Catalyzing Innovation
ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019

STIMULUS FOR LAND GRABBING AND DEFORESTATION IN THE BRAZILIAN AMAZON

BRENDA BRITO[1], PAULO BARRETO[1], AMINTAS BRANDÃO JR[1,2], SARA BAIMA, PEDRO HENRIQUE GOMES[1]
[1]Imazon, Brazil
[2] University of Wisconsin, USA
brendabrito@imazon.org.br

Abstract

We assessed the impact in the Brazilian Amazon of a 2017 land law that reinforces a mechanism for acquiring land rights historically linked to deforestation, since land grabbers clear the forest to signal land occupation and claim land rights. In particular, we assessed two significant potential impacts: i) the loss of government revenue due to the sale of public land below market prices and ii) the risk of future deforestation in 29.2 million hectares allocated to expand land privatization. The short term revenue loss ranges from U$ 5 to 8 billion for 8.6 million hectares; the future revenue loss ranges from U$ 23 to 34.1 billion for 29.2 million hectares; and between 1.3 to 2 million hectares would risk being deforested until 2027. The Brazilian government should review the decision about this area allocation; prioritize land allocation for conservation and, if selling part of this area, charge market prices.

1. INTRODUCTION

The Brazilian government revised the country's rules on land tenure regularization and reinforced the contradiction between forest protection and land policies. This revision threatens efforts to reduce forest loss in the Amazon and may undermine the country's pledges to the Paris Accord, since the national commitments to reduce greenhouse gases (GHG) emissions rely mostly on curbing deforestation (Rochedo et al., 2018). In addition, Brazil's new president declared to be in favor of weakening environmental enforcement, of freezing demarcation of indigenous territories and of strengthening the agribusiness sector in the region (Sengupta, 2018). All these measures, if implemented, could also lead to more deforestation.

Passed in July 2017, the new law (number 13,465) granted amnesty for those who illegally occupied public rural lands between 2005 and 2011, a crime according to a 1966 federal law with a penalty of between six months to three years detention. The amnesty is valid even for illegally deforested areas. According to the new law, land grabbers are entitled to purchase public lands below market prices. Also, the new law extends these benefits for large areas up to 2,500 hectares (Rochedo et al., 2018), which represents a 1,000 hectares increase compared to the previous legislation (Intrator, 2011). All these factors have the potential to stimulate further land grabs and forest loss, since they reinforce a preemption mechanism for acquiring land rights (Intrator, 2011) that has been historically linked to deforestation in the Amazon region (Alston, Libecap, & Mueller, 2000; Brown, Brown, & Brown, 2016; Fearnside, 2001).

In this preemption mechanism: i) first, the private parties occupy public land and, in some cases, expel indigenous peoples or traditional communities previously occupying these areas; ii) then, they deforest the area and plant grass to raise cattle, which is a relatively cheap way to signal land use (Brown et al., 2016); iii) they then request a land title from the government as a formal recognition of their land occupation. When land grabbers occupy public areas after the legal deadline for granting land rights, they reach representatives in Congress, usually from the so-called rural caucus (*ruralistas*), to demand a legal revision for extending such deadlines and to demand land price discounts. For instance, in the previous law, land-holders that occupied federal public areas as of July 2004 could request a land title from the federal government upon compliance with some requirements, including not owning another rural property and not have been a previous beneficiary of land reform (Intrator, 2011). However, the

government has extended the 2004 deadline to 2011 in the 2017 legal revision, separating landholders in two groups: i) those who occupied public land as of July 2008 will share the same benefits as those who had occupied land until 2004 and ii) those who occupied public land after July 2008 and as of December 2011, including landholders who have another rural property, can also apply for a land title, but paying a higher land price than the first group. As of January 2018, three lawsuits were questioning the constitutionality of this law before the Brazilian Supreme Court.

In addition to promote the privatization of public lands, the federal government has reduced the pace of demarcastion of indigenous lands and creation of conservation units (Rochedo et al., 2018), both considered important mechanisms to recognize land rights of indigenous peoples and traditional communities, while acting as barriers to the advance of deforestation (Nogueira, Yanai, de Vasconcelos, de Alencastro Graça, & Fearnside, 2018; Soares-Filho et al., 2010). Such actions threat the conservation of almost 70 million hectares of undesignated forests in the Brazilian Amazon with potential for creation of new protected areas and allocation to social use, instead of privatization (Azevedo-Ramos & Moutinho, 2018; Brazilian Forest Service, 2017).

In this study, we assessed two possible impacts of the new law in the Brazilian Amazon and the governmental emphasis in privatization of public land instead of allocation of such area to conservation and social uses: i) the loss of government revenue due to the sale of land below market prices and ii) the risk of future deforestation.

2. METHODS

2.1. ASSESSING REVENUE LOSS

We estimated the potential governmental revenue loss by comparing the public land sale using market and governmental prices. We divided this analysis into two sets of public land stocks as follows:

- Short-term revenue loss due to sale of public lands occupied up to 2004 (the previous temporal requirement for receiving a land title) with a total of 32,490 parcels, accounting for 8.6 million hectares in the Brazilian Amazon (Figure 1). These parcels were in the process of receiving a land title from the Brazilian government through sale as of March 2018. Each parcel size ranges from 50 to 2,500 hectares.

- Future revenue loss in public land designated for potential future sale encompassing 29.2 million hectares (Figure 1), including: parcels occupied by 2004 that have not yet been individually mapped; parcels occupied after 2004; unocuppied areas that may be targeted by land grabbers and 1.5 million hectares that may overlap with indigenous land claims, considering that the National Indian Foundation (Funai) has indicated partial interest in such area.
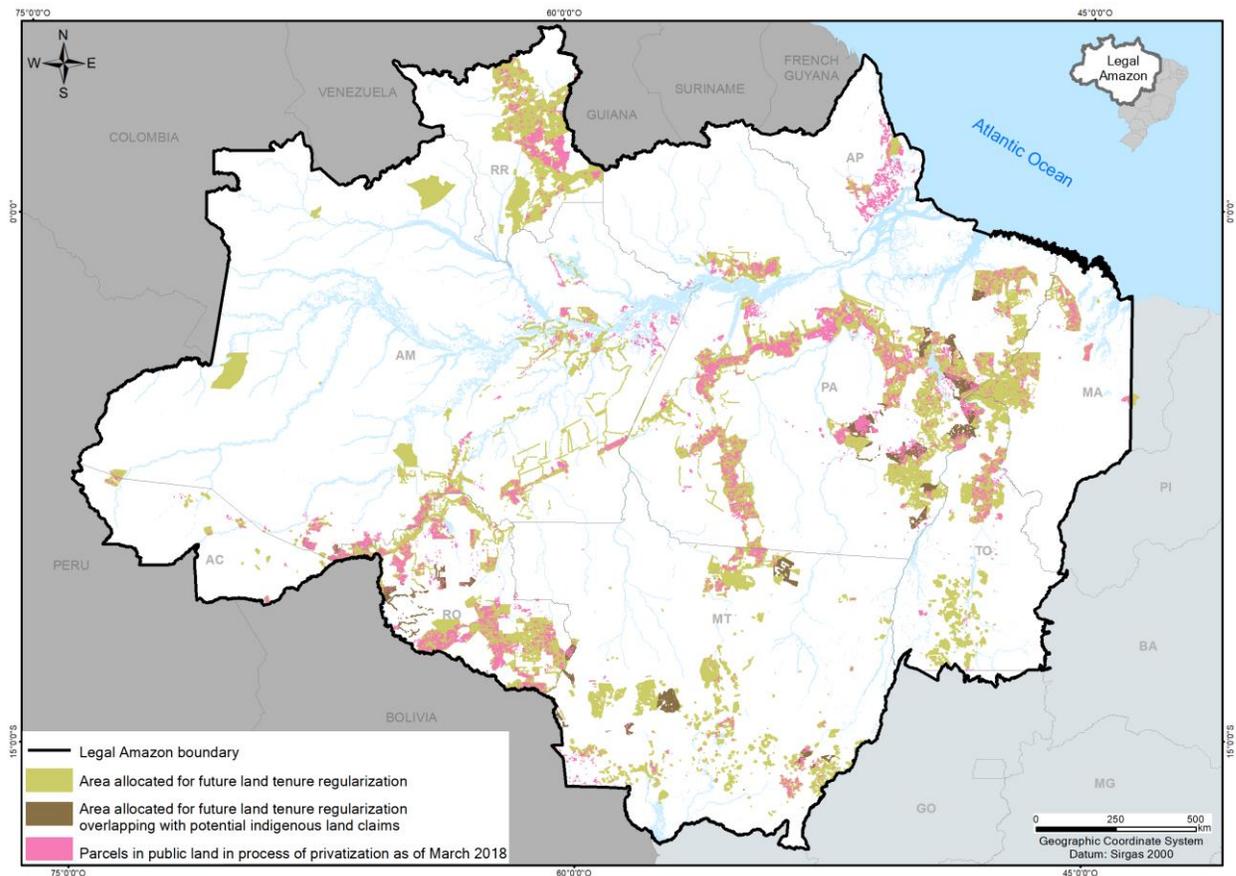
Figure 1. Parcels in public land in process of privatization as of March 2018. The map shows the location of 32,490 parcels already in process of receiving a land title as of March 2018 and of areas allocated for future privatization in the Brazilian Amazon.

We estimated the revenue loss by calculating the difference between the market price and governmental price for these areas. Our estimate considered the average land market price per municipalities by 2016 (IEG/FNP, 2017) and four scenarios for governmental land prices established by the new law (Table 1). These scenarios vary depending on: i) the form of payment for the land (e.g. 20-year installments or lump sum payment); ii) the year the public land was occupied; iii) whether the landholder has another property and iv) whether the land title beneficiaries want to avoid losing the parcel if they fail to comply with certain labor and environmental regulations. For payments in installments and lump sum, the Federal Decree 9,304/2018 establishes the percentage of land price to be charged in each case, ranging from 10% to 50% of the minimum governmental land price. The exact percentage discount depends on the parcel

size and the fiscal module of the parcel's municipality[1]. However, in the future revenue loss scenario, we did not have information on the size of each parcel to apply the specific percentage, so we calculated the range of possible values from 10% and 50% of the minimum governmental land price.

Table 1: Scenarios of land prices according to market and government rules used in the estimation of potential revenue loss.

	Payment in installments	**Lump sum payment**	**Avoiding future land retaking**	**Area occupied between 2008-2011 or when landholder owns another property**
Governmental price	10% to 50% of the minimum governmental land value*	80% of governmental price payment in installments (a 20% discount)	100% of the medium governmental land price	100% of the maximum governmental land price
Market price	100% of the average market price per municipality	80% of market price payment in installments (a 20% discount)	100% of the average market price per municipality	100% of the average market price per municipality

* The percentage applied in each parcel depends on the parcel size and on coefficients indicated in the Federal Decree 9,309/2018.

2.2. ASSESSING RISK OF FUTURE DEFORESTATION

We assessed the risk of future deforestation in the 29.2 million hectares allocated to expand land privatization. Forty percent of this area was already deforested as of 2016. We applied the methods used by Barreto and colleagues to estimate the risk of future deforestation in 2017-2027 as a consequence of the advance of the cattle ranching frontier if this area is allocated for private landholdings (Barreto, Pereira, Brandão Jr., & Baima, 2017). We modified the methodology for this study by extending the period analyzed, from three to ten years. Below is a description of the methodology steps:

- We quantified the remaining forest in the 29.2 million hectares based on historical deforestation data from the Project for Monitoring Deforestation in the Legal Amazon (Prodes).

- We used the Land Change Modeler, available in TerrSet software (version 18.31) to estimate the risk of deforestation in the remaining forest area. The software estimated the association of the

---

[1] The fiscal module is a unit used by the government to measure rural properties that varies in each municipality.

deforested area with variables of interest for two periods considered in this study: 1988-2016 and 2000-2016. The variables used to estimate the association were: a) terrain and b) distance from the public land parcels calculated in IDRISI software to: i) rivers, ii) old deforestation, iii) recent deforestation, iv) protected areas, v) roads, vi) special areas (conservation units, indigenous lands, military areas), vi) areas of federal settlement projects, vii) slaughterhouses and viii) areas under embargo for illegal deforestation. To calibrate the model, we used the Relevance Weight (RW) method (Sangermano, Eastman, & Zhu, 2010) that estimated the importance of each variable for the deforestation risk map. The most important variables according to RW were: distance from the public land parcels to i) recent deforestation, ii) nonmilitary areas, iii) old deforestation, iv) areas of federal settlement projects, v) areas of federal settlement projects, and vi) slaughterhouses (Barreto et al., 2017).

- We projected the areas of deforestation risk for two possible scenarios: i) the average deforestation rate of 1988-2016 would continue and ii) the average deforestation rate of 2000-2016 would continue. The steps to estimate each scenario were as follow(Barreto et al., 2017):
  - We calculated the mean deforestation rate for the 1988-2016 and 2000-2016 periods from the deforestation data detected by PRODES in the Amazon biome;
  - We combined the predictor variables with the 1988-2016 and the 2000-2016 land cover maps and generated deforestation risk maps. These maps show the similarity between the remaining forest and the previously deforested cells. The greater the similarity, the greater the risk of this cell being deforested in the future.
  - Using the Top Rank tool in TerrSet we allocated the mean deforestation rates calculated in step 3a over the deforestation risk map. The Top Rank selected the cells with the highest deforestation risk until the final result for both scenarios: the 1988-2016 rate and the 2000-2016 scenario.

3. RESULTS

3.1. GOVERNMENTAL REVENUE LOSS

The estimated short-term governmental revenue loss for the sale of the 8.6 million hectares of public lands varies from U$ 5 to 8 billion (Figure 2), considering the conversion rate of R$3.7 to US$1.00. The potential future governmental revenue loss for the sale of the additional 29.2 million hectares that may be privatized ranges from U$ 23 to 34.1 billion (Figure 3). Therefore, in total, the new land policy could lead to revenue losses of U$ 42.1 billion, if we add the maximum estimated losses in the short-term and future scenarios.

Governmental land prices established by the new law represented in average 2% to 42% of the land's market value in the five scenarios of short-term and future revenue loss. This variation is based on the total discount applied in each scenario and whether the minimum, medium or maximum governmental land price applies in each scenario according to the legislation. Our results demonstrate that even the highest governmental price scenarios (medium and maximum governmental land prices) are advantageous for the buyer. For instance, by paying 27% or 33% of market value (medium governmental land prices in short-term and future scenarios, respectively), the title beneficiary eliminates the risk of losing the property if failing to comply with social and environmental requirements and can easily profit by selling the land for the market price.
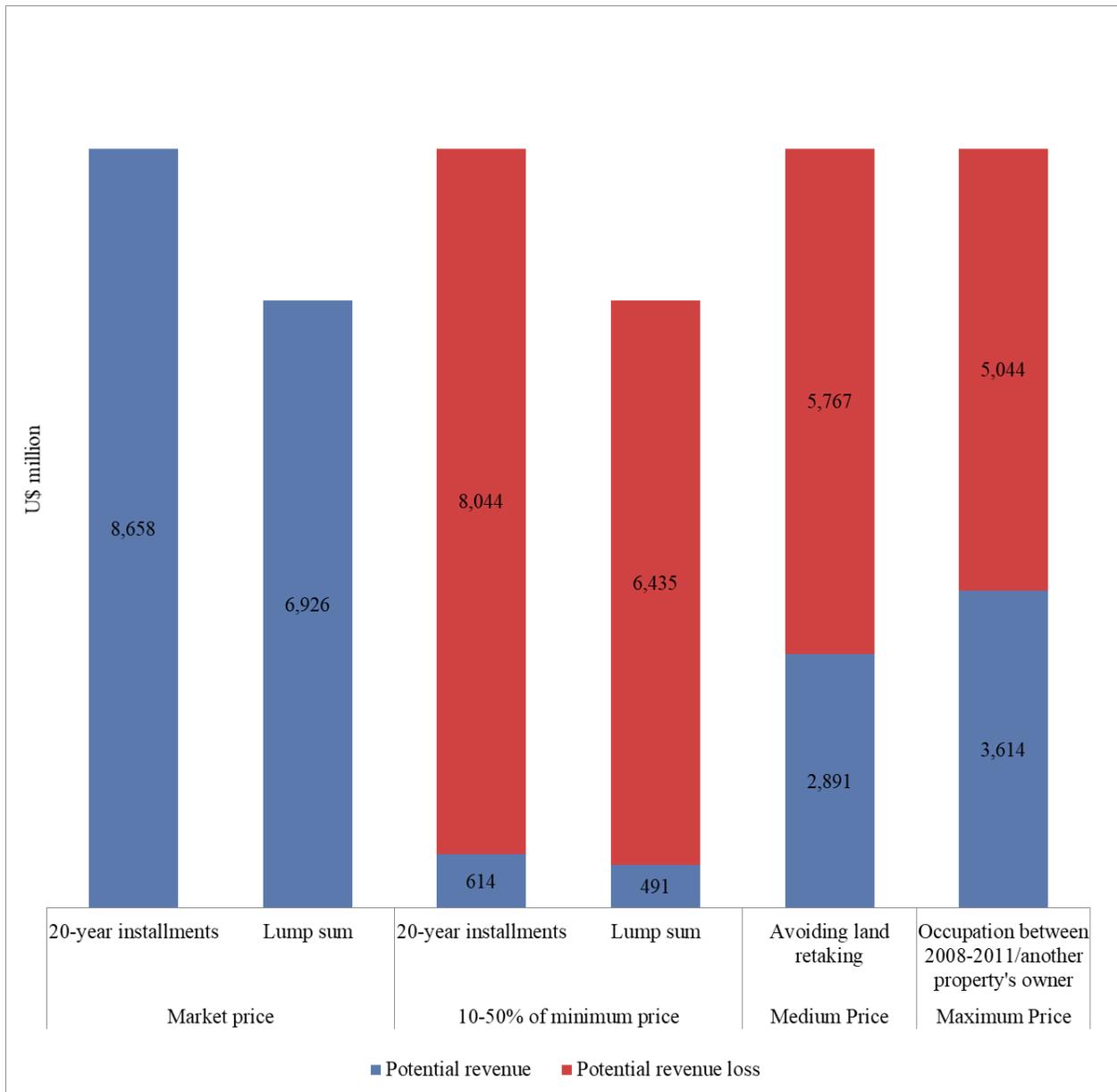
Figure 2. Estimated short-term revenue loss with regularization of 32,490 parcels occupied up to 2004 in the Brazilian Amazon region
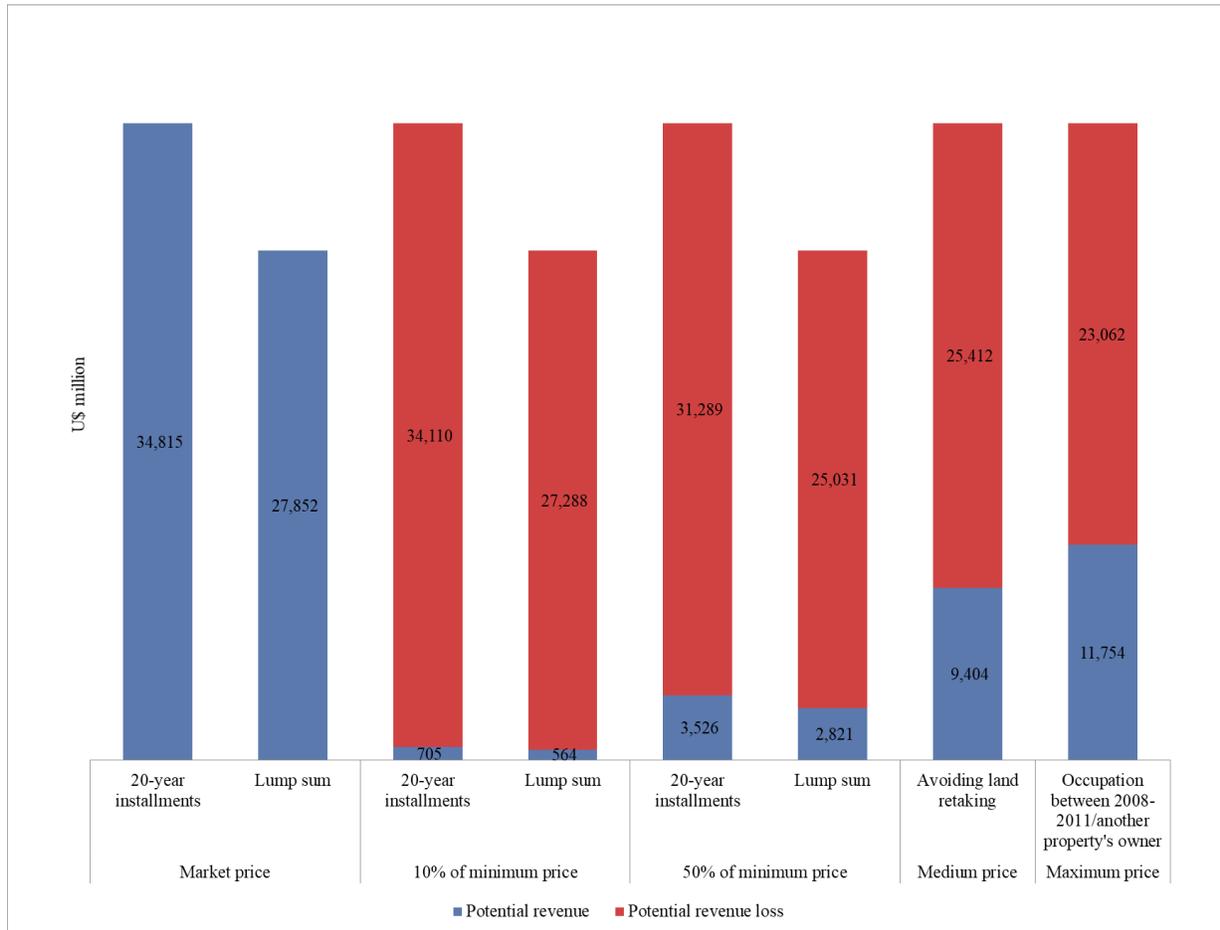
Figure 3. Estimated future revenue loss with regularization of 29.2 million hectares designated for private landholding regularization in the Brazilian Amazon region.

3.2. RISK OF FUTURE DEFORESTATION

If all the 29.2 million hectares are allocated for future sale, between 1.3 to 2 million hectares risk being deforested due to the cattle ranching frontier advance until 2027 (Figures 4 and 5). Such estimates are between 4 to 6 times above the targeted annual deforestation rate for the Amazon region by 2020 (339,000 hectares), according to the national climate change policy law.
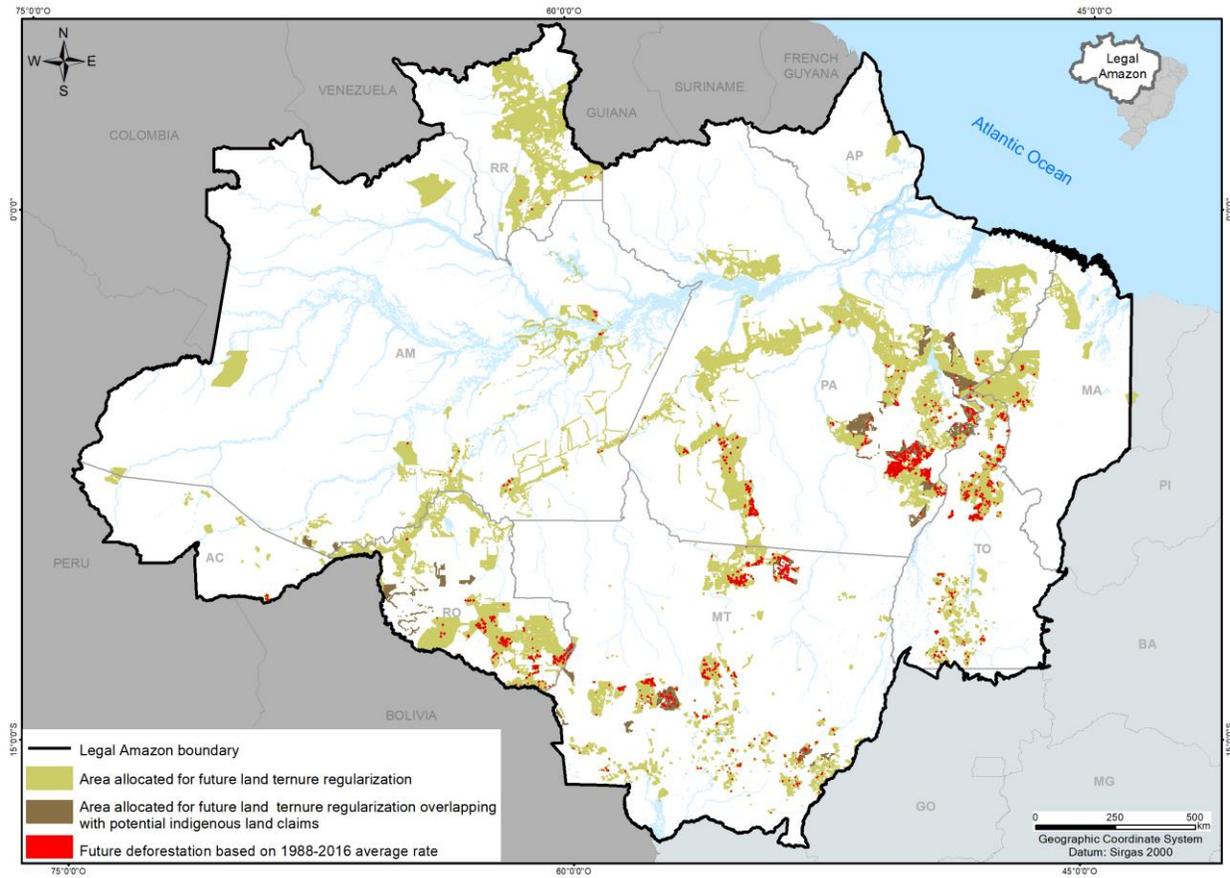
Figure 4. Deforestation risk for 2017-2027 in areas allocated for future land regularization in the Brazilian Amazon based on the 1988-2016 rate
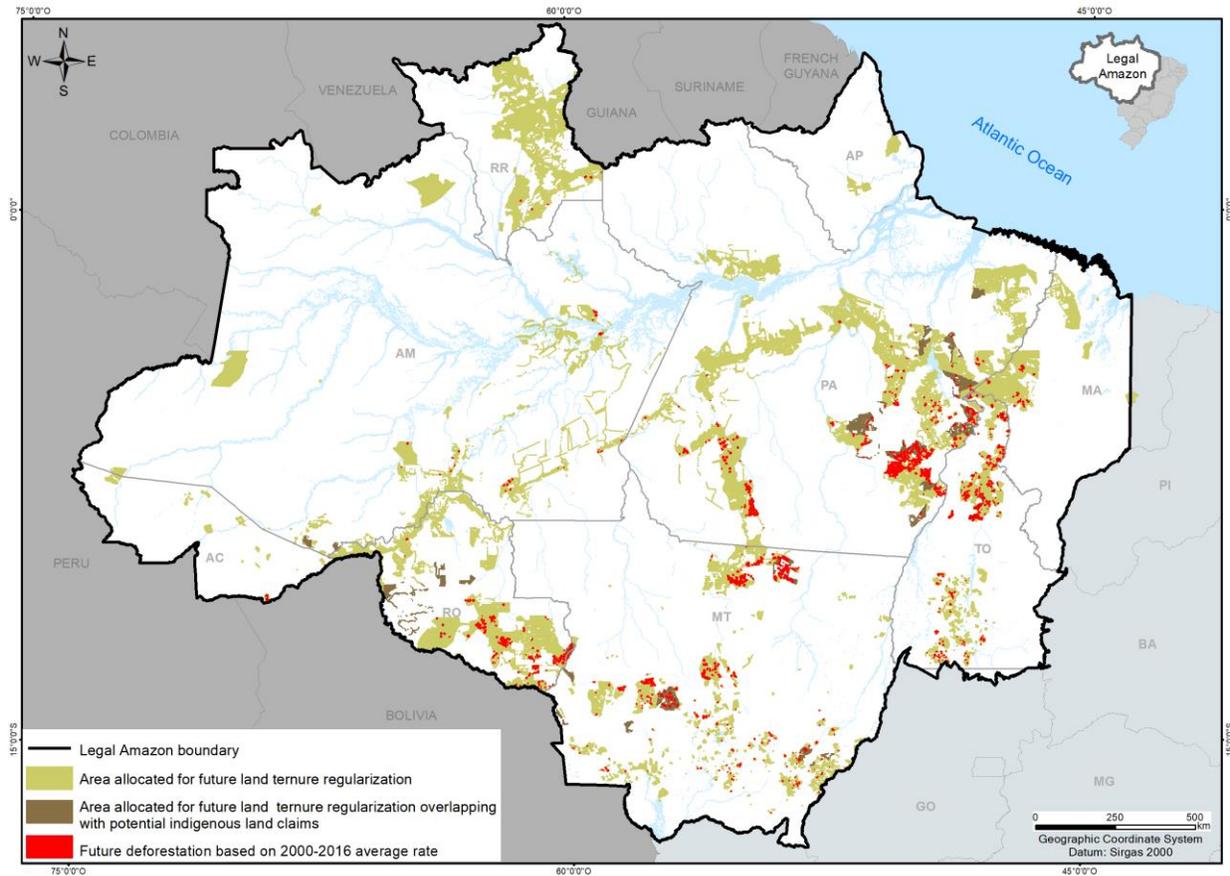
Figure 5. Deforestation risk for 2017-2017 in areas allocated for future land regularization in the Brazilian Amazon based on the 2000-2016 rate.

4. DISCUSSION

4.1. INCREASED RISK TO CONSERVATION AND INDIGENOUS LANDS RIGHTS

The new land policy repeats an old pattern of validating illegal grabbing of public lands and rewards the illegal occupants by selling land below market prices. As in the past, this situation is likely to lead to at least two negative impacts: i) loss of public revenues in the order of tens of billions of US$ and ii) new illegal occupations of public lands associated with deforestation. If Brazil repeats the cycle of validating illegal occupation in public land associated with forest loss, the efforts to reduce deforestation and land disputes will be endless.

Beyond the financial and social conflicts implications, this scenario is in stark contradiction to other federal and state conservation, human rights, and development policies. According to current Brazilian laws and policies, the allocation of public lands should prioritize granting land rights to indigenous

peoples (a constitutional right) and traditional communities, as well as creating new conservation units, which is consistent with the national goals of reducing deforestation.

Thus, to comply with the Brazilian constitution, the federal government should not consider as land available for sale the abovementioned 1.5 million hectares of non-allocated land with partial interest from the National Indian Foundation (Funai). Even if Funai still needs to conduct the legally required studies to determine the extent of the claimed indigenous territories, such areas should become temporarily unavailable for other types of land allocation. This measure could prevent issuing private land titles in areas that could be later declared as indigenous territories.

4.2. FREEZING PUBLIC LAND SALE AND IMPROVING LEGAL MECHANISMS TO DECIDE LAND ALLOCATION

A new wave of privatization of public lands in the Amazon could stimulate new illegal occupations over the 70 million hectares of non-allocated forest in the Amazon. The conservation of this area is paramount to meet the Brazilian commitments to the Paris Accord. Thus, to prevent land grabbing and deforestation of such an area, the government should: i) freeze public land sales in the Amazon region, ii) submit the decision about this area allocation for public and scientific review and, if selling part of this area, iii) charge market prices. The two first measures could be done by expanding the use of an existing legal mechanism called Area of Provisional Administrative Limitations (ALAP for its Portuguese acronym), a legal instrument that freezes any type of land allocation over a certain area for seven months[2], as well as temporarily restricting threatening activities in this territory (Assunção, Gandour, & Rocha, 2012). Currently, the ALAP only applies to areas being considered for conservation units and the federal government has not used this mechanism since 2006 (Brito, 2017). However, instead of pushing for private landholding regularization in existing forest areas, the federal government should extend the use of ALAP for any type of non-allocate areas, even those without an initial intention to create conservation units (Brito, 2017). Such a measure would help reducing further illegal occupations in the targeted areas and it would speed up the recognition of priority land claims for indigenous groups, traditional communities and conservation targets.

---

[2] Article 22-A of the Federal Law 9,985/2000.

5. CONCLUSION

This study demonstrated that the 2017 land law in Brazil will have financial and socioenvironmental costs to the country, as well as threat the country's climate change mitigation commitments if the deforestation advances over the 29.2 million hectares to be allocate to privatization in the Amazon. The federal government can still prevent such perverse effects by freezing new privatizations, increasing public land prices and prioritizing the recognition of indigenous land rights and conservation needs. However, such measures to avoid the estimated damages are unlikely to be implemented if two political factors remain: i) the agribusiness lobby continues to hold enormous power such as they demonstrated by changing laws to facilitate land grabbing and ii) Brazil's new president implement policies to freeze demarcation of indigenous lands as he declared during the campaign.

6. REFERENCES

Alston, L. J., Libecap, G. D., & Mueller, B. (2000). Land reform policies, the sources of violent conflict, and implications for deforestation in the Brazilian Amazon. *Journal of Environmental Economics and Management*, *39*(2), 162–188. https://doi.org/10.1006/jeem.1999.1103

Assunção, J., Gandour, C., & Rocha, R. (2012). *Deforestation Slowdown in the Legal Amazon : Prices or Policies?* Rio de Janeiro.

Azevedo-Ramos, C., & Moutinho, P. (2018). No man's land in the Brazilian Amazon: Could undesignated public forests slow Amazon deforestation? *Land Use Policy*, *73*, 125–127. https://doi.org/https://doi.org/10.1016/j.landusepol.2018.01.005

Barreto, P., Pereira, R., Brandão Jr., A., & Baima, S. (2017). *Os frigoríficos vão ajudar a zerar o desmatamento da Amazônia?* Belém: Imazon. Retrieved from http://www.imazon.org.br/PDFimazon/Portugues/livros/Frigorificos e o desmatamento da Amazônia.pdf

Brazilian Forest Service. (2017). Cadastro Nacional de Florestas Públicas - Atualização 2016.

Brito, B. (2017). *Market mechanisms to compensate for illegal deforestation in the Brazilian Amazon and their connection to land tenure governance*. Stanford University.

Brown, D. S., Brown, J. C., & Brown, C. (2016). Land occupations and deforestation in the Brazilian Amazon. *Land Use Policy*, *54*, 331–338. https://doi.org/10.1016/j.landusepol.2016.02.003

Fearnside, P. M. (2001). Land-Tenure Issues as Factors in Environmental Destruction in Brazilian Amazonia: The Case of Southern Pará. *World Development*, *29*(8), 1361–1372.

https://doi.org/http://dx.doi.org/10.1016/S0305-750X(01)00039-0

IEG/FNP. (2017). *No Title*. São Paulo: IEG/FNP.

Intrator, J. (2011). From Squatter to Settler: Applying the Lessons of Nineteenth Century US Public Land Policy to Twenty-first Century Land Struggles in Brazil. *Ecology Law Quarterly*, *38*(1), 179–232. https://doi.org/10.15779/Z38DG29

Nogueira, E. M., Yanai, A. M., de Vasconcelos, S. S., de Alencastro Graça, P. M. L., & Fearnside, P. M. (2018). Brazil's Amazonian protected areas as a bulwark against regional climate change. *Regional Environmental Change*, *18*(2), 573–579. https://doi.org/10.1007/s10113-017-1209-2

Rochedo, P. R. R., Soares-Filho, B., Schaeffer, R., Viola, E., Szklo, A., Lucena, A. F. P., … Rathmann, R. (2018). The threat of political bargaining to climate mitigation in Brazil. *Nature Climate Change*, *8*(8), 695–698. https://doi.org/10.1038/s41558-018-0213-y

Sangermano, F., Eastman, J. R., & Zhu, H. (2010). Similarity weighted instance based learning for the generation of transition potentials in land change modeling. *Transactions in GIS*, *14*(5), 569–580.

Sengupta, S. (2018). What Jair Bolsonaro's Victory Could Mean for the Amazon, and the Planet. *The New York Times*. Retrieved from https://www.nytimes.com/2018/10/17/climate/brazil-election-amazon-environment.html

Soares-Filho, B., Moutinho, P., Nepstad, D., Anderson, A., Rodrigues, H., Garcia, R., … Maretti, C. (2010). Role of Brazilian Amazon protected areas in climate change mitigation. *Proceedings of the National Academy of Sciences*, *107*(24), 10821–10826. https://doi.org/10.1073/pnas.0913048107

7. LIST OF TABLES

8. LIST OF FIGURES