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Unmasking the impunity of illegal deforestation in the Brazilian Amazon: a call for enforcement and accountability

Marcondes G Coelho-Junior^{1,2,*}, Ana P Valdiones¹, Julia Z Shimbo^{3,4}, Vinicius Silgueiro¹, Marcos Rosa^{4,5}, Carolina Del Lama Marques^{4,6}, Magaly Oliveira⁴, Suely Araújo⁷ and Tasso Azevedo^{4,7}¹ Instituto Centro de Vida (ICV), Cuiabá, MT 78043-405, Brazil² Instituto de Florestas, Universidade Federal Rural do Rio de Janeiro (UFRRJ), Seropédica, RJ 23897-000, Brazil³ Instituto de Pesquisa Ambiental da Amazônia (IPAM), Brasília, DF 70863-520, Brazil⁴ MapBiomas, São Paulo, SP 01407-200, Brazil⁵ ArcPlan, São Paulo, SP 04026-001, Brazil⁶ Escola Nacional de Botânica Tropical, Jardim Botânico do Rio de Janeiro (ENBT/JBRJ), Rio de Janeiro, RJ 22460-030, Brazil⁷ Observatório do Clima (OC), São Paulo, SP 13426-420, Brazil

* Author to whom any correspondence should be addressed.

E-mail: marcondes.coelho@icv.org.br**Keywords:** Amazonia, deforestation alerts, forest policy, enforcement action

Abstract

Amazon deforestation has been growing since 2012 and more recently under record rates. In fact, a new wave of rainforest destruction is on, challenging environmental agencies and policymakers. Political negligence has boosted deforestation in the Amazon, when coupled with deforestation drives that we already know about, as well as exempting environmental offenders and clearing the way to major infrastructure projects, in addition to weakening environmental agencies and command and control policies. In this letter, we share perspectives on the dynamics of deforestation alerts in the Brazilian Amazon and the action of public enforcement agencies, to draw attention to the urgency of supporting these entities for resuming the fight against deforestation. Our results reveal the few enforcement actions on deforestation alerts (1.3%) by the major environmental agency from the federal government. When compared with state government agencies, our in-depth case study showed a higher number of enforcement actions, promoting accountability for illegal deforestation in the Brazilian Amazon. It is evident that budget cuts for federal environmental agencies and changes in enforcement procedures have jeopardized actions to combat illegal deforestation. Our analysis calls for federal agencies to resume their powers, and for state agencies to recognize their role in environmental reinforcement and assigning liability. In the end, we list five key factors for reestablishing enforcement actions by public agencies for fighting deforestation and improving dissuasive effects.

1. Political negligence boosts Amazon deforestation

Satellite-based monitoring of the Brazilian Amazon shows that deforestation has been growing in the biome since 2012, increasing by 140% from 2012 to 2020 (INPE 2021). Between August 2020 and July 2021, the Amazon lost 13 200 km²—the highest deforestation rate in 15 years (INPE 2021). Moreover, the average size of deforestation polygons has increased by 61% in the past ten years, when strong environmental policies that were in place forced deforesters to reduce the size of patches cleared to avoid scrutiny (Trancoso 2021). Altogether,

these figures reveal a new wave of destruction in the Brazilian Amazon Rainforest, revealing a major challenge for environmental agencies and policymakers.

Brazil has already proven that combating deforestation in the Amazon is possible and effective through investment in public policies, private agreements, and monitoring systems (Nepstad *et al* 2014). Especially due to the establishment of sector agreements and the implementation of the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm), Brazil achieved an 84% reduction in its deforestation rate in 2012 (INPE 2021). There is no doubt that major investments in PPCDAm were key to strengthening environmental

enforcement capacities within governmental agencies, thus contributing to an improvement in performance (West and Fearnside 2021). However, it seems that the successful lessons in fighting illegal deforestation are being ignored by the current federal government. Besides shutting down PPCDAm in 2019, the government has significantly reduced environmental agencies budgets and changed the procedures for ensuring liability and assigning responsibilities to offenders. As predicted, these changes undermine the effectiveness of command and control action, leading to a drop in infraction notices in the Amazon region (Rajão *et al* 2021).

On the other hand, during the Leaders' Summit on Climate, held in April 2021 by the US government, Brazilian representatives promised to double the budget for enforcement capacities and reaffirmed the commitment to eliminating illegal deforestation by 2030. To that end, the Amazon Plan 2021/2022 was launched, which establishes guidelines for enforcement actions and fighting illegal deforestation, forest fires, and other environmental crimes. However, according to the Brazilian Climate Observatory (Observatório do Clima 2021), this Plan downgrades the country's commitment, as it establishes goals that will allow 16% more devastation than what was recorded under the previous government. Additionally, government-authorized military operations in the Amazon, which required a large number of public investments, did not yield the expected results. On the contrary, these operations worked as 'smokescreens', diverging efforts and weakening environmental protections (Ferrante and Fearnside 2021).

Another government plan, the National Plan for Controlling Illegal Deforestation and Recovering Native Vegetation 2020–2023, presented as a policy of zero tolerance for illegal deforestation, has also been criticized as being insufficient and unclear by national authorities. The Federal Court of Accounts (TCU) states that the federal government has failed at environmental management in the Amazon and that the Plan has very imprecise goals and does not establish specific deadlines for implementation (TCU 2021). Therefore, the combination of threats that include: exempting environmental offenders, aggravating forest fires and clearing the way to major infrastructure projects, in addition to weakening environmental agencies and, command and control, have boosted deforestation. In this letter, we share perspectives on the dynamics of deforestation alerts in the Brazilian Amazon and the action of public enforcement agencies, to draw attention to the urgency of supporting these entities for resuming the fight against deforestation. Combating the current sense of amnesty for offenders and assigning responsibility for illegal deforestation is crucial, given that the country already has in place the tools for monitoring

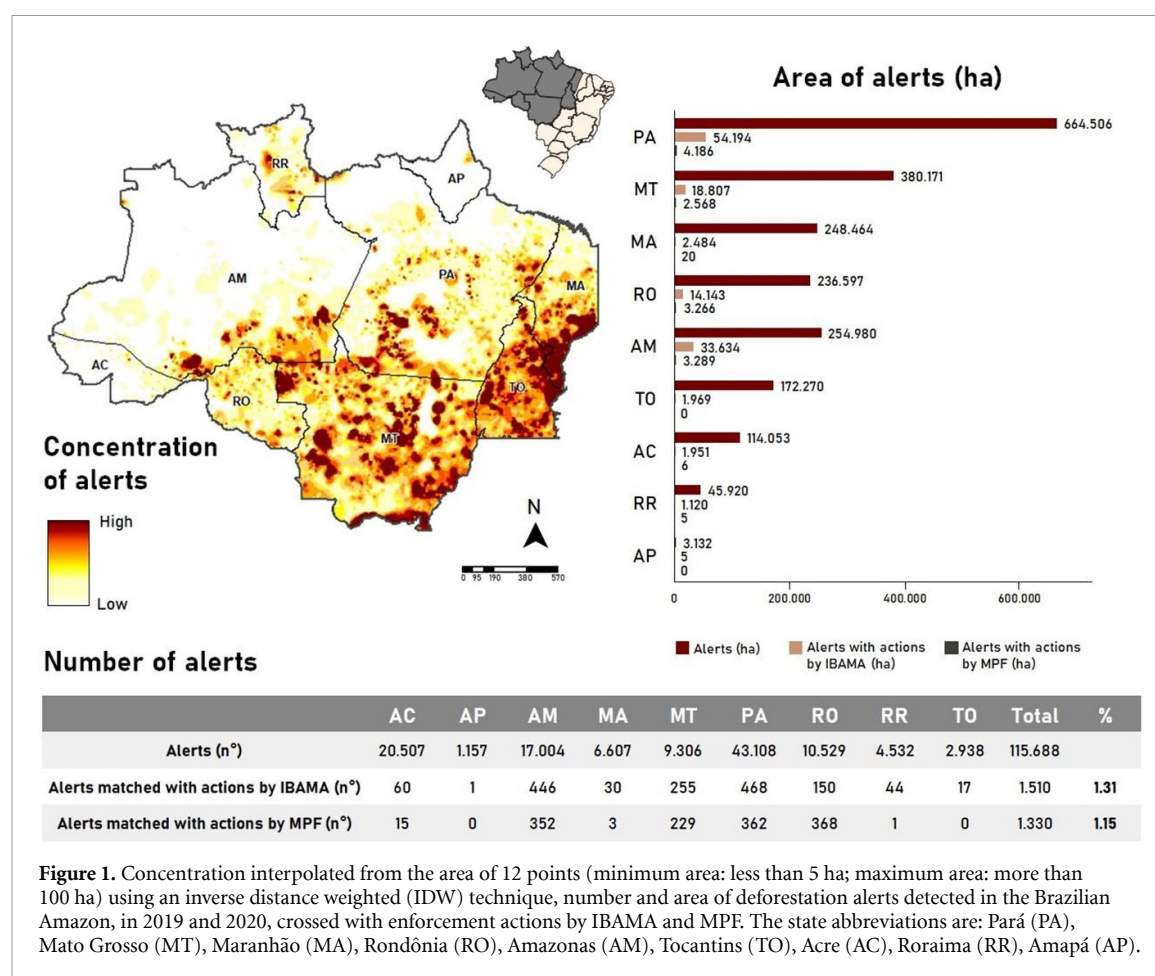
and detecting qualified deforestation alerts for orienting rapid and efficient remote and on-the-ground action.

2. Tracking environmental enforcement actions for Amazon deforestation

Herein, we analyze two sets of databases on deforestation and enforcement in the Brazilian Amazon, a region that includes nine Brazilian states (figure 1): (a) deforestation alerts from 2019 to 2020 from the MapBiomas Alert platform (<http://alerta.mapbiomas.org/>), a system that validates and refines deforestation alerts (generated by DETER-INPE, SAD-IMAZON, GLAD-University of Maryland and SIRAD-X-ISA) with daily high-resolution images (3 m) in Brazil; and (b) liability lawsuits and infraction notices brought by public agencies.

The analyses were done at two scales. Firstly, we used federal databases for all the Brazilian Amazon states to access official information about enforcement actions in illegally deforested areas and also about legally deforested areas (with permits). Secondly, we performed an in-depth investigation into the state of Mato Grosso. According to the public statements, the Mato Grosso state government is committed to eliminating illegal deforestation, securing transparency of environmental databases and engaging in actions to fight deforestation in the state listed as second in the rank of deforestation rates (INPE 2021) (www.sema.mt.gov.br/transparencia). We take the state of Mato Grosso, a world leader in producing agricultural and ranching commodities while safeguarding a rich biological and cultural diversity—43 ethnic indigenous peoples and various other traditional communities, as a case study to verify whether public policies have indeed led to a better performance in terms of responses to combat deforestation.

We used a data triangulation approach, crossing data from deforestation alerts with infraction notices and embargoes by the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA) and public interest lawsuit brought by the Federal Public Prosecutor's Office (MPF). For the state of Mato Grosso, we also performed a geometric intersection between those databases and data from deforestation permits, embargoes, and infraction notices issued by the State Environmental Secretariat (SEMA) and investigations performed by the State Public Prosecutor's Office (MPMT). This way, we were able to identify if the deforestation was previously authorized and if the areas were inspected by state agencies on the ground. The detailed method used, as well as further information on the subject, can be accessed in the Annual Report on Deforestation in Brazil 2020 (Azevedo *et al* 2021).



3. Enforcement actions to combat illegal deforestation

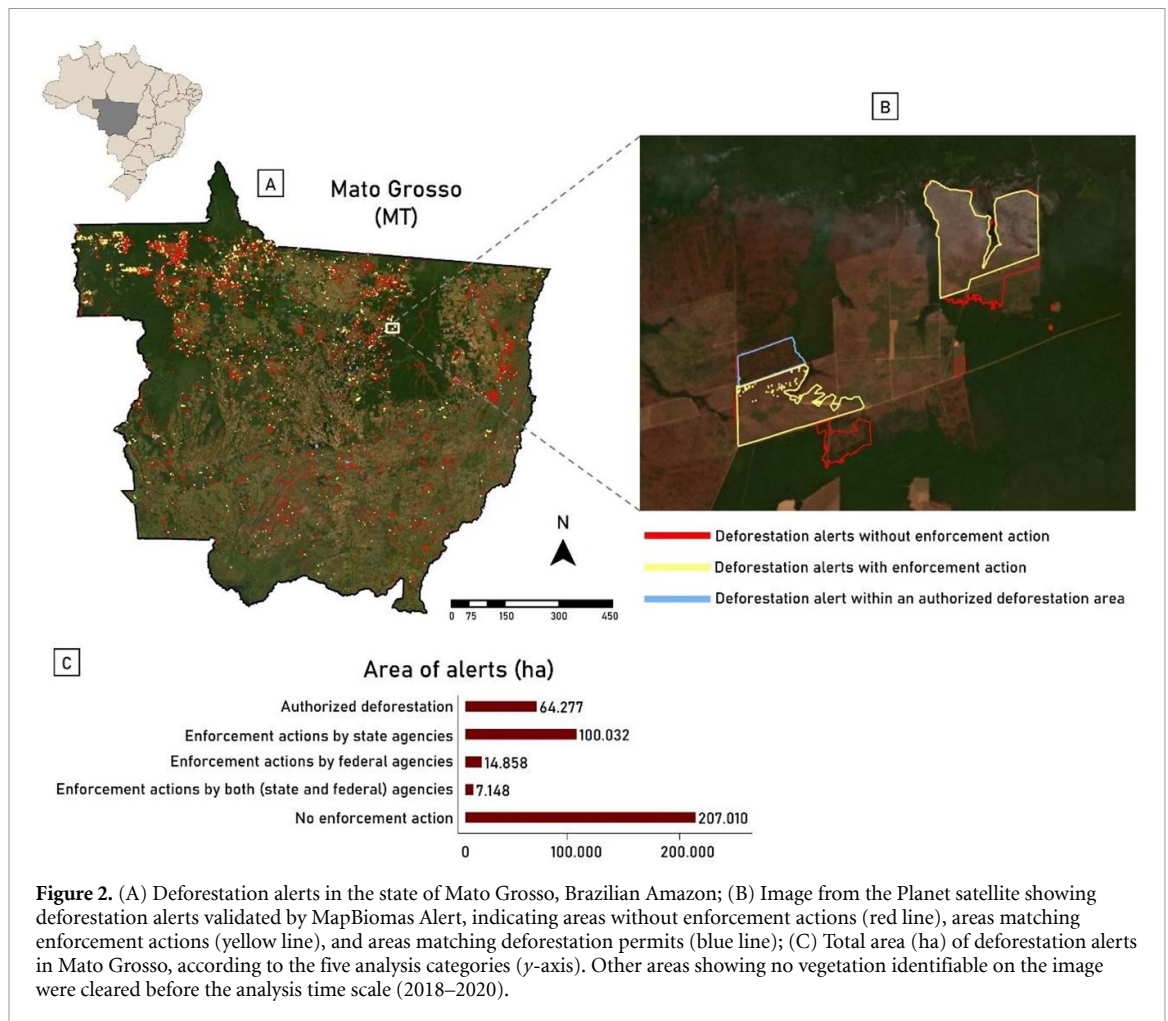
Our analysis shows that only 1.3% of the deforestation alerts in the Brazilian Amazon published by MapBiomas Alert match with IBAMA's infraction notices and/or embargoes (figure 1). This represents only 6.1% of the total deforested area detected, an extremely low level for enforcement activities. Not even the 11 municipalities defined by the National Council for the Amazon as priorities for receiving military operations show satisfactory enforcement—only 3% of the 22 583 alerts detected received infraction notices and/or embargoes from IBAMA, which represented 12% of the area deforested. This is worrisome, given that almost 99% of deforestation alerts in Brazil still show signs or evidence of illegality, or at least the corresponding permits are not recorded in publicly available databases (Azevedo *et al* 2021).

Poor results such as these reflect the reduction in IBAMA's actions in recent years. The reasons noted by the TCU for the lack of enforcement by IBAMA include the reduction in the number of inspectors over the years and deficiencies in the nomination process for strategic positions in the enforcement team (TCU 2021). Changes in procedures for administrative and criminal penalties for infraction notices,

which in practice end up freezing environmental penalty procedures, also hinder the agency's effectiveness (Lopes and Chiavari 2021). Even though IBAMA has reduced the number of infraction notices for illegal deforestation in the Amazon (Rajão *et al* 2021), there is already a backlog of more than 17 000 infraction notices awaiting conciliation hearings (Spring 2021).

Other agents besides IBAMA are involved in tackling deforestation, such as the MPF. Through the Amazônia Protege Program (<http://amazoniaprotege.mpf.mp.br/>), the MPF brings legal action against those responsible for illegally deforesting more than 60 hectares. From this initiative, we found that 318 public interest lawsuits were brought for deforestation between August 2017 and December 2019, for a total of 91 506 hectares. Of those, 13 340 hectares matched deforestation alerts for 2019, which represents 1.3% of the area of the alerts. Nevertheless, the MPF's action has been strategic in promoting a dissuasive effect. As an example, an unprecedented lawsuit brought by the MPF against an invader of public lands demanded indemnification for climate damages for the deforestation of 2400 ha between 2011 and 2018 (Bragança *et al* 2021).

At the state scale, we found that 16% of the deforested areas detected in the state of Mato Grosso (MT) matched valid deforestation permits for the



alert detection period (figure 2). Another 25% of the deforested areas matched actions by state agencies (SEMA and MPMT) (figure 2). This area corresponds to more than 100 000 hectares with embargoes, notices or investigations, and is almost six times larger than that identified for federal agencies, which matched 4% of the area for alerts, including actions by IBAMA and MPF.

In 2020, after an increase in enforcement actions, notices from SEMA led to more than 190 million USD in fines for environmental violations. Supported by the use of near-real-time monitoring technologies, the state agency has been strengthening actions against illegal deforestation since the second semester of 2019. In 2020, that strategy led to an increase of 33% in the number of notices and 192% in the area embargoed by the agency (Valdiones *et al* 2020). Even though enforcement data from the state government illustrates the relevant role that the subnational level can play in fighting deforestation, especially in a scenario where federal agencies are being undermined, 53% of the area deforested in Mato Grosso in 2019 and 2020 remains without any action for enforcement or liability identified.

This result shows that urgent and higher impact measures are needed to fight illegal deforestation. Field operations are known to exert a strong dissuasive effect on large-scale deforestation violations, but such actions are not universally effective (Börner *et al* 2015). Therefore, we emphasize that besides intensifying enforcement in the field, technological tools, and remote monitoring must be promoted as the basis for administrative notifications. These tools and systems coupled with transparency mechanisms can contribute towards identifying the ‘rotten apples of Brazilian agribusiness’ (Rajão *et al* 2020), that jeopardize Amazon conservation. Thus, adding efforts to prevent the trade of commodities linked to deforestation would not only avoid the aggravation of other problems besides forest loss, such as land grabbing (Brito *et al* 2019), but also the violation of the rights of traditional peoples (Urzedo and Chatterjee 2021).

4. Urgent action required to avoid collapse

Along with forest loss, numerous consequences reported by scientists illustrate the impacts of

neglecting criminal activities in the Amazon (Science Panel for the Amazon 2021). Part of the Amazon has already become a net source of carbon for the atmosphere (Gatti et al 2021); the drop in rainfall due to deforestation can indicate the loss of billions of dollars for agricultural production in the region (Leite-Filho et al 2021); impacted livelihoods of local populations compromise sustainable use of the forest (Fearnside 2017); and the Amazon's own capacity for bearing all those impacts is threatened and may reach a tipping point of no return, turning the world's most biodiverse tropical forest into a degraded ecosystem (Lovejoy and Nobre 2018).

Our analysis calls for federal agencies to resume their powers, and for state agencies to recognize their role in environmental reinforcement and assigning liability. We already know the main drivers of deforestation in the Amazon, and thus have a clear path to follow for a zero-deforestation agenda. Therefore, we list five key factors for reestablishing enforcement actions by public agencies for fighting deforestation and improving dissuasive effects: (a) investment in capacity building and technology uptake to strengthen technical teams in public agencies; (b) restructuring IBAMA legal regulations to ensure proper procedural steps for enforcement and bringing offenders to justice; (c) integrating state and federal enforcement systems to promote strategic planning for actions and transparency by the agencies; (d) field operations based on artificial intelligence and satellite monitoring to enable rapid and effective response, and (e) support for community-based initiatives for territorial monitoring and strengthening relations between public agencies and local partners. Furthermore, improving traceability of commodities through transparency and international pressure for reestablishing control of illegal activities in the Amazon, e.g. the Organization for Economic Cooperation and Development the EU-Mercosur Trade Agreement must continue to be a part of global solutions for protecting the Amazon.

Data availability statement

The data that support the findings of this study are openly available at the following URL/DOI: <https://plataforma.alerta.mapbiomas.org/>.

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Author contributions

All authors: Conceptualization, Methodology, Data curation, Investigation, Formal analysis. M G C J: Writing—original draft. A P V, J S, V S, M R, and T A: Validation, Supervision, Writing—review & editing, Funding. C D L M, M O, S A: Validation, Writing—review & editing.

Conflict of interest

No competing interest.

Ethics statement

All authors have read and agreed to the published this version of the manuscript.

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