is essential to create permanent groups to monitor land tenure regularization by land agencies. Otherwise, the tendency will be for new changes and loosening in the laws, without the appropriate public discussion.

Box 1.

Summary of changes to state land laws in the Brazilian Amazon in 2018 and 2019

Amapá

Supplementary State Law No. 110/2018 revoked the previous rule and copied several articles of Federal Law No. 13,465/2017 (result of the conversion into law of Provisional Measure (MP) No. 759/2016). The state law even allows the state to use the same land prices adopted by Incra. Another point copied was the maximum period for the beginning of occupation of public land until 2011. However, as the previous state law did not stipulate a deadline, this aspect turned out to be positive.

Mato Grosso

In 2019, the state made its first change to its Land Code since 1977. The change was partial, removing some requirements had only been met on paper and creating new forms of regularization, but failing to introduce points necessary for combatting the continued occupation of public land. Some highlights are:

- Waiver of bidding: the previous law required that all state areas be titled through a bidding process, but in practice, the only bid for the purchase was from the occupant of the property.
- Creation of the special sale modality: if the occupant cannot prove the direct or indirect exploitation of the property by his/

her family and the actual practice of farming in the area, he/she may substitute such requirements by: i) presentation of a letter from the adjoining areas, in which neighbors declare that they recognize the boundaries of the property; and ii) presentation of supporting documents[133]. The regulation of the law included the Rural Environmental Registry (CAR)[134] in the list of these documents, a direct contradiction to the Forest Code, which explicitly states that CAR cannot be considered a title for the purpose of recognizing the right of property or possession[135].

- Mandatory compliance clauses after titling: in the special sale category, the title holders must comply with rules such as respecting environmental legislation and impeding of work analogous to slavery. Failure to comply with these clauses within five years after the titling results in the state reclaiming the property. However, other types of regularization, such as donation or regular sale, do not have these same requirements.
- Absence of a time frame for the beginning of occupations: the change in the law does not determine the deadline for the beginning of occupations that can be regularized. There is only the requirement of a five-year minimum occupation in the donation category of the law. In the sale category, the only indication of minimum time appears in an administrative ruling of the Land Institute of Mato Grosso (Intermat) of 2002, indicating a year and a day of occupation to apply for the title. Thus, someone who occupies a public area for only a year could apply for regularization.

[133] The documents required in this category are: letter from neighboring property owners, state registration, registration with the Agricultural Defense Institute of the State of Mato Grosso (Indea), invoices for purchase and sale of inputs, georeferenced dividing fences, Rural Environmental Registry and other documents that demonstrate that the applicant is the legitimate owner of the property (Art. 9-B of State Law No. 3,922/1977, included by State Law No. 10,863/2019 and Art. 4, §1 of State Decree No. 146/2019).
[134] Art. 4, §1, IV and V of State Decree n.146/2019.
[135] Art. 29, §2 of Federal Law n. 12,651/2012.

Pará

Approved urgently and sanctioned despite veto requests from more than 60 organizations[136], the new law brought several controversial aspects. Some highlights are:

- Risk of privatization of forests in the state: the state law considers that properties in illegally occupied public areas with a large fraction of conserved forests (such as 98% of forest area) can be sold. The decree that regulates this prohibits only the sale or donation of areas composed entirely of forests. By admitting this possibility, the project will end up stimulating the privatization of public forests and will conflict with the forest concession instrument provided for by Federal Law No. 11,284/2006 (See Fact 6).
- Absence of an occupation timeframe for some modalities: areas with implemented agrarian activities can only be sold or donated if occupied up to 2014[137]. However, the law does not indicate a deadline for the occupation of public land for selling properties that do not have agrarian activities in place, another category provided for by law. This may allow the regularization of occupied areas after publication of the law.
- Withdrawal of the market price requirement: the previous law determined the collection of market value for regularization by sale, which was excluded by the new rule. Even though in practice the values adopted by Iterpa were below the market[138], this change allowed for an even greater reduction, which was

[136] Letter available (in Portuguese) at: https://terradedireitos.org.br/uploads/arquivos/requerimento- lei-terras.pdf. Accessed on Sept. 29, 2020.
[137] Pará State Law No. 8,878/2019 does not indicate a deadline for regularization by donation, but Pará State Decree No. 1,190/2020 defined the date of July 8, 2014 in its Art. 74, I.
[138] Cardoso Jr., Dário et al. 2018. *O Estado da Amazônia: Potencial de Arrecadação Financeira com a Regularização Fundiária no Pará* (p. 14). Belém: Imazon. Available at https://imazon.org.br/publicacoes/potencial-de-arrecadacao-financeira- com-a-regularizacao-fundiaria-no-para/. Accessed on Sept. 1, 2020.

approved by the State Agricultural, Agrarian and Land Policy Council in September 2020 and which has not yet been formalized with a new normative ruling[139] (See Fact 8).

Rondônia

The Rondônia land law was published in December 2020 (State Law No. 4,892/2020). The text is based on Federal Law No. 11,952/2009, with some particularities. We highlight:

- Deadline for occupation of public land established as July 22nd, 2008.
- Land tenure regularization with exemption from bidding is only valid for properties that have not been subject to an infraction notice or environmental embargo, with a process underway in environmental agencies. However, it does not indicate what will be done with properties that have been the subject of prosecution for environmental crimes: whether the state government will reclaim the land or if it will be regularized via bidding.
- Prohibits regularization if the occupant or spouse has committed a land grabbing crime. However, this determination needs to be detailed, since the crime of land grabbing does not exist in Brazilian legislation. In this case, a decree could indicate which crimes already covered by law will be considered in the assessment of this item.
- Collection of only 10% of the value of bare land (VTN) for the method of selling public land, pending the indication whether the value for the calculation will be the minimum, average or maximum VTN.

[139] Faepa. 2020. Cepaf aprova proposta de Tabela de preços de referência do Valor de Terra Nua para fins de Regularização Fundiária e de estímulo à atividade de desenvolvimento florestal sustentável. Belém: Faepa. Available at: http://sistemafaepa.com.br/faepa/conselho-de-politica-agricola-agraria-e-fundiaria-cepaf-aprova-proposta-de-tabela-de-precos-de-referencia-do-valor-de-terra-nua-para-fins-de-regularizacao-fundiaria-e-de-estimulo-a-atividad/. Accessed on Nov. 18, 2020.

Roraima

In November 2019 the state Land Law was amended. Among the main changes we highlight:

- Change in the time limit for occupation of public land that can receive title: changed from June 17, 2009 to November 13, 2017[140].
- Alteration in the concept of direct exploitation of the property: one of the titling requirements for sale, the concept now allows regularizing areas in which economic activity is managed through a legal entity, whose share capital the applicant is the holder of[141].
- Increase in the area eligible for sale: from 1,500 hectares to 2,500 hectares[142].
- Possibility for the same person receiving land titles to more than one property, as long as the sum of all properties does not exceed 2,500 hectares[143].
- 50% discount in the legal reserve area of the property, applicable on the sale price with other discounts provided for by law[144].
- Possibility of regularizing areas where the applicant has only family-run recreational activities for sale[145].

[140] The law requires that the occupation take place at least two years before the publication of Law n. 1,351/2019, of November 14, 2019 (Art. 29, III of State Law n. 976/2014, as amended by State Law n. 1,351/2019).
[141] Art. 2, III of Roraima State Law n. 976/2014, amended by Roraima State Law n. 1,351/2019.
[142] Article 21 of Roraima State Law n. 976/2014, as amended by Roraima State Law n. 1,351/2019.
[143] Art. 1, Paragraph 3 of Roraima State Law n. 976/2014, amended by Roraima State Law n. 1,351/2019.
[144] Art. 56-C of Roraima State Law n. 976/2014, inserted by Roraima State Law n. 1,351/2019.
[145] Article 29, paragraph 6 of Roraima State Law No. 976/2014, added by Roraima State Law n. 1,351/2019.

Tocantins

Initially published as State Provisional Measure no. 09/2019, and converted into State Law no. 3,525/2019, the new rule will allow the state to recognize and validate property records that were challenged judicially and administratively. This occurs mainly with the cases of parish records, which date from the 19th century and were originally only an attempt to register land, without the power to generate a property right. However, in many cases, they were illegally registered with a notary, generating several legal disputes over their validity. The new law requires that properties be georeferenced and certified within two years and does not apply when the area is: i) object of judicial claim by a state or federal agency; ii) object of expropriation actions for agrarian reform purposes or located in indigenous and quilombola areas. The rule is the result of the work of the Nucleus for Prevention and Land Tenure Regulation (Nupref), of the Tocantins Judicial Administrative Department, but which does not include the participation of representatives of civil society and academia[146].

[146] Members of the Nucleus are: Attorney General of Tocantins, Land Institute of Tocantins (Itertins), Incra, Real Estate Company of the State of Tocantins (Terrapalmas), Association of Municipalities of Tocantins (ATM) and Association of Notaries and Registrars of Tocantins (Anoreg), Federal Government Property Superintendence, Terra Legal Project in Tocantins, Attorney General of the Municipality of Palmas, Secretariat of Urban Development, Land Regularization and Regional Services of the Municipality of Palmas (Art. 1 and items of Provision No. 005/2018 of the Judicial Administrative Department of Tocantins).

Conclusions and priority actions

The land laws applicable in the Brazilian Amazon have several incentives for the region to continue to be the target of illegal land occupations combined with deforestation. Among them, we have highlighted throughout this report:

I. Absence of a time limit for occupations on public land, which allows areas to be occupied at any time with the expectation of titling. Even when there is a time limit, the Legislative Branch changes the laws to postpone this period, reinforcing the expectation of regularization.
II. Price below the market value in the sale of public land by the government and lack of effective collection of these values, generating expectations of high profitability in resale after titling.
III. Permission for properties with environmental liabilities and recent deforestation to be regularized, without requiring a commitment to environmental regularization prior to issuance of the title.
IV. Absence of monitoring of contractual obligations established during the titling, which makes it impossible to reclaim the properties when the titleholders disobey the rules. This governmental omission discourages compliance with social and environmental clauses, such as the need for environmental regularization to maintain the property.
V. Lack of transparency in the work of land agencies and the absence of participatory bodies for decision-making on the allocation of public lands. This undermines social control over land tenure regularization practices and may

favor the privatization of public areas that have other legal regularization priorities.

Based on these findings, we conclude that the current land rules and practices are not aligned with the conservation of the Amazon rainforest. These rules make it possible for new occupations of public areas with deforestation to be titled, with a high expectation of profit due to the low value of public land, in addition to the low probability that these values will actually be paid or that it will be necessary to comply with any environmental regulation in order to maintain title to the property. To change this situation and promote greater harmony with environmental laws, it is essential that state and federal laws are reviewed and changed to:

I. Establish a transparent and widely consulted procedure for designating public lands. This can be done through public consultations on the situation of plots or portions of undesignated plots. This would increase, for example, the chance of identifying areas in conflict and with priority demands for territorial recognition or environmental conservation.
II. Prohibit privatization of predominantly forested areas. In these cases, when there is no overlap with other priority interests of territorial recognition or conservation, these areas should be allocated for forestry concessions, in accordance with Federal Law No. 11,284/2006. The privatization of areas that have, for example, more than 80% of their forest cover, allows part of this forest to be deforested legally, contributing to deforestation.
III. Define a time frame that limits the date of occupation of public lands subject to titling, for those laws that do not have this provision. In addition, we recommend the inclusion in the State Constitutions of an article providing an impediment to

future changes in this time frame, explicitly recognizing the principle of halting environmental setbacks for this purpose.

IV. Determine values of properties compatible with the land market in regularization for sale. Possible subsidies for rural producers should occur for sustainable use and conservation in the areas, instead of subsidizing the value of the property. For example, create a system that grants discounts on portions of the value of the property in case of adoption of low carbon agriculture practices and conservation of forest cover. In addition, we recommend that the task of collecting amounts be passed on to financial institutions, so that there is an effective payment or execution of debts.

It is also essential that land agencies receive investments to modernize their practices, organize their databases in digital format and greatly expand the active transparency of information. For this, we highlight as priority needs:

I. The adoption of information management systems for processing the entire flow of administrative processes and automating tasks (when possible). For example, automate the crossing of databases to verify certain regularization requirements that can be verified remotely. This would reduce the time needed for field inspections, allowing a focus on issues that need on-the-spot verification, such as attesting that the area has no conflict.

II. The updating and organization of a digital database, creating different data layers for properties that are already titled, in process of titling and rejected. The vectorization of the area

of properties that have not yet been georeferenced and the verification of georeferenced information are two of the largest challenges in this task. To that end, the agencies must seek partnerships in order to reinforce their teams.

III. Publishing of detailed data on properties in the process of regularization and already titled on the internet, including the shapefiles of these areas. Considering the history of disorganization and lack of digitalization of the databases, this task can begin with more recently titled areas.

IV. Structuring procedures and staff for monitoring mandatory clauses after titling, reclaiming properties in cases of non-compliance. It is also essential to reclaim properties whose regularization processes are rejected, removing those that do not meet the requirements and assigning another designation for the property.

Appendices

Appendix 1.
Methodology for calculating the land tenure situation in the Amazon

I.1. Designated areas

To determine the total designated areas in the Amazon Region, we used information from designated Indigenous Lands, Protected Areas (except Environmental Protection Areas - APAs), Settlement Projects, Military Areas, Quilombola Territories, Private Properties and Public Forests (Table 11). We did not consider the limits of APAs as designated areas, as this type of Protected Area does not change the land tenure of the property. In other words, the land remains as undesignated public land, and the existence of private properties is allowed inside.

We performed the analysis in the ArcGIS 10.8 Geographic Information System (GIS). For the vector data (shapefile - shp.), we used the Albers equal-area conic projection, in Datum Sirgas 2000. After the data projection, we calculated the total area that has already been designated in the Brazilian Amazon through the intersection of continuous designated areas using the Disolve geoprocessing tool in the ArcGIS 10.8 program. The tool makes it possible to eliminate cartographic overlays on the layer itself (e.g., Settlement over Settlement) and facilitates the total calculation of the area that has already been designated.

To define the area allocated to each land category, we verified the cartographic overlaps between the layers e.g., Indigenous Land superimposed on a Protected Area. This visualization was made using the Selection by Location tool. After visualizing the overlay,

we removed the overlapped information with the Erase tool[147]. This analysis used the following order of priority: Indigenous Land, Protected Area, Settlement Project, Public Forest, Military Area and, finally, private property.

Thus, the resulting data were gathered and added, forming a main layer called the designated area, with all the information of areas that have already been designated without overlaps and divided by the units of the federation (states).

[147] For example, when an Indigenous Land overlapped on a Protected Area, we prioritized the Indigenous Land area.

Table 11. Data source for the analyses

Description	Source	Year
Military Area	National Registry of Public Forests (*Cadastro Nacional de Florestas Públicas* - CNFP)	2017
Area with possible demand for Indigenous Land	Technical Chamber for the Designating Federal Public Lands (*Câmara Técnica de Destinação de Terras Públicas Federais*)	2017
Area undergoing the process of establishing a federal Protected Area	Chico Mendes Institute (ICMBio)	2016
State areas registered in the name of the state	National Registry of Public Forests (*Cadastro Nacional de Florestas Públicas* - CNFP)	2017
Federal areas pending a decision on designation	Terra Legal Program and Technical Chamber for the Designating Federal Public Lands (*Câmara Técnica de Destinação de Terras Públicas Federais*)	2017
Federal areas designated for future land tenure regularization	Technical Chamber for the Designating Federal Public Lands (*Câmara Técnica de Destinação de Terras Públicas Federais*)	2017
Federal areas being transferred to the state	Institute of Lands and Colonization of Roraima (Iteraima), Institute of the Environment and Territorial Planning of Amapá (Imap) and the Terra Legal Program	2017
Rural Environmental Registry (CAR)	Brazilian Forest Service (SFB)	2020
Undesignated Public Forests	National Registry of Public Forests (*Cadastro Nacional de Florestas Públicas* - CNFP)	2017
Designated Public Forests	National Registry of Public Forests (*Cadastro Nacional de Florestas Públicas* - CNFP), Pará State Decree n. 2.560/2010 and n. 354/2012	2017
Property mapped for land titling	National Institute of Colonization and Agrarian Reform (Incra)	2021
Private property	Properties certified under the Land Management System (Sigef)[148], National Property Certification System (SNCI) and Land Institute of Mato Grosso	2020
Rural Settlement Projects	National Institute of Colonization and Agrarian Reform (Incra)	2020
Rural Settlement Projects	National Institute of Colonization and Agrarian Reform (Incra)	2020
Quilombolas Territories	National Institute of Colonization and Agrarian Reform (Incra)	2020
Protected Areas (except APA)	Instituto Socioambiental (ISA)	2020

[148] Although we consider the data on private properties in SNCI and Sigef as titled and regular private properties, this data should be treated with caution, since Incra does not verify the validity of the property's documentation.

I.2. Undesignated areas under regularization and registered in the Rural Environmental Registry

In order to identify the total of undesignated areas and their situation, we excluded from the area of the Brazilian Amazon the total of areas that were already designated, calculated according to the previous section. The resulting data was called an undesignated area or area lacking information. The entire process was carried out with vector data in the Albers equal-area conic projection, in Datum Sirgas 2000. The data source is detailed in Table 11.

Next, we identified three layers of data in this area:

I. Area with possible demand for Indigenous Land based on information from the Technical Chamber for Designating and Regularizing Federal Public Lands in the Brazilian Amazon. This Chamber, formed by different federal public administration bodies overseeing land tenure issues[149], assesses the allocation of federal public land tracts. Based on the data obtained from areas for future land tenure regularization, as decided by the Technical Chamber, we verified the existence of areas of partial interest to Funai. Thus, we chose to identify them separately from the others as areas with a possible demand for Indigenous Land.
II. Areas for the creation of a federal Protected Area, based on data collected with the ICMBio of areas with ongoing processes for this type of designation.
III. Property areas undergoing regularization by the Terra Legal Program (until 2017).

We calculated continuous designated areas using the Dissolve geoprocessing tool, with the ArcGIS 10.8 program.

[149] The operation of the Technical Chamber is regulated in articles 11 to 16 of Federal Decree No. 10,592/2020.

Next, using the Erase geoprocessing tool, we excluded the polygons from the total undesignated areas with the information indicated in items I, II, III above. The final result was the undesignated area without this information, onto which we inserted the layer of properties registered in the 2019 Rural Environmental Registry (CAR), to verify if there was an indication of occupation. Thus, in this study we chose to use CAR as an indication of occupation rather than classifying it as private areas. This is because CAR is a self-reporting database that has not yet had its information validated by public agencies. The publicly available CAR data also do not inform whether the area has been formally titled. We emphasize that it is possible that part of the properties in CAR are properties regularized in the past, whose geographic information is not included in public land databases. However, there is no reliable source to confirm this information. Thus, we understand that this area registered in CAR would be a priority for the work of land agencies, either for land tenure regularization, for the reclaiming of illegally occupied public areas or, still, for updating land tenure databases.

I.3. Methodology for calculating state and federal areas

To identify whether the undesignated areas calculated in the section above belong to the federal government or to state governments, we used the information available in the National Registry of Public Forests and the Technical Chamber for Designating Federal Public Lands. The entire process was carried out with vector data in the Albers equal-area conic projection, in Datum Sirgas 2000. We identified the following layers:

I. Federal areas: in the layer of undesignated areas or areas lacking information, we used the data from ICMBio on areas

for the creation of a Protected Areas; and with the Technical Chamber for the Designating Federal Public Lands. In this latter case, the areas were divided between areas destined for future land tenure regularization (as decided by the Technical Chamber), areas with partial interest from Funai (see explanation in the section above) and areas awaiting decision on designation by the Chamber Technique.

II. State areas: we use data from areas registered by the states, available in the National Registry of Public Forests as Type B public forests[150]. Also, the total remaining area after the exclusion of federal areas and areas registered by states is classified as areas that were not registered and possibly belong to the state. This is because the undesignated federal areas for the Amazon are limited to those that were registered in the name of the Federal Government until 1987[151].

III. Federal areas being transferred to the state: for Amapá, we used information made available on the Imap website in vector format (shp.). We overlaid the polygons from these areas with the layer of undesignated areas to determine the areas being transferred. For Roraima, we used information provided by Iteraima about the name of federal tracts being transferred to the state.

To calculate the total area in each jurisdiction (federal or state), we used the Dissolve and Clip tools in the ArcGIS 10.8 program.

[150] SFB. 2020. *Como é feito o cadastro das florestas públicas*. Brasília: SFB. Available at:http://www.florestal.gov.br/component/content/article/62-informacoes-florestais/80-como-e-feito-o-cadastro-das-florestas-publicas. Accessed on Oct. 2, 2020.

[151] In 1987, Decree-Law no. 2,375 revoked Decree-Law no. 1,164/1971, which federalized the unclaimed public land located one hundred kilometers from each side of federal highways already built, under construction or project.

Apppendix 2.
Types of land tenure regularization

Table 12. Types of land tenure regularization of private occupations on public land provided for in the laws that apply to the Brazilian Amazon

Types of landtenure regularization	AC	AM	AP	MA	MT	PA	RO	RR	TO	Federal
Rural settlements			●	●		●		●		●
Occupation authorization or license[152]								●	●	
Concession for the right of use	●	●	●	●		●		●		●
Declaration on the recognition of ownership or temporary recognition[153]	●		●							
Donation of public land	●	●	●	●	●	●	●	●	●	●
Ownership legalization	●			●	●	●			●	●
Barter transaction[154]	●	●		●		●		●	●	
Recognition of Indigenous Land										●
Recognition of Quilombola Territory			●	●		●				●

[152] A provisional document, granted in some states when the requirements for issuing a definitive title have not yet been met by occupants of public land.
[153] Issued after the land regularization process has started while the definitive title has not been granted.
[154] The exchange occurs when the public authority recognizes the impossibility of occupying a determined public land claimed, resulting in the concession of another area.

▶ Continuation of Table 12

Types of landtenure regularization	AC	AM	AP	MA	MT	PA	RO	RR	TO	Federal
Emphyteusis transfer or buy-back[155]						●				
Authorization for sustainable use[156]										●
Sustainable use Protected Areas[157]	●	●	●	●	●	●	●	●	●	●
Sale of public land	●	●	●	●	●	●	●	●	●	●

[155] Emphyteusis (*aforamento*, in Portuguese) is the transfer of the right to use a State property to a private individual (*foreiro*), who must pay annual fees. Established by the Civil Code of 1916, the creation of new emphyteusis was prohibited as of 2003 (according to the Civil Code of 2002). Those cases that already existed continue to comply with the rules of the previous Civil Code until their extinction. While it is not terminated, an emphyteusis can be transferred to another individual through the payment of a fee called a laudemium (a procedure called transfer of rights). The outsider can also obtain full ownership of the property with the payment of an emphyteusis buy-back (a kind of purchase of the property).

[156] Applied by the Federal Asset Secretariat until 2018 for recognition of traditional riverbank communities in lowland areas, mangroves, marine lands, according to SPU Decree nº 89/2010.

[157] In the Sustainable Development Reserve and Extractive Reserve categories, the government must recognize the land rights of the traditional communities inhabiting such areas. In National or State Forests, this recognition is also allowed, although its main purpose is the designation of the area for sustainable production.

Appendix 3.
Requirements for land tenure regularization in state and federal laws in the Brazilian Amazon

Each state has its own laws indicating the requirements for regularizing state public land occupations through donation or sale. Such rules are not necessarily in line with the requirements provided for in federal law, which apply to areas owned by the Federal Government. Tables 13 and 14 show the main requirements identified for each of the states of the Brazilian Amazon. For sale, we consider requirements for the regular category, since some states, such as Amazonas, Mato Grosso and Pará, also provide special types of sales[158].

Table 13. Requirements in state and federal laws for public land donation in the Brazilian Amazon

Requirements for donating public land	AC	AM	AP	MA	MT	PA	RO	RR	Federal
Up to one fiscal module			●	●			●	●	●
Up to 100 hectares	●	●			●	●			
Spouse cannot hold office in certain government bodies specified by law		●				●		●	●
Spouse must not have benefited from an agrarian reform program or any other type of land tenure regularization project	●								●
Spouse or partner cannot have claimed the acquisition of another rural property				●					

[158] Other types of sale are provided by state law to make exceptions and allow the legalization of more occupations on public land, e.g., when the property does not meet certain requirements for regular sale. Even the federal legislation provides for the so-called direct sale, which makes an exception and allows the titling of occupations that occurred after 2008, as long as they began up to 2011 (Art. 36 of Federal Decree No. 10,592/2020).

Continuation of Table 13

Requirements for donating public land	AC	AM	AP	MA	MT	PA	RO	RR	Federal
Farming or agricultural activity in place	●	●	●	●	●	●	●	●	●
Be in good standing related to tax debts and state debt							●		
Direct exploitation (exercised by the applicant and family)		●					●		●
Indirect exploitation (performed by third parties)					●				
Property was not subject to an environmental infraction notice or embargo, with a lawsuit in progress at environmental agencies							●		
Registration in the Rural Environmental Registry (CAR)						●	●		
Usual address (not the applicant's permanent address)	●								
Permanent residence	●			●					
Cannot own a rural property over 65 hectares			●						
Cannot own a rural property after December 2007	●								
Cannot own a rural property				●			●		●
Occupation prior to a specific date			●			●	●		●
Direct occupation (by applicant and family)		●	●				●		●
Unresisting and peaceful occupation or area without challenge from third parties or under judicial demand		●	●		●	●	●	●	●
Occupants and spouses or companions have not committed the crime of land grabbing							●		
Income of up to ten minimum wages	●						●		

▸ Continuation of Table 13

Requirements for donating public land	AC	AM	AP	MA	MT	PA	RO	RR	Federal
Income of up to three minimum wages					●			●	
Income of up to five minimum wages		●							
Applicant cannot be in the Employers' Registry of the Ministry of Economy who have subjected workers to conditions similar to slavery		●							●
Applicant cannot hold office in certain government bodies specified in the legislation	●	●		●				●	●
Applicant cannot have benefited from land reform program or any other type of land tenure regularization project	●	●	●		●		●	●	●
Applicant did not receive another donation title						●			
Being born in Brazil or naturalized Brazilian			●				●		●
Be of legal age, except in case of succession or emancipation							●		
Electoral situation in the state is in compliance			●						
Minimum time occupying the property	●	●		●	●	●			

Table 14. Requirements in state and federal laws for the sale of public land in the Brazilian Amazon

Requirements for the sale of public land	AC	AM	AP	MA	MT	PA	RO	RR	Federal
Spouse cannot hold office in certain government bodies specified by law		●				●		●	●
Spouse or partner may not have participated directly or indirectly in fraud in land-related legal proceedings				●		●			

▸

▸ Continuation of Table 14

Requirements for the sale of public land	AC	AM	AP	MA	MT	PA	RO	RR	Federal
Spouse or partner cannot have claimed the acquisition of another rural property				●					
Farming or agricultural activity in place		●	●	●	●	●	●	●	●
Be in good standing related to tax debts and state debt							●		
Direct exploration (exercised by the applicant and family)		●	●		●		●	●	●
Exploration of the property in compliance with environmental laws or in the process of regularization or environmental adjustment						●			
Indirect exploration (performed by third parties)					●				
Property was not subject to an environmental infraction notice or embargo, with a lawsuit in progress at environmental agencies							●		
Registration in the Rural Environmental Registry (CAR)						●	●		
Customary residence (not the applicant's permanent address)			●	●					
Cannot own rural property over 65 hectares			●						
Cannot be the owner of an urban or rural property in any part of the national territory		●							
Cannot own a rural property				●			●		●
Cannot have acquired a public property whose area added to the intended area exceeds 2,500 hectares					●				

▸

▶ Continuation of Table 14

Requirements for the sale of public land	AC	AM	AP	MA	MT	PA	RO	RR	Federal
Cannot have benefited from an agrarian reform program or any other type of land tenure regularization project		●	●				●		●
Cannot have benefited from an agrarian reform program or land tenure regularization when the sum of the properties exceeds 2,500 hectares								●	
Occupation prior to a specific date			●			●	●	●	●
Direct occupation (by applicant and family)		●	●				●	●	●
Unresisting and peaceful occupation or area without challenge from third parties or under judicial demand		●	●		●	●	●	●	●
Occupant cannot hold office in certain government bodies specified in legislation		●						●	●
Occupants and spouses or companions have not committed the crime of land grabbing							●		
Applicant cannot be in the Employers' Registry of the Ministry of Economy of those who subjected workers to conditions analogous to slavery		●				●		●	●
Being born in Brazil or naturalized Brazilian			●				●	●	●
Be of legal age, except in case of succession or emancipation							●		
Electoral situation in the state is in compliance			●						
Minimum time occupying the property	●	●		●	●	●		●	

Appendix 4.
Land titling and gender

Most state laws maintain that the land title must be issued in the name of the man and the woman when they are married or in a stable relationship (Table 15). Federal rules have been recently modified to make an exception for marriages under a separate property regime. In this case, the title does not need to be issued in the name of the couple[159]. In addition, federal law, Pará and Amapá also ensure the right to the title for couples in same-sex unions. Only Mato Grosso and Tocantins do not refer to the gender issue in the land title in their laws (Table 15).

Even with this assurance in most laws, it is not possible to state that these rules are applied in practice. This is because in the few situations in which there is disclosure of the names of those who received a title, only the name of one person appears. Thus, it is not possible to assess whether the title is made in the name of the couple, for example, when there is this legal provision.

[159] Art. 17, I subparagraph a, of the Federal Decree No. 10,592/2020.

Table 15. Legal provisions on gender for issuing land titles in the Brazilian Amazon

Legal provisions	AC	AM	AP	MA	MT	PA	RO	RR	TO	Federal
Issuance of the title on behalf of the man or woman regardless of marital status				●						
Issuance of title in the name of the man or woman when unmarried	●		●							
Issuance of the title preferably in the name of the woman when married		●								
Issuance on behalf of the couple for stable or same-sex unions			●			●				●
Preferably on behalf of the woman in cases where there is no marriage, stable union or same-sex union			●			●				●
No references in the law					●		●		●	
Title is in the name of the couple, if married	●		●			●		●		
Title on behalf of the couple, if married, except if under a separate property regime										●

Appendix 5.
Mandatory compliance clauses after receiving the land title

Most of the applicable land laws in the Brazilian Amazon have cancellation clauses, which are obligations that must be fulfilled by the titleholders (Table 16). In case of non-compliance, the government that issued the security may reclaim the properties. However, in general there is no monitoring of these obligations.

Table 16. Cancellation clauses provided for in the laws applicable to land titles in the form of public land sales in the Brazilian Amazon

Cancellation clauses in land titles	AC	AM	AP	MA	MT	PA	RO	RR	TO	Federal
Compliance with national guidelines on companies and human rights, as provided for in Federal Decree N. 9,571/2018						●				
Rational and adequate use						●				
Farming in place			●	●	●					●
Compliance with labor laws in the property						●				
Compliance with land payment conditions and methods			●	●	●					●
Completion of the title's real estate registration within one year, extendable for an equal period						●				
State will participate in the results of the economic exploitation of natural mining resources						●				

▸ Continuation of Table 16

Cancellation clauses in land titles	AC	AM	AP	MA	MT	PA	RO	RR	TO	Federal
Requirement of environmental license to exercise economic activities on the property						●		●		
Exploitation that favors the well-being of owners and workers						●				
Termination of clauses after three years upon payment of 100% of the average value of the bare land										●
Termination of clauses after three years upon full payment of the land value			●							
Implementation of agricultural activity					●	●				
Inalienability until discharge		●						●		●
Inalienability for ten years		●	●	●			●			●
Inalienability for five years					●	●				
Maintain the agroforestry destination of the property	●									
Maintain and/or recover areas of permanent preservation and legal reserve or environmental regularization	●					●				
Do not exploit labor in conditions analogous to slavery			●		●	●				●

▶ Continuation of Table 16

Cancellation clauses in land titles	AC	AM	AP	MA	MT	PA	RO	RR	TO	Federal
Do not exploit child labor					●	●				
Does not have cancellation clauses in titles									●	
Prohibition of irregular deforestation in areas of permanent preservation or legal reserve								●		
Prohibition of deforestation without authorization from the environmental agency						●				
Transfer without prior consent of the land agency is forbidden	●					●				
Express waiver of receipt of any compensation for bare land and vegetation due to environmental law restrictions	●									
Respect for environmental legislation, in particular CAR			●		●					●
Proper use of available natural resources and preservation of the environment						●				

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