



# INTELLIGENCE AND STRATEGIC ACTIONS

The Role of the Federal Public  
Prosecutor's Office in Addressing  
Climate Change



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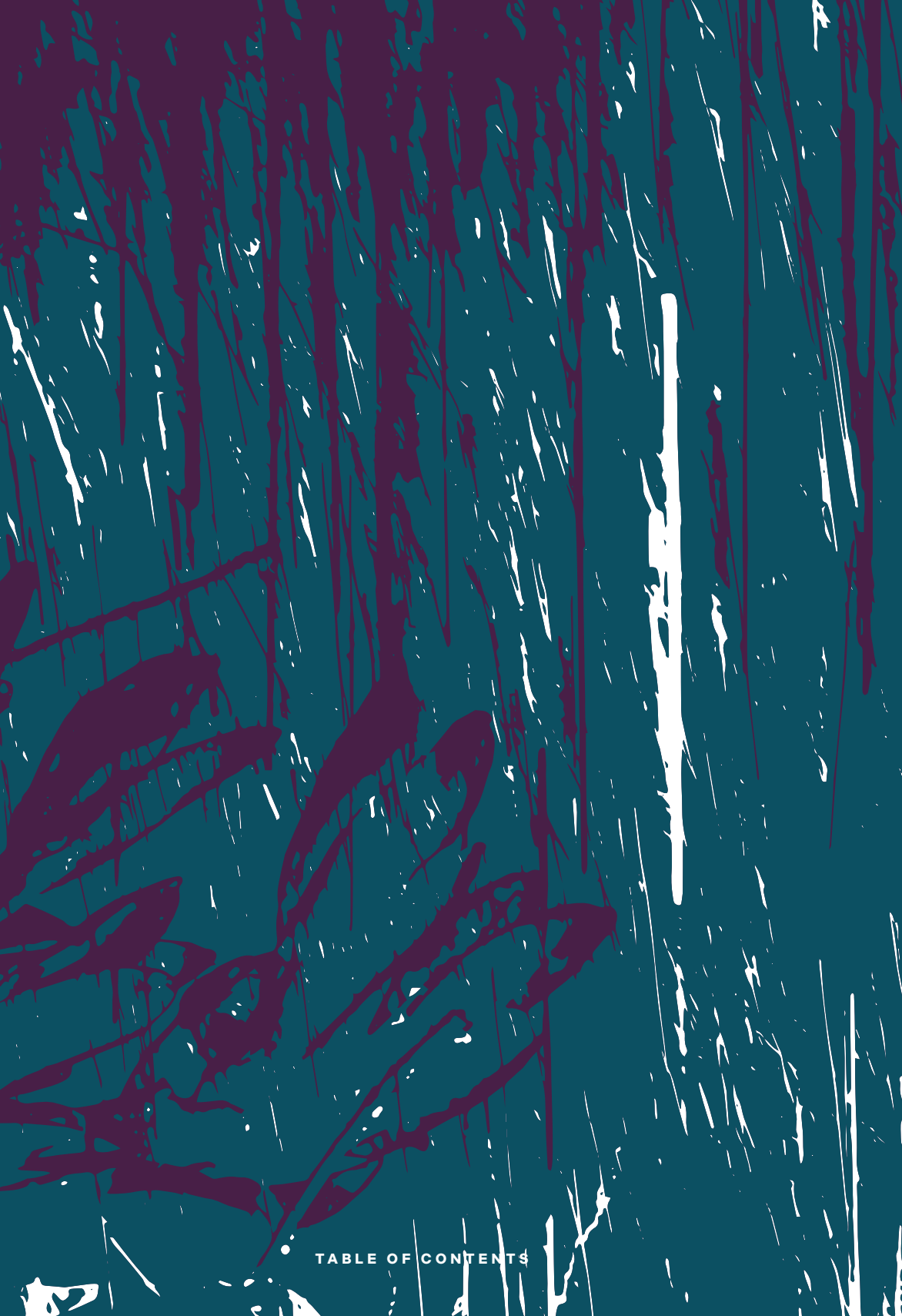
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# Looking, listening, intelligence and strategy: an equation for the future of the forest

The title of this publication, *Intelligence and strategic actions: the Federal Public Prosecutor's Office facing climate change*, brings together two key words for addressing a third. By evoking intelligence and strategy, the publication highlights essential elements in tackling climate change – literally, two terms that, in essence, encompass a vast range of challenges: heavy rains, droughts, fires, abnormally high and low temperatures. In a domino effect, these phenomena trigger concerns intrinsically tied to life, well-being, loss of biodiversity, and food security.

For nearly three decades, FUNBIO has been dedicated to environmental conservation and sustainable development. It is with great satisfaction that we highlight our partnership with the Federal Public Prosecutor's Office. Established in 2024, this collaboration has fostered highly productive dialogues on solutions, lessons learned, and perspectives in a world where the impacts of climate change are becoming increasingly tangible. The articles in this publication look back at this journey, take stock of the present, and point toward the future.

This book is essential reading for anyone who seeks not only to better understand the role and actions of the Brazilian justice system in confronting climate change, but also to learn about the concrete initiatives it has led. Balancing innovation with legal certainty, exploring the links between financing, development models, and climate, and emphasizing the importance of active listening are among the stimulating insights generated through Climate Dialogues. This initiative forms part of the COPAÍBAS Program, supported by the Norwegian Embassy in Brazil and financially managed by FUNBIO.

Defined by superlatives, the Amazon is a vast realm whose frontiers reach far beyond formal boundaries and whose conservation poses daily challenges, both new and familiar. Listening, negotiating, embracing new tools such as data intelligence, and recognizing the Amazon's diversity, along with the equally diverse solutions it demands, are themes illustrated in the articles that showcase the justice system's proactive role in Brazil's largest biome. This stands as a powerful source of encouragement for the conservation of this monumental natural, social, and territorial heritage.

**ROSA LEMOS DE SÁ**

FUNBIO's Secretary General



# Cross-cutting actions for a just socioenvironmental future

For nearly three decades, the Federal Public Prosecutor's Office (MPF) has worked tirelessly to safeguard the environment and protect vulnerable groups. Its actions extend beyond environmental and historical-cultural heritage issues to encompass the defense of human rights, with particular attention to Indigenous peoples, quilombola communities, and traditional populations. This long-standing commitment underpins a cross-cutting and coordinated approach that is essential to addressing Brazil's pressing socio-environmental challenges.

Today, MPF members reaffirm this commitment through initiatives that go far beyond responding to isolated problems. By designing and implementing strategic actions with the capacity to generate large-scale impact, the MPF seeks to strengthen public understanding that environmental protection is a non-negotiable value, inspiring structural change in the way the country manages its natural resources.

To this end, the MPF builds partnerships that add consistency and strength to its initiatives. Working in networks, expanding spaces for collective action and fostering shared responsibility, has become a strategic pathway to address the challenges of climate change. This approach involves not only bringing together diverse actors but also mobilizing knowledge developed with dedication and through participatory practices that value multiple perspectives and reinforce collective action.

The fifth volume of the Climate Dialogues collection reaffirms the initiative's vocation as a meeting ground for the justice system, science, civil society, and the communities of the Amazon and the Cerrado. Created by FUNBIO under the CO-PAÍBAS Program, the series was designed to amplify diverse voices and extend the reach of strategies to confront climate change and combat illegal deforestation.

This volume, *Intelligence and Strategic Actions: the Federal Public Prosecutor's Office Facing Climate Change*, underscores the distinctive contribution of the MPF, an institution that, over decades, has steadily broadened its role in environmental defense. It brings together solid reflections and concrete experiences of Federal Prosecutors who, in diverse contexts, face the challenge of turning technical and legal knowledge into effective institutional action.

The book is organized into two parts. The first, "Between the Past and the Things to Come: Transformations in the Legal Order in Times of Climate Change," opens with Prosecutor Ubiratan Cazetta's analysis of the multiple arenas of dialogue essential to the MPF's work, emphasizing that effective responses cannot remain bound to a reactive command-and-control paradigm. Galtiênio da Cruz Paulino proposes a new model of environmental liability grounded in full reparation, the application of the polluter-pays principle, and intergenerational justice. Guilherme Diego Rodrigues Leal examines the challenges of environmental protection in the Brazil-Colombia-Peru tri-border region, exposing the limits of state sovereignty in the face of transnational environmental crime and the need for co-operative legal mechanisms.



The second part, “Weaving Futures: Between Technology, Culture, and Socio-Environmental Justice,” showcases concrete experiences. Rafael da Silva Rocha presents the *Carne Legal* Program, illustrating how data intelligence and strategic partnerships can improve livestock traceability, enhance transparency, and curb deforestation. Ricardo Augusto Negrini examines Conduct Adjustment Agreements (CAAs) in the cattle industry and the prohibition of livestock raising on Indigenous Lands, a topic of significant legal and social relevance. Gabriel de Amorim Silva Ferreira and Raphael Luís Pereira Bevilaqua discuss the urgent need for an economic transition in the Amazon, contending that while predatory cattle ranching still predominates, a sustainable bioeconomy offers a viable alternative for income generation and regional development. Finally, Leandro Mitidieri Figueiredo analyzes the risks and legal solutions for reducing pressure on protected areas, underscoring that development can be achieved without environmental setbacks.

Collectively, these articles offer not only informed reflection but also hard data that underline the urgency of the climate agenda. In 2023, Brazilian agribusiness exports surpassed 140 billion dollars, even as the Amazon continued to experience alarming rates of deforestation. These figures exemplify the tension between the economic power of productive sectors and the fragility of environmental protection mechanisms, highlighting the importance of innovative legal tools and a strategic state response.

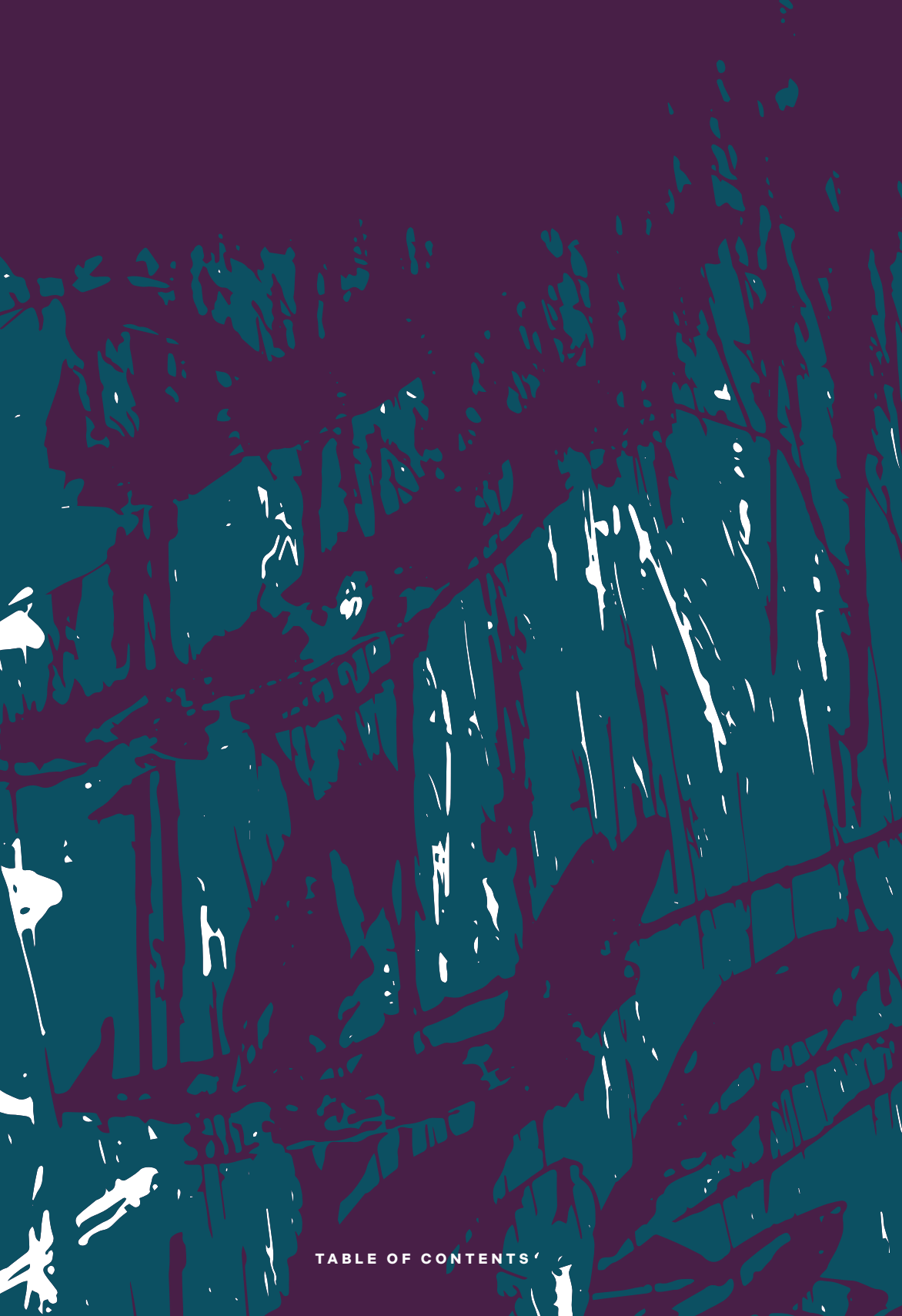
This book is therefore more than an academic compilation; it is a call to action. By bringing together the analyses and practices of MPF members, it reaffirms that confronting the climate crisis requires not only norms but also institutional intelligence, dialogue among diverse actors, and the courage to innovate. May this fifth volume of the series inspire new connections and strengthen the collective efforts of all who work to preserve the Amazon, protect Indigenous peoples, quilombola communities, and traditional populations, and build a sustainable future.

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# Climate Dialogues

BY ANDRÉIA DE MELLO MARTINS

**A** *gathering of voices for a new future* is a call to action to weave networks and build shared solutions, recognizing that while each of us holds power, together we hold far greater potential for transformation. This means rethinking how we communicate: innovating beyond traditional models, decentralizing knowledge, and creating space for new ways of seeing reality to emerge.

At a moment when innovation is essential, Climate Dialogues was launched to bring together a diverse range of professionals from Brazil's justice system around climate change and the fight against deforestation in the Amazon and the Cerrado. The initiative looks beyond the traditional, day-to-day duties of these professionals and invites them to expand their sense of what can be achieved collectively when confronting highly complex issues.

The strategy was conceived in 2020 by FUNBIO – the Brazilian Biodiversity Fund, a private, non-profit national financial and operational mechanism that partners with government, the private sector and civil society to channel strategic and financial resources into effective biodiversity conservation initiatives.<sup>1</sup> In this context, “strategic resources” also means the exchange of knowledge and the building of partnership networks.

In 2020, a pandemic year marked by unprecedented global challenges, FUNBIO forged a partnership with Norway's Ministry of Foreign Affairs to implement the *Community, Protected Areas, and Indigenous Peoples Project in the Brazilian Amazon and Cerrado Savannah Program*, known as COPAÍBAS.<sup>2</sup> The program aims to curb deforestation and the resulting greenhouse gas emissions by advancing strategies that conserve forests and native vegetation across the Amazon and Cerrado biomes.

Built around four interconnected lines of action, COPAÍBAS is a strategic initiative designed to protect the environment and strengthen socio-biodiversity. It brings together complementary measures that both value traditional knowledge and support adaptation to climate change. Its first line of action focuses on reinforcing protected areas in the Cerrado, recognizing their importance for biodiversity conservation and climate regulation. In parallel, the program works to strengthen the environmental and territorial management of Indigenous peoples, ensuring respect for their rights and expanding their autonomy over traditional lands.

A third front is dedicated to spreading information about the risks of climate change and encouraging the use of tools to combat deforestation and promote sustainable practices. Completing the program is an emphasis on increasing the economic efficiency of local value chains and production systems, fostering the sus-

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1 For more information about FUNBIO – the Brazilian Biodiversity Fund, visit: [funbio.org.br](https://funbio.org.br).

2 For more information about COPAÍBAS, visit: [copaibas.org.br](https://copaibas.org.br).

tainable use of natural resources and adding value to socio-biodiversity products as a source of income and environmental preservation.

By bringing these dimensions together, COPAÍBAS proposes a development model that unites environmental protection with climate resilience, grounded in the realities of communities and territories across the Amazon and the Cerrado.

Within this framework is the Climate Dialogues initiative, part of the program's third line of action devoted to disseminating information on climate change risks and tools to combat deforestation. Its purpose is to make climate issues part of the everyday work of professionals who uphold the legality of public policies, defend human rights and ensure an ecologically balanced environment, with financing strategies as a key driver of innovation. Through spaces for dialogue, information exchange and collective idea-building, the initiative seeks to generate practical solutions and guidance on how legal obligations and new opportunities can be implemented more effectively and efficiently in tackling climate change.

By convening diverse actors and perspectives, Climate Dialogues strengthens both institutional coordination and social engagement in shaping concrete, sustainable responses to one of the greatest challenges of our time.

Structured in phases and designed to mobilize different stakeholders, Climate Dialogues pinpoints opportunities for partnerships and connections that bring local challenges into view and open up multiple pathways to solutions. One such partnership was forged with the Federal Public Prosecutor's Office in Amazonas, which expanded the collective effort by incorporating experiences from other states into this shared undertaking.

## The Brazilian Justice System

Brazil's justice system comprises several public legal careers, each with distinct responsibilities. At its core is the Public Prosecutor's Office (*Ministério Público*, in Portuguese), an independent body whose main role is to uphold the law and safeguard fundamental rights. It monitors the legality of public and private actions and may investigate and, when necessary, prosecute those who break the law. To do so, the Public Prosecutor's Office can open investigations and file civil lawsuits to defend essential collective rights such as environmental protection, cultural heritage, public health, and quality education.

This institution has two branches: the State Public Prosecutor's Office (MPE) and the Federal Public Prosecutor's Office (MPF). Both ensure compliance with the law but in different spheres. The state branches act at state and municipal levels, while the federal branch handles issues of national scope. Each state hosts a federal unit that addresses regional realities while considering the nationwide impact of public and private actions, ensuring that public authorities comply with the law and that private actors respect existing legislation.

Through its Federal Prosecutors, the Federal Public Prosecutor's Office (MPF) works for social well-being with a strategic focus on large-scale action. Unlike local interventions, there is a deliberate effort to understand the chains and flows behind events, going beyond their surface to tackle issues of national scope. These matters are highly complex, often transdisciplinary, and demand multiple perspectives at their core.

To meet this challenge, the initiative has built partnerships with several constitutional bodies to make information more accessible and broaden exchanges among diverse social actors. One outcome of these collaborations is the production of books that capture the perspectives and positions of public legal professionals empowered to act on these issues.

A conceptual project designed to give transparency to ongoing actions while also sharing insights on innovations, highlighting challenges and opportunities and helping these themes reach wider audiences and inspire deeper reflection.

## **Partnership with the Federal Public Prosecutor's Office**

On March 3, 2024, FUNBIO formalized a partnership with the Federal Public Prosecutor's Office (MPF) through the Federal Prosecutor's Office in Amazonas, under Technical Cooperation Agreement N° 001/2024.

In a series of alignment meetings, the partners outlined the most effective methodologies to adopt. It was also agreed that, beyond Federal Prosecutors based in Amazonas, prosecutors from other Amazonian states specializing in environmental issues, or working on cases with repercussions in Amazonas, would be invited to participate. This broadened the perspective on the biome, providing not only a clearer view of the challenges but also of the strategic solutions being developed.

The initiative unfolded in four phases, culminating in the creation of this book. More than a simple partnership, it was a coordinated and strategic institutional effort by both organizations to expand knowledge, foster exchange and engage a network of professionals working on climate and environmental issues, helping to strengthen public policies and actions that protect natural resources and the communities that depend on them.

## **Methodology**

Each institution faces its own operational challenges, whether stemming from structural constraints or from the responsibilities tied to its daily work. That's why, before launching Climate Dialogues, the team conducted a series of interviews with members of the Federal Public Prosecutor's Office. The questions covered sensitive climate topics, knowledge of existing financing mechanisms, ideal models for information sharing, and other key issues.

This mapping allowed the initiative to adjust its procedures and make the necessary alignments for the next stages of action.

The second phase took place through virtual meetings designed to bring participants closer together and enable interaction even during the pandemic. Activities were hosted on a dedicated, publicly accessible platform and supported by background texts prepared to guide discussion.

This stage fostered dialogue between representatives of Brazil's justice system and civil society on the contemporary challenges facing the Amazon and the Cerrado, as well as on lessons from other biomes that could be adapted. The activities ran throughout 2022, with each day devoted to a specific theme.



The third stage introduced “circular meetings”, so called because they were designed to gather a select group of professionals with diverse backgrounds and experiences to contribute to deeper, more qualified discussions. Held in person in U-shaped or circular seating, the format was conceived to create a horizontal space for dialogue, supported by expert facilitators, under the premise that no one holds more knowledge than another, only different experiences.

These discussions took place on May 16 and October 30, 2024, at MPF headquarters in Manaus, in an environment that enabled collective reflection on solutions to the proposed themes, with the goal of mapping local and regional specificities to support participants’ work on the ground.

The topics were defined through alignment meetings with the initiative’s focal points. Each invited expert was carefully identified and selected for the experience and perspective they could bring to the group. Rather than simply acting as speakers, they served as collaborators – facilitators who contributed ideas and reflections to enrich the discussions.

Five themes guided these meetings: opportunities created by major international events in Brazil such as the COP and the G20; public and climate security; measurement of climate damage; strategies to combat deforestation; and the carbon market. This exchange of knowledge proved crucial for identifying specific subjects to explore in greater depth in the next phase of the initiative.

The fourth phase was the experiential meeting: an immersive, collaborative gathering designed to bring representatives of the justice system into a dynamic, interactive environment connected to relevant projects. Its aim was to build solutions and pathways for addressing the climate challenges faced in the state. The idea was to create a space for pause and reflection on real cases, encouraging coordinated, network-based action.

Unlike the circular meetings, the experiential meeting stretched over two full days and combined immersive reflection with a technical visit, designed to link theoretical debate to good practices drawn from local realities. Held on March 28–29, 2025, in Novo Airão, the program alternated between in-depth discussions and a field visit in the surrounding Amazonian region.

The immersive workshop focused on combating deforestation and explored related themes such as communication; information systems and technology; and economic alternatives to deforestation. Practical cases, strategies and opportunities for promoting sustainable production models were presented to broaden participants’ understanding of both the challenges and the potential of local and regional initiatives.

It concluded with a technical visit that included dialogue with community members, reflection on models for managing protected areas and on the management of wild animals. The visit covered two protected areas: Anavilhanas National Park and the Rio Negro Sustainable Development Reserve.

The technical visit included stops at the operational bases of ICMBio – the Chico Mendes Institute for Biodiversity Conservation, developed with philanthropic support. Participants learned why those bases were established there, the challenges faced by the teams monitoring the park, and the possibilities for improvement. They also discussed the importance of partnerships to support protected areas, highlighting their role as tools for local development tied to the surrounding landscape.

A stop in the Santo Antônio community showcased community-based tourism from the residents' own perspective. Welcomed by a local leader who shared insights into daily life, the challenges faced and the progress achieved, participants saw how scientific concepts are reframed through a community lens and connected to social initiatives. The visit offered an immersion into the region's social and environmental dynamics, underscoring the importance of community leadership in conservation and sustainable development, whether through tourism or extractive activities.

Finally, the itinerary included sites practicing species management that balances tourism with animal welfare while creating income opportunities for local communities.

## **Unpacking challenges and building new solutions**

The climate agenda has moved to the forefront of Brazil's national debate, especially in international decision-making arenas such as the G20 and the Conferences of the Parties (COPs) under the United Nations Framework Convention on Climate Change (UNFCCC). Across these forums runs a shared expectation: that countries will reach consensus on more effective models for implementation.

There is a growing push to confront intertwined crises such as climate change, biodiversity loss, soil and ocean degradation, desertification, droughts and pollution. In this context, Brazil faces the challenge of presenting a robust, integrated and coherent national plan to meet its climate commitments, especially those set out in its Nationally Determined Contribution (NDC) under the Paris Agreement. Delivering on these targets requires a strong legal foundation: environmental public policies need legal certainty, implementation models must be adaptable to different social groups, and climate finance must be adequately secured through both national resources and international cooperation.

Although the phenomenon is global, its effects are felt directly and specifically at the local level, demanding territorialized responses ideally built in dialogue with affected communities. For this reason, it is necessary to understand not only the scientific but also the legal environment, which ultimately provides the essential elements for guaranteeing everyone's right to an ecologically healthy and balanced environment.

The debates within the Climate Dialogues initiative brought several key issues to the fore, notably the importance of protecting food sovereignty and ensuring access to healthy food produced locally and sustainably, thereby strengthening the region's socio-environmental resilience.

They also underscored not only the remarkable progress of scientific knowledge but the urgent need to translate and share it, making complex information accessible to all segments of society and useful for everyday decision-making. This imperative extends beyond scientific data to other climate-related issues, especially when clarifying technical and complex matters with significant impact on the well-being of local populations.

Resistance to environmental policies often stems from a lack of adequate, clear, and accessible information, or from distrust of measures that are ultimately designed to safeguard traditional ways of life. This underscores the importance

of developing new formats and models for ongoing dialogue, aimed at integrating scientific knowledge and traditional wisdom to build effective solutions, particularly in a context marked by competing narratives, conflicting interests, and the spread of disinformation.

Communication has emerged as a strategic pillar in shaping how society understands environmental issues such as deforestation, territorial protection, and the role of public institutions. Within the justice system, this challenge is even more pronounced. Although socio-environmental initiatives have gained prominence, institutional communication often remains limited, using language that feels remote from the audiences most directly affected.

This is especially relevant when addressing environmental violations. The MPF has been active in the criminal sphere to hold offenders accountable. However, further progress is needed in the reparatory and socio-economic dimensions, particularly in identifying what can be offered to impacted communities. In this regard, the Conduct Adjustment Agreement (CAA) stands out as a promising instrument for ensuring the prompt and participatory implementation of environmental and socio-environmental commitments.

In parallel, there is an urgent need to strengthen networked action, recognizing that any solution for the Legal Amazon must be built in an integrated manner and anchored in a strategic, long-term vision. Without such a systemic perspective, problems will continue to be addressed in a fragmented way, without confronting their structural causes. Breaking this cycle requires broadening the focus of enforcement strategies beyond holding only the direct perpetrators of deforestation accountable to also reaching the real orchestrators: financiers, logistical intermediaries, and ultimate beneficiaries who profit from the illegal exploitation of natural resources.

This shift necessarily brings public security into the discussion. Studies and investigations show that the Legal Amazon faces multidimensional challenges that extend far beyond environmental concerns. In the legal sphere, crimes such as land grabbing, illegal logging, illegal mining, and livestock production are closely intertwined with environmental offenses. There is mounting evidence of growing connections to organized crime and drug trafficking, creating a complex ecosystem of illegality. Illicit resources are often integrated into the formal economy by exploiting loopholes in financial control and regulatory systems.

Addressing these complexities requires improving the quality of data on public security and violence in the region to support the design of effective policies and strategies for the Legal Amazon. It also demands a comprehensive, inter-institutional approach that integrates environmental, economic, legal, and public security sectors.

Another crucial dimension is the measurement of climate damage. The principle of full reparation requires, first and foremost, efforts to restore degraded areas, complemented by ecological compensation for harms not remediable *in situ* and by compensation for the irreversible portions of damage (including residual and interim losses). Yet, significant obstacles persist in the scientific determination of climate damage, both in quantifying the excessive concentration of greenhouse gases in the global atmosphere and in attributing responsibility to specific emitting sources within national territory. Once emissions are identified and quantified for a given source, it becomes possible to estimate the potential or actual damages caused.

Although the debate on measuring climate damage has seen notable technical progress, with new methodologies and data tools emerging to support litigation and financial quantification, the number of climate-related lawsuits remains limited.

This places an urgent demand on the legal field. Law must develop more effective and responsive instruments to address climate phenomena that are increasingly complex and disruptive. This entails not only revising existing regulations but also embracing new legal paradigms that reflect the interdependence of climate, biodiversity, and social justice.

The MPF has historically played a leading role in environmental litigation in Brazil. In recent years, this leadership has expanded through an increasingly significant partnership with organized civil society. This collaboration has diversified legal strategies, strengthened oversight of government action, and heightened pressure for compliance with environmental and climate commitments. Yet critical questions remain, such as how global actors can be held accountable for concrete losses, like crop failures caused by floods or droughts, whose causes are diffuse and transnational. How can the costs and damages stemming from a global climate phenomenon, aggravated by cumulative emissions over time in different regions, be shared equitably?

In parallel, expanding investments that generate income for traditional communities and populations has emerged as a key strategy. However, this requires moving beyond the conventional lens through which these groups are often viewed. It calls for a deeper understanding of sustainable value chains, recognizing that they are frequently constrained by the absence of basic infrastructure in many territories, such as healthcare, education, transportation, and sanitation. This structural precariousness, compounded by management limitations, undermines the effectiveness and scalability of initiatives directed at traditional communities.

Access to fundamental rights such as basic sanitation services, healthcare, and quality education remains extremely limited in many regions, underscoring the urgency of integrated public policies that address these inequalities at their roots. At the same time, initiatives supported by philanthropy and/or legal obligations have been driving innovative approaches aimed at transforming realities, often with strong potential for replication.

Training traditional populations, especially youth and community leaders, enhances their understanding of local production chains, enabling them to identify weak links and critical points that require improvements in management and organization. Decentralizing knowledge also fosters community autonomy, empowering people to take ownership of essential information and make more informed decisions about socio-productive activities.

This is directly linked to the carbon market, which has raised high expectations as a tool for environmental conservation and income generation but has also revealed serious structural vulnerabilities, particularly in areas inhabited by traditional peoples and communities. Debates have highlighted enduring challenges such as land-tenure insecurity and institutional weaknesses in project oversight and monitoring.

To unlock the carbon market's potential in a fair and effective way, preventive measures must be established, transparency guaranteed, and the State's role in regulation and mediation strengthened. Equally, it must be recognized that

without genuine consultation and respect for sociocultural diversity, no ecological transition is possible. Broader dialogue with society is also essential, with clear and transparent communication of the impacts and benefits of each choice.

Finally, another key issue highlighted was the role of digital tools, such as monitoring platforms, georeferenced databases, and artificial intelligence solutions, which increasingly support decision-making, coordinated action planning, and the strengthening of enforcement. For these technologies to be genuinely effective, they must be fully integrated into institutional routines and embedded within collaborative strategies across agencies and actors, thereby expanding their reach and impact in the territories. Their use should also be guided in ways that promote critical engagement with the information provided.

These discussions reinforce the importance of aligning technological innovation with governance, ethics, and inter-institutional collaboration so that, for instance, the use of artificial intelligence becomes not only technically feasible but also socially relevant and legally robust. In this context, professionals remain at the center: they are the ones who feed, validate, and steer the use of these technologies, making sustained investment in technical training and interdisciplinary dialogue indispensable.

There is broad consensus that, rather than focusing solely on new technologies, priority should be given to improving and integrating existing databases to ensure their quality and practical applicability. Institutional effectiveness depends not only on generating more data but on using it strategically to design public policies, inform decision-making, and combat environmental offenses.

A critical issue highlighted is the technical and legal responsibility of those who input data into these systems. The accuracy and consistency of recorded information can have direct consequences, including in criminal proceedings. In a context where criminal networks are increasingly organized and adaptable, the institutional response must be equally robust, i.e., coordinated, integrated, and grounded in reliable data.

## Looking at experiences and new ideas

Building on their work, Federal Prosecutors reflected on existing experiences and the new knowledge gained through these exchanges. To present these insights, the book is organized into two parts. The first, titled “Between the Past and the Things to Come: Transformations in the Legal Order in Times of Climate Change,” brings together three articles that examine the introduction of the climate agenda within the Public Prosecutor’s Office and the challenges of tackling and prosecuting environmental offenses. This section opens with an article by Federal Prosecutor Ubiratan Cazetta, which clearly illustrates these issues by exploring the challenges facing the Public Prosecutor’s Office in the context of climate change. Drawing on his extensive experience, Cazetta argues that there is no single forum for coordination; rather, multiple spaces for dialogue are needed, spaces that communicate with one another and, ideally, converge into a broader coordinating body.

The chapter then presents an article by Federal Prosecutor Galtiênio da Cruz Paulino, who examines responsibility, prevention, and environmental

justice in the context of deforestation and climate change. He argues that the link between deforestation and climate change calls for a new paradigm of environmental accountability, one in which the ecological costs of human activities are internalized, breaking with the logic of socializing the burdens of degradation. In his view, confronting environmental collapse requires an effective legal framework grounded in full reparation, climate governance, and intergenerational justice, with rigorous application of the principles of precaution, polluter-pays, and strict liability. Such measures, he contends, must be accompanied by coherent public policies that reduce deforestation, restore degraded areas, and strengthen vulnerable communities, safeguarding the rights of both present and future generations.

The chapter concludes with an article by Federal Prosecutor Guilherme Diego Rodrigues Leal, which discusses the Federal Public Prosecutor's Office's role in environmental protection across the Brazil-Colombia-Peru tri-border region. His analysis reflects on the legal challenges and strategies for addressing transnational environmental crime. According to Leal, although the MPF has robust legal instruments within Brazilian territory, it faces significant limitations in responding to environmental harm originating in neighboring countries due to the rigidity of state sovereignty and the slow pace of international cooperation. This creates a tension between its constitutional mandate to protect the environment and the legal limits of its jurisdiction. In light of this, he calls for the development of new legal and political mechanisms that would enable the MPF and counterpart agencies in Amazonian countries to act jointly, promptly, and in an integrated manner.

The second part of the book, titled "Weaving Futures: Between Technology, Culture, and Socio-Environmental Justice," highlights concrete experiences drawn from the lived realities of members of the Public Prosecutor's Office. Knowledge of the past provides a foundation for future reflection, helping to build new bridges ahead. This section opens with an article by Federal Prosecutor Rafael da Silva Rocha, which explores data intelligence and strategic partnerships in combating deforestation in the Amazon under the *Carne Legal* Program. This program illustrates an effective model for tackling environmental challenges by moving beyond inspection to act as a catalyst for public policy. According to the author, its success lies in combining institutional strengthening, the strategic use of data, and coordination across multiple sectors. He argues that environmental control in the Amazon requires integrated Governance, with traceability of the livestock supply chain, integration of public data, and stronger auditing mechanisms, to enhance oversight and build confidence in legal production. In this sense, the *Carne Legal* Program should be seen as an evolving model that proves it is possible to develop effective legal solutions even within fragmented regulatory contexts. Advancing this agenda calls for coordinated action by the justice system, the productive sector, oversight bodies, and political leadership, united around the common goal of promoting fair and sustainable development in the Amazon.

The section then presents an article by Federal Prosecutor Ricardo Augusto Negrini, who deepens the discussion of the *Carne Legal* Program by examining the prohibitions established under the Conduct Adjustment Agreement (CAA) for livestock production and cattle raising on Indigenous Lands. Negrini argues that

banning livestock activities in these territories is justified by the risks to their environmental and cultural integrity, as well as by the difficulty of verifying, without due process, the legitimacy of decisions made by the affected communities.

The discussion then turns to economic transition with contributions from Federal Prosecutors Gabriel de Amorim Silva Ferreira and Raphael Luis Pereira Bevilaqua, who address predatory livestock practices and, more broadly, advocate for what they call a “sustainable bioeconomy.” They note that despite the high market value of forest products, extractivists capture only a fraction of this value due to their dependence on intermediaries and the lack of effective public policies. This undervaluation of extractivism renders livestock production, although environmentally harmful, an apparently more viable option for small producers in Rondônia. To break this cycle, they propose measures such as economically valuing standing forests through public policies that incentivize the bioeconomy and support structural change, moving beyond palliative measures to build viable economic alternatives capable of preserving the Amazon and advancing social justice.

The book closes with an article by Federal Prosecutor Leandro Mitidieri Figueiredo, who offers an important discussion on the threats to, and legal solutions for, mitigating the impacts on protected areas. These areas represent the principal and most structured strategy for biodiversity conservation in Brazil and worldwide. They are legally protected spaces established to conserve ecosystems, preserve biological diversity, protect natural resources, and ensure the provision of essential ecosystem services such as climate regulation, water resource protection, and soil conservation. Despite their importance, these areas remain under threat. From this perspective, Figueiredo argues that promoting economic development does not require relaxing environmental rules or reducing protected areas, since sustainable and viable alternatives exist. Such strategies make it possible to generate income while keeping the forest standing and supporting family farming and traditional peoples, provided they are accompanied by effective government support.







# **Between the past and the things to come: transformations in the legal order in times of climate change**

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## CLIMATE CHANGE: CHALLENGES FOR THE PUBLIC PROSECUTOR'S OFFICE

BY UBIRATAN CAZETTA<sup>3</sup>

When considering Law and the need to incorporate creativity into its application, a central challenge emerges: how to reconcile innovation with legal certainty. By its very nature, Law is predominantly reactive, addressing existing demands and conflicts. An important exception to this dynamic was the 1972 Stockholm Conference, which marked a turning point by introducing a more proactive, environmentally focused approach.

Although earlier precedents can be identified, Stockholm stands out as a landmark and remains a constant reference for innovation, whether by reshaping established legal concepts or adapting them to new challenges. By contrast, in other fields of Law, notably civil law, the underlying logic and structures have remained virtually unchanged since the 19th century, underscoring the difficulty of breaking with tradition without jeopardizing predictability and stability.

From this perspective, Stockholm inaugurated a shift in the treatment of environmental issues, reframing them less as matters of individual concern and more as collective interests, moving beyond the narrow lens of personal rights. The challenge, therefore, lies in rethinking legal instruments and institutions, many of which do not yet exist or remain bound by traditional frameworks anchored in the past. Such transformation demands innovation and renewal, yet without abandoning the legal certainty that ensures the system's stability.

Yet this new approach must take shape in a country with singular characteristics. Brazil holds an extraordinarily rich natural environment, with biodiversity potential that is virtually unmatched. While such a claim may sound boastful, it is a recognized reality: few, if any, countries share the same scale and environmental diversity as Brazil. This unique condition imposes distinct responsibilities and calls for legal responses that are innovative and sensitive to the nation's socioecological complexity.

Brazil is a country of continental dimensions, unified by a common language but marked by tensions arising from vast geographic, social, and cultural diversity. Unlike many regions of the world, it does not face widespread armed conflict or severe instability. What it does confront, however, is deep inequality across social, economic, and environmental dimensions.

In this setting, the integration of complex debates such as climate change presents formidable challenges. Climate change is inherently uncertain, projecting unpredictability into the future. While awareness is growing that it is no longer

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possible to move forward at the same pace or with the same strategies, it is equally clear that today's decisions produce outcomes surrounded by uncertainty. This reality underscores the urgency of adopting new approaches, more creative, daring, and committed to sustainability and social justice.

## Dialogue and participation: the challenge of coordination

Within this naturally complex and dynamic environment, the role of the Public Prosecutor's Office, and, more broadly, the justice system, takes on particular importance. By justice system, we refer to all actors engaged in this field: private and public lawyers, Public Defenders, the Public Prosecutor's Office, and the Judiciary itself. Each must adapt and reinvent its practices in response to legal instruments that are still being developed.

The first and most evident conclusion is that a system based solely on command-and-control logic, i.e., purely repressive, cannot deliver the expected outcomes. Deforestation illustrates the point: if the response relies only on enforcement and punishment, the battle will be lost before it even begins. Repression and control remain essential, but they must be carefully designed and integrated into broader strategies that account for the surrounding social, economic, and environmental realities.

In a country such as Brazil, with its continental dimensions, abundant resources, and profound inequalities, exclusive reliance on command and control will never suffice. This highlights the strategic role of development banks and the importance of debates on innovative financing mechanisms.

Equally crucial is recognizing the role of financial institutions, which play a well-defined part in Brazil's development policy but are too often underestimated or forgotten in public debate. This oversight creates space for simplistic criticism of their work. Development banks, in particular, have a historic and strategic mission that must be valued and safeguarded, especially as they celebrate milestones such as 70 years of meaningful contribution.

Financial institutions collect savings from across society and channel them into investments that generate returns. In this strategic role, when they recognize the need to look ahead and incorporate mechanisms to confront climate change, they become essential agents of transformation. Their active participation is indispensable, as their actions can leverage concrete and sustainable solutions to the pressing challenges we face.

The Public Prosecutor's Office also has a role to play in this context, though it begins from a structural limitation: its historically reactive function, as already noted. The institution was conceived with a primarily repressive outlook, focused on criminal matters, and retained this profile until the 1980s. Two milestones significantly reshaped this trajectory: first, the enactment of the Public Civil Action Law (Law Nº 7,347/1985), which disrupted traditional notions of civil procedure; and second, the 1988 Federal Constitution, which definitively consolidated new areas of activity, especially in collective protection and the defense of human rights.

Traditionally, the Public Prosecutor's Office has served as the criminal prosecutor: identifying crimes, gathering evidence, bringing cases to trial, and seeking

accountability before the Judiciary. This role is, by definition, backward-looking – focused on events that have already occurred. It is important, both as a means of repression and, in certain respects, as a pedagogical tool. Yet, on its own, it does not provide solutions for the future.

With the expansion of collective protection in Brazil and the Public Prosecutor's Office taking on a leading role, it has become possible to move beyond a repressive framework toward a more proactive approach. This shift is far more effective and concrete, particularly in conflict resolution.

Conduct Adjustment Agreements (CAAs) and similar instruments, as well as interventions in processes such as environmental licensing, especially in defining environmental compensation and allocating resources, are considerably more effective. They enable self-composition, connecting those who, for various reasons, must finance certain measures with those responsible for carrying out compensatory actions. In this way, actors required, or willing, to invest in environmental issues can actively participate in shaping the model itself.

This approach goes beyond the imposition of obligations or the outcome of a condemnatory judgment, which implies defeat and often generates resistance. Through composition, whether by CAAs or other mechanisms, it becomes possible to introduce an element of satisfaction for the parties involved. As a result, what begins as an adversarial dispute can evolve into an internal corporate policy or even a public policy, producing more tangible and lasting results.

In this sense, the Public Prosecutor's Office also plays the role of negotiator, advancing environmental protection and strengthening mechanisms to confront climate change. While its repressive role remains essential, the challenge of climate change demands a proactive stance, one that prioritizes dialogue and constructive solutions.

Two points deserve particular emphasis: the need for continuous preparation and internal debate among members of the Public Prosecutor's Office. Effective action in confronting climate change is inconceivable without an ongoing process of training and qualification. This must include not only conceptual updates, but also access to innovations, engagement with the latest research, and familiarity with the most advanced developments in climate science.

Such dialogue is indispensable, and the strictly legal dimension may ultimately be the least decisive, given that law rests on relatively stable foundations. What truly matters is engagement with other fields of knowledge and research, including socio-environmental and ethno-environmental perspectives, as well as the natural sciences.

A concrete example is the carbon market, which involves highly specific concepts, such as carbon and methane accounting, that must be translated into technical instruments. Only with a clear scientific basis can society operate effectively in this field. Within this scope lies a crucial recognition, both for the Public Prosecutor's Office and for society at large: litigation or the judicialization of such issues should be regarded as the least desirable path.

Civil procedure, even in its collective form, still bears the conceptual limits of its origins, having been designed for disputes between two parties, generally centered on property matters. In the classical examples of law, these disputes were between Titius and Maevius, Roman names seldom used today, yet still present in civil procedure textbooks when illustrating individual litigation models.

When this individualistic paradigm is set aside and attention shifts to the collective sphere, the theory proves both promising and innovative. Considerable progress has been made, and there is now active discussion on the possibility of structural decisions that transform the very logic of traditional procedure and aim to address complex realities. Yet between theory and practice stands the Judiciary, shaped and trained within an entirely different framework.

This makes continuous training essential for all actors in the judicial process: judges, lawyers, public defenders, members of the Public Prosecutor's Office, and even justices of higher courts such as the Federal Supreme Court. These professionals are often confronted with entirely new issues for which their traditional legal education has not equipped them.

They have the capacity to adapt, but cannot remain bound to inherited knowledge, they must be exposed to renewal. This is one of the main obstacles when dealing with new financing instruments, understood here in the broadest sense, from donations to direct financing of the territories where such resources will be applied.

Decisions on how to manage risks in financing or structure public calls for donations and investments inevitably face the uncertainty inherent in the projects themselves. Even the best-planned initiatives, such as reforestation projects, carry no guarantee of achieving the expected outcomes. Unpredictable climatic factors, from drought to excessive rainfall, can disrupt timelines and compromise results.

Yet while solutions in the field are innovative and realities are constantly shifting, they are often assessed through a mindset anchored in the past. This is a major risk to be avoided. A traditional outlook on new financing mechanisms can weaken both their legitimacy and their effectiveness. For instance, questioning the validity of an investment simply because results were not achieved within the original timeframe ignores the fact that uncertainty is intrinsic to such models. It is one thing to deal with insecurity caused by hasty decision-making; it is another to recognize insecurity as part of the process itself.

The Judiciary, therefore, must increasingly prepare to work with uncertainty and remain open to society as a whole, particularly in the profoundly unequal context in which we live. To implement short-, medium-, and long-term climate policies, polarization must be left behind. The choice between destruction and protection is no longer the issue. The challenge now is to determine how best to use available resources to reduce regional inequalities and adopt measures truly capable of addressing climate change.

## Financing and active listening

In discussions of international financing, the focus often falls almost exclusively on control mechanisms, such as hiring teams of inspectors, acquiring equipment, and deploying field staff. While these measures are important to extend the State's presence into remote areas and maintain direct contact with beneficiaries, the mistake lies in assuming they are the only, or sufficient, solution.

When resources are directed straight to communities with the aim of empowerment and autonomy, they are frequently accompanied by bureaucratic require-

ments for which those communities are unprepared. These range from accounting procedures to the very notion of how to manage and document resource use in a way that makes it auditable.

For projects of this nature to succeed, a broad and integrated approach is essential. In a country with Brazil's complex federal system, a central question arises: how can effective coordination structures be built?

Environmental law has traditionally advanced a bottom-up model, strengthening municipalities and local communities, an approach I fully endorse. Yet within Brazilian federalism, historically shaped by strong centralization at the federal level since the early Republic, serious challenges emerge in aligning local, state, and federal policies.

The solution is neither to weaken municipalities nor to grant the Union an absolute, omnipotent role, as if it alone could decide. The real challenge is to strike a balance in which the Union, states, and municipalities act in a coordinated and collaborative manner, respecting constitutional competences while overcoming the institutional fragmentation that so often undermines the effectiveness of environmental policy.

Nor is it viable to pursue the opposite path, transferring all responsibility to municipal and state levels while excluding the Union. What Brazilian society must find is a point of balance – a genuine redesign of federalism that allows for coordinated, cooperative, and effective action across all levels of government.

The COVID-19 pandemic offered a concrete example. At first, measures taken by federative entities were often contradictory and uncoordinated. Yet this fragmentation also created space for civil society to demand greater clarity, coherence, and participation in decision-making. Mechanisms must be established to ensure that all decision-makers are involved, and that responsibility does not rest exclusively with the State.

The State, in its regulatory role, plays an essential and irreplaceable part in shaping and implementing public policy. On its own, however, it cannot address today's complex challenges, particularly in the socio-environmental sphere. Without the effective participation of civil society, institutional efforts will inevitably fall short. This requires a broader conception of civil Society, one that goes beyond the traditional view of NGOs and social movements to include traditional populations, environmental organizations, the productive sector, the financial system, universities, research centers, and other actors who, directly or indirectly, influence and are influenced by political decisions.

Institutional barriers must be broken down, stigmas overcome, and the “grammar” of each sector, its interests, timelines, and logics, properly understood. Only through such collective effort at comprehension and coordination will it be possible to resolve conflicts and build responses equal to the scale of today's challenges. Financing, of course, will always remain a central issue.

Brazil will inevitably face budgetary constraints. In this context, international resources can play an important role in driving transformation. Their effectiveness, however, will be limited if applied in isolation or disconnected from broader, more structural public policies.

For example, channeling resources solely to expand the number of environmental inspectors will achieve little without parallel policies that go beyond enforcement. What is required is a new logic of territorial occupation and land

use, one that creates value from standing forests, restored areas, and biodiversity, without defaulting to environmental degradation as the primary or unquestioned option.

How can standing forests be transformed into genuine economic assets? How can the restoration of degraded areas become a legitimate source of sustainable development? These questions capture only part of the complexity of a challenge that demands immediate action and a process of definition with space for both social participation and State engagement.

Within this context, it is crucial to consider how to engage the Public Prosecutor's Office in the climate change agenda and, more importantly, how to ensure its participation in practical and effective action. This challenge is particularly significant in light of one of the institution's defining features: the functional independence of its members.

Functional independence, guaranteed by the Federal Constitution, is a cornerstone of the Public Prosecutor's Office, granting each member autonomy in the exercise of their duties. Yet this very safeguard, essential to impartiality and freedom of action, can, at times, make it difficult to establish cohesive institutional strategies, particularly in matters that require systemic, integrated, and cross-cutting approaches, such as climate change.

It is important to stress that the functional independence of members of the Public Prosecutor's Office is not, in itself, a problem. On the contrary, it is a fundamental guarantee of autonomy and legitimacy in institutional action. Yet, in the face of complex and cross-cutting challenges such as those posed by climate change, it is essential to establish institutional solutions that provide common guiding parameters without undermining that autonomy. This requires internal reflection.

The effective engagement of the Public Prosecutor's Office therefore depends on three complementary fronts. The first is the direct action of its members in the territories, through the signing of Conduct Adjustment Agreements (CAAs), the creation of spaces for intersectoral dialogue, and the pursuit of consensual solutions that bring together diverse local actors. The second concerns institutional oversight, which demands proactive and coordinated action from internal coordination and control bodies. In the Federal Public Prosecutor's Office, this role is performed by the Chambers of Coordination and Review, while in the state Public Prosecutor's Offices it generally falls to the Operational Support Centers (OSCs), which organize, support, and guide functional activity. The third front is the alignment between the individual action of members and these institutional coordination mechanisms, so that responses are consolidated in an articulated, effective, and genuinely committed way to the urgency of the climate agenda.

A concrete example of such cooperation among multiple actors took place in 2007 with the launch of the *Carne Legal* Program in the state of Pará. This initiative involved coordination between the State Government, the Federal Government (through Ibama), and BNDES, which financed solutions for the livestock sector.

This case illustrates the involvement of employers' associations, trade unions, municipalities, the state, and the Public Prosecutor's Office. Originating in a conflict sparked by a series of public civil actions, the *Carne Legal* Program evolved into an initiative that directly reduced deforestation rates. It stands as a successful model of interinstitutional coordination, underscoring the strategic role the Pub-



lic Prosecutor's Office can play when acting in partnership with civil society and a broad range of public and private actors. Faced with structural challenges such as curbing deforestation and promoting sustainable livestock, building effective solutions requires cooperation, shared responsibility, and dialogue. No single actor can address such complexity alone.

It is necessary to abandon the belief in personalistic or quick-fix solutions. There are no simple answers to multifaceted problems, nor saviors capable of resolving them. What has worked in practice is collective construction, rooted in the integration of knowledge, commitments, and institutional capacities.

In this sense, several cooperation agencies have reported financing projects with significant resources that nonetheless failed to achieve their intended results. A key reason identified is that these initiatives often arrived with ready-made solutions, shaped by outsiders, whether foreign or domestic, unfamiliar with local realities. They also tended to overlook active listening to the very communities most directly affected.

With traditional populations, listening must be truly active. It requires setting aside preconceived notions and resisting the urge to project one's own perspective onto others, since these are distinct life stories and cultures. What is essential is to listen with respect, acknowledge the legitimacy of local knowledge, and seek to understand challenges from the perspective of those who experience them.

A telling example occurred when an Indigenous community met with the Federal Public Prosecutor's Office to discuss an environmental issue. At the outset, the community's warriors made a request that seemed, at first, unusual: the construction of swimming pools in the villages. As the dialogue unfolded, however, the deeper meaning of that request emerged.

What they were truly denouncing was the degradation of the river that had long sustained the community, culturally, nutritionally, and spiritually. Once a space for leisure, fishing, and daily life, the river was no longer safe. Testimonies described rashes, eye irritation, and illnesses previously unknown. The community could no longer enter the waters that had shaped its way of life for generations.

The swimming pools, then, were both a symbolic and practical attempt to compensate for the loss of the river. It was the community's way of saying: "If we can no longer live in our river, we want at least something that resembles it." What seemed at first an unusual request was, in fact, an expression of grief over a profound rupture with the natural environment that had sustained their culture and way of life. This is why dialogue is indispensable. It requires listening, entering the territory and the lives of these communities with care, and avoiding the imposition of ready-made solutions. Joint construction must come first. Where there is genuine openness to listen and a willingness to build together, much of the challenge is already addressed.

ILO Convention N° 169 is often cited as a model for consultation and dialogue with traditional peoples. Perhaps a similar mechanism is needed within public institutions themselves, an "institutional ILO 169" designed to foster listening and dialogue among the Judiciary, the Public Prosecutor's Office, governments, and even the financial system. Each institution operates within its own logic, its own "grammar", and often fails to recognize the perspective of the other.

What a judge understands by competence, for instance, may mean something entirely different to someone in the financial system, who lacks legal training.



Terms familiar in one field may carry very different meanings in another, precisely because of distinct backgrounds, logics, and repertoires.

The lack of dialogue between sectors is, to a large extent, what prevents the construction of consensus and solutions. In many instances, there is no real conflict, only mutual misunderstanding, stemming from the inability to see through another's perspective. Without qualified listening and efforts to translate across these different "institutional grammars," situations that could be resolved with openness and dialogue instead take on the appearance of permanent conflict.

In this context, Minister Luiz Fux's proposal for the National Council of Justice (CNJ) is exemplary. It brings a new perspective to a body originally conceived to exercise administrative control over the Judiciary, traditionally centered on statistics, such as the number of rulings issued, rather than on the effectiveness of those decisions.

This shift in perspective is vital. A thousand environmental rulings have little value if none produce concrete, effective outcomes in the real world. A judgment delivered twenty years after environmental harm merely entrenches the damage and, in some cases, may even aggravate it. Bringing this debate into the CNJ and promoting engagement with governors in broader processes is therefore a necessary step to strengthen interinstitutional dialogue and to rethink the role of the Judiciary in meeting contemporary socio-environmental challenges.

There is no single forum for coordination. What reality requires are multiple spaces of dialogue that can communicate with one another and, ideally, converge into a broader coordinating framework. Even in the case of the Amazon, it is a mistake to treat the region as homogeneous. The Amazon is plural. The social, environmental, and economic realities of southern Pará differ from those of western Pará, which in turn differ from those of Amazonas, Acre, and other states. It is therefore essential to establish diverse regional forums for discussion, with the active participation of civil society and the strengthening of participatory democracy. Dialogue cannot be confined to official arenas alone.

Vanity may be one of the most difficult barriers to overcome. The goal is not to eliminate dissent, indeed, dissent is both healthy and necessary, but to ensure it takes place in an environment where all can listen and be heard, and where the ultimate objective is the collective construction of solutions, not the assertion of individual protagonism.

Finally, an equally crucial point is the need for closer ties between the Judiciary and scientific knowledge. Traditionally, the justice system was designed to respond to concrete cases, not to engage in dialogue with academia. Yet the complex challenges of the 21st century, especially in the areas of environment, technology, and health, demand precisely this connection.

The training of judges and the work of Judicial Schools are key to consolidating the bridge between science and law. In this process, the CNJ has a central role: to institutionalize dialogue with academia and to foster decisions grounded in evidence and the best available technical and scientific knowledge.

## DEFORESTATION AND CLIMATE CHANGE: RESPONSIBILITY, PREVENTION, AND ENVIRONMENTAL JUSTICE

BY GALTÍENIO DA CRUZ PAULINO<sup>4</sup>

The climate crisis is no longer a distant threat; it has become a concrete reality, increasingly present in the daily lives of populations across the globe. Even with the recent decline in deforestation rates, the direct effects of global warming alone are already capable of altering vegetation cover, leading to water stress, tree mortality, and a higher frequency of wildfires. It is widely acknowledged that climate change and the occurrence of extreme events can reshape species composition and jeopardize the long-term sustainability of tropical forests<sup>5</sup>.

In Brazil, the worsening of global warming has been primarily linked to rising greenhouse gas emissions from fossil fuel combustion, deforestation, and the improper use of land for agriculture<sup>6</sup>.

In the Amazon, the consequences of global warming are potentially catastrophic, with droughts and forest fires intensified by phenomena such as El Niño and Atlantic oscillations. Studies show that the 2005 global warming event, for example, played a direct role in the devastating drought that year by amplifying temperature anomalies in the Atlantic Ocean. That drought was triggered by a mass of abnormally warm water in the Atlantic<sup>7</sup>.

Projections from the Hadley Centre model point to a dramatic rise in the probability of severe droughts in the Amazon, up to 90% by 2060, if greenhouse

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**5** LYRA, Andre de Arruda; CHOU, Sin Chan; SAMPAIO, Gilvan de Oliveira. Sensitivity of the Amazon biome to high-resolution climate change projections. *Acta Amazonica*, Manaus, v. 45, n° 4, pp. 383–392, Dec. 2015. Available at: <http://dx.doi.org/10.1590/1809-4392201502225>. Accessed on: May 15, 2024.

**6** CARVALHO, João Luis Nunes et al. Potencial de sequestro de carbono em diferentes biomas do Brasil. *Revista Brasileira de Ciência do Solo*, Viçosa, v. 34, n° 2, pp. 277–289, Apr. 2010. Available at: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0100-06832010000200003&lng=en&nrm=iso](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-06832010000200003&lng=en&nrm=iso). Accessed on: June 15, 2025.

**7** FEARNSIDE, Philip Martin. Global warming in Amazonia: impacts and mitigation. *Acta Amazonica*, Manaus, v. 39, n° 1, pp. 137–148, Mar. 2009. Available at: <http://dx.doi.org/10.1590/S0044-59672009000100015>. Accessed on: June 11, 2025.

gas emissions continue at their current pace, particularly if CO<sub>2</sub>-equivalent concentrations surpass 400 ppmv<sup>8</sup>.

These impacts are most visible through prolonged droughts, catastrophic floods, landslides, and other extreme events, often intensified by unsustainable land use and the destruction of natural ecosystems. Drought, for instance, is the most frequent disaster in Brazil, accounting for 45.67% of all incidents recorded in the S2iD system<sup>9</sup>. Between 2008 and 2023 alone, more than 24,000 rainfall-related disasters, such as flooding, flash floods, and landslides, were documented in the country, with an alarming 74% of them occurring in just the past 15 years.<sup>10</sup>

Recent large-scale events include the devastating landslides in Rio de Janeiro's mountain region in 2011, which claimed over 900 lives<sup>11</sup>; the storms in Bahia between 2021 and 2022, which resulted in 27 deaths and left 190 municipalities under a state of emergency<sup>12</sup>; and the landslides on the northern coast of São Paulo in 2023, which caused 65 fatalities.<sup>13</sup>

Illegal deforestation, particularly in the Legal Amazon, occupies a central role in this debate. Beyond directly contributing to global warming through the release of vast amounts of carbon into the atmosphere, it also weakens the resilience of territories to withstand extreme events.

Data from SEEG (2023)<sup>14</sup> show that deforestation was responsible for 47% of Brazil's net greenhouse gas emissions in 2021, largely driven by the conversion of tropical forests. This devastation disrupts regional hydrological cycles and diminishes the so-called "flying rivers," which transport moisture from the Amazon to the country's central-southern regions.<sup>15</sup>

Scientific literature, reports by the Intergovernmental Panel on Climate Change (IPCC), and national statistics consistently point to a direct correlation between human-driven environmental degradation and the intensification of severe climate events. At the same time, Brazil's legal framework has advanced in strengthening mechanisms for accountability, prevention, and remediation of environmental damage.

This article seeks to examine this interface between deforestation and climate change from the perspective of environmental civil liability, climate justice, and the role of public institutions, particularly the Federal Public Prosecutor's Office.

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<sup>8</sup> Ibid.

<sup>9</sup> MPF. *Atuação do Ministério Público Federal na Prevenção a Desastres Climáticos*. Brasília, 2025.

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

<sup>13</sup> Ibid.

<sup>14</sup> Observatório do Clima. *SEEG – Sistema de Estimativas de Emissões de GEE. Relatório 2023*. Available at: <https://seeg.eco.br/>.

<sup>15</sup> NOBRE, Carlos. *O futuro climático da Amazônia*. INPE, 2014.

## Deforestation and the intensification of the climate crisis

Deforestation stands as one of the most critical drivers of Brazil's climate crisis. The removal of native vegetation, particularly in the Amazon, reduces the capacity for carbon sequestration, disrupts hydrological cycles, and accelerates greenhouse gas emissions.

There is now overwhelming scientific consensus that the rise in average global temperature – already more than 1.6°C above pre-industrial levels – is directly linked to the growing frequency and severity of climate-related disasters, such as those recently impacting southern Brazil.<sup>16</sup>

This 1.6°C threshold was reached in 2024.<sup>17</sup> Attribution studies carried out by scientific networks such as World Weather Attribution show that the probability of extreme events like the floods and landslides in Rio Grande do Sul in May 2024 has doubled as a direct consequence of escalating global temperatures.<sup>18</sup>

It is important to stress that, even with strengthened global efforts to curb greenhouse gas (GHG) emissions, the persistence of these gases in the atmosphere – methane for about 10 years, nitrous oxide for roughly 120 years, and carbon dioxide for up to a millennium – means that frequent and intense climate events will remain an unavoidable reality for decades.<sup>19</sup> This highlights the urgent need for broad, cross-cutting climate adaptation policies.

Projections for the Amazon biome, based on dynamic vegetation models, indicate substantial changes in vegetation cover under different climate scenarios. In the RCP4.5 scenario, parts of the tropical forest are replaced by deciduous forest and natural grassland. In the more pessimistic RCP8.5 scenario, the replacement occurs exclusively by natural grassland by the end of the 21st century. In terms of forest loss, the model projects a decline of approximately 9% of tropical forest in the State of Amazonas under RCP4.5, and a far more severe reduction of around 50% under RCP8.5 by century's end.<sup>20</sup>

In states such as Pará, Rondônia, and Acre, forest loss could exceed 90% between 2085 and 2095 under the RCP8.5 scenario, while Mato Grosso and Tocantins may face complete conversion to natural grassland by the end of the century. Although higher atmospheric CO<sub>2</sub> concentrations could, in theory, stimulate tree growth, projections from the Eta-HadGEM2-ES model indicate rising temperatures combined with declining rainfall across the Amazon. This combination outweighs the fertilization effect of CO<sub>2</sub>, leading to forest degradation in these simulations.<sup>21</sup>

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**16** MPF. *Atuação do Ministério Público Federal na Prevenção a Desastres Climáticos*. Brasília, 2025.

**17** Ibid.

**18** Ibid.

**19** Ibid.

**20** LYRA, Andre de Arruda; CHOU, Sin Chan; SAMPAIO, Gilvan de Oliveira. Sensitivity of the Amazon biome to high resolution climate change projections. *Acta Amazonica, Manaus*, v. 45, n° 4, pp. 383-392, Dec. 2015. Available at: <http://dx.doi.org/10.1590/1809-4392201502225>. Accessed on: May 15, 2024.

**21** Ibid.

Among the most striking outcomes is the large-scale replacement of forest by grassland, which could extend the duration of the dry season and intensify severe droughts, further damaging vegetation. The contraction of the Amazon biome could also trigger a positive feedback loop, driving higher temperatures and disrupting the regional hydrological cycle.<sup>22</sup>

The IPCC (2022)<sup>23</sup> reports that tropical deforestation accounts for roughly 10% of annual global CO<sub>2</sub> emissions, with Brazil ranking among the top five emitters worldwide. Moreover, studies by Lovejoy and Nobre<sup>24</sup> warn that the Amazon biome is approaching a tipping point, beyond which the forest may enter an irreversible trajectory toward savannization.

The Amazon's vulnerability is increasingly evident in the rising mortality of trees driven by water stress and the growing frequency of forest fires, disturbances for which Amazonian species have not evolved defenses, given their historical rarity. Climate models already project the replacement of forest by savanna vegetation. The IPCC (2007a), for instance, indicates that by mid-century, higher temperatures and reduced soil moisture could gradually transform large portions of the eastern Amazon from tropical forest into savanna. Moreover, the loss of evapotranspiration, critical for recycling water and sustaining rainfall in the region, could sharply reduce precipitation, particularly during the dry season, if more than 40% of the forest were converted to pasture or soy fields.

When biotic feedbacks are taken into account, such as the release of carbon from biomass and soils once forest is replaced by pasture, temperature projections increase by up to 38% by 2100.<sup>25</sup> This release of carbon creates a powerful feedback that amplifies the greenhouse effect, raising the possibility of a “runaway greenhouse effect,” in which global warming would spiral out of control regardless of reductions in anthropogenic emissions. Supporting this concern, recent research has documented soil carbon losses in Great Britain with only a 0.8°C rise in global temperatures since 1900. The vast carbon reserves contained in global soils, including those of the Amazon, hold the potential to push the climate system beyond this threshold, triggering an irreversible greenhouse trajectory.<sup>26</sup>

While the “most likely” estimate for climate sensitivity (the rise in global temperature associated with a doubling of pre-industrial CO<sub>2</sub>) is 2.8°C, reassessments indicate with 95% certainty that the actual value could reach up to 6.2°C. This highlights the need for climate policies to account for more extreme scenarios.<sup>27</sup>

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**22** Ibid.

**23** IPCC. Sixth Assessment Report. Geneva: UN, 2022.

**24** LOVEJOY, Thomas; NOBRE, Carlos. Amazon tipping point: Last chance for action. *Science Advances*, 2018.

**25** FEARNESIDE, Philip Martin. Global warming in Amazonia: Impacts and Mitigation. *Acta Amazonica*, Manaus, v. 39, n° 1, pp. 137-148, Mar. 2009. Available at: <http://dx.doi.org/10.1590/S0044-59672009000100015>. Accessed on: June 11, 2025.

**26** Ibid.

**27** FEARNESIDE, Philip Martin. Global warming in Amazonia: Impacts and Mitigation. *Acta Amazonica*, Manaus, v. 39, n° 1, pp. 137-148, Mar. 2009. Available at: <http://dx.doi.org/10.1590/S0044-59672009000100015>. Accessed on: June 11, 2025.

In Brazil, greenhouse gas emissions from land-use change and agriculture are particularly significant, representing about 75% of total CO<sub>2</sub> emissions, 91% of CH<sub>4</sub> emissions, and 94% of N<sub>2</sub>O emissions. Without these two sectors, Brazil would rank 17th globally in GHG emissions; when they are included, however, the country rises to fifth place. Historically, the loss of soil organic matter due to land-use change and agriculture has contributed an additional 78 Pg of carbon to the atmosphere in the form of CO<sub>2</sub>.<sup>28</sup>

Beyond their direct climate impacts, deforestation also undermines ecosystems and local communities, leaving them more exposed to floods, droughts, and landslides. The *Atlas Brasileiro de Desastres Naturais*<sup>29</sup> shows that municipalities with the highest deforestation rates record the greatest number of disasters linked to extreme rainfall.

Within this context, the connection between environmental change and public health is particularly critical, as illustrated by Chagas disease. Still a persistent public health concern, the disease is aggravated by multiple factors, including climate change, deforestation, migration, uncontrolled urbanization, and oral transmission. Addressing its complex environmental, social, and cultural determinants requires an integrated approach that bridges economic, social, and environmental dimensions in the pursuit of sustainable development.<sup>30</sup>

## Environmental civil liability and the duty to repair

The 1988 Federal Constitution, in Article 225, §3, established strict liability for environmental damage<sup>31</sup>. Law N° 6,938/81<sup>32</sup>, in turn, introduced the polluter-pays principle, grounded in the theory of integral risk, as repeatedly affirmed by the Superior Court of Justice. In this framework, liability does not require proof of fault; it suffices to demonstrate the existence of damage and a causal link with the harmful activity. This liability applies both to those who directly cause the damage and to those who benefit from it or fail to prevent it (STJ, REsp 650.728, Reporting Justice Herman Benjamin).

The obligation is also *propter rem*, tied to the property itself. This means that possession or ownership of the degraded area is sufficient to trigger liability for reparation, including in cases of irregular occupation registered in SICAR. As Mi-

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**28** CARVALHO, João Luis Nunes et al. Potencial de sequestro de carbono em diferentes biomas do Brasil. *Revista Brasileira de Ciência do Solo*, Viçosa, v. 34, n° 2, pp. 277-289, Apr. 2010. Available at: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0100-06832010000200003&lng=en&nrm=iso](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-06832010000200003&lng=en&nrm=iso). Accessed on: June 15, 2025.

**29** CEMADEN. *Atlas Brasileiro de Desastres Naturais*. Brasília, 2022.

**30** SOUZA, R. C. M. de et al. Chagas disease in the context of the 2030 agenda: global warming and vectors. *Memórias do Instituto Oswaldo Cruz*, Rio de Janeiro, v. 117, e200479, 2022. DOI: 10.1590/0074-02760200479.

**31** BRAZIL. Constitution of the Federative Republic of Brazil of 1988.

**32** BRAZIL. Law N° 6,938, of August 31, 1981. National Environmental Policy.

laré (2015)<sup>33</sup> observes: “those who cause damage are not held liable as guilty of producing it, but as its author, that is, simply because they caused it.”

Case law further recognizes the extension of liability to those who benefit indirectly from environmental violations (STJ, REsp 1.374.284/MG, Reporting Justice Herman Benjamin), as well as the possibility of joint liability of individuals and legal entities involved. This broadens the scope of accountability in contexts such as land grabbing, predatory exploitation, and land speculation, reinforcing the effectiveness of environmental protection.

Land tenure is a central driver of deforestation, as the granting of titles to public lands often depends on the implementation of so-called “improvements,” which in practice means clearing forested areas. In addition, government-subsidized agricultural credit serves as a powerful incentive for the expansion of crops and livestock, further intensifying pressure on forest ecosystems.<sup>34</sup>

## Full reparation, environmental justice, and climate governance

In environmental matters, reparation must be full. This requires not only *in natura* measures, such as restoring degraded areas, but also monetary compensation for intermediate damages (the loss of ecosystem services until new vegetation reaches maturity) and residual damages (those that persist even after recovery). Case law authorizes the combination of obligations to act, to refrain from acting, and to compensate (STJ, REsp 1.145.083/MG, Reporting Justice Herman Benjamin). For purposes of quantification, IBAMA has set a technical parameter of R\$ 10,742.00 per hectare of deforestation in the Amazon (Technical Note Nº 02001.000483/2016-33).

Law Nº 12,608/2012<sup>35</sup> assigns clear responsibilities to federal, state, and municipal governments in risk and disaster management. Yet, implementation remains hindered by weak institutional integration, insufficient planning, and low budget execution. The Federal Court of Accounts (TCU Ruling Nº 2479/2021<sup>36</sup>) found that by 2020, 81% of municipalities at risk of disasters had not updated their Contingency Plans. Against this backdrop, the Federal Public Prosecutor’s Office and state public prosecutors play a decisive institutional role in advancing climate policy, particularly through public civil actions and the external oversight of environmental public policies.

Curbing deforestation requires more than repression; it also demands valuing forest conservation through compensation for environmental services. Programs such as *Bolsa Floresta* in Amazonas, which pay small farmers and extractivists to

33 MILARÉ, Edis. *Direito Ambiental*. 10 ed. São Paulo: RT, 2015.

34 FEARNside, Philip M. Amazon forest maintenance as a source of environmental services. *Anais da Academia Brasileira de Ciências*, Rio de Janeiro, v. 80, nº 1, pp. 101-114, Mar. 2008. Available at: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0001-37652008000100012&lng=en&nrm=iso](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0001-37652008000100012&lng=en&nrm=iso). Accessed on: June 12, 2025.

35 BRAZIL. Law Nº 12,608, of April 10, 2012. National Policy on Civil Protection and Defense.

36 FEDERAL COURT OF ACCOUNTS (TCU). Ruling Nº 2479/2021 – Plenary. Available at: <https://pesquisa.apps.tcu.gov.br/redireciona/acordao-completo/ACORDAO-COMPLETO-2513668>.



refrain from clearing land, are examples of direct payments for environmental services (PES) that aim to keep forests standing.

Carbon accounting for such mechanisms can follow two approaches: additionality (emission reductions compared to a hypothetical baseline, as in the Kyoto Protocol) or stock maintenance (annual payments based on the value of stored carbon). The latter is more suitable in areas with little or no prior deforestation.<sup>37</sup>

Payments should be made strictly for verified carbon benefits (*pay-as-you-go*), not for promises, and must be transparent and verifiable to ensure genuine climate impact. Addressing the inherent uncertainty of avoided deforestation projects and the risk of leakage (shifting deforestation elsewhere) requires stronger data and monitoring systems, ideally through accounting at the national level or within large political units.<sup>38</sup>

To mitigate the impacts of global warming, sustainable land management practices can maintain or enhance carbon storage in the soil–plant system. These include adopting no-till agriculture, restoring degraded pastures, implementing integrated crop–livestock–forestry systems, reforesting marginal lands, and eliminating the use of fire. In the Amazon biome, maintaining intact forest cover is especially critical given its vast carbon sequestration capacity (estimated at 421 to 470 Tg annually, with 70% stored in aboveground biomass) and the substantial greenhouse gas emissions released through deforestation and burning.<sup>39</sup>

In the Cerrado, no-till farming and crop–livestock integration show considerable potential for carbon accumulation. In the Atlantic Forest, reforestation and sustainable sugarcane management (with mechanized harvesting replacing burning) also contribute to emissions mitigation, with the capacity to remove up to 18.5 Tg of carbon per year from the atmosphere.<sup>40</sup>

Financial data underscore the pressing need for investments in prevention. Between 1995 and 2019, climate-related events in Brazil caused average annual economic losses exceeding R\$ 13.33 billion, totaling approximately R\$ 330 billion. Drought accounted for the highest share of these costs, reaching R\$ 199.8 billion.<sup>41</sup>

By contrast, the Federal Court of Accounts has pointed out that every dollar invested in disaster prevention saves ten dollars in post-disaster response.<sup>42</sup> Yet

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**37** FEARNSIDE, Philip M. Amazon forest maintenance as a source of environmental services. *Anais da Academia Brasileira de Ciências*, Rio de Janeiro, v. 80, n° 1, pp. 101-114, Mar. 2008. Available at: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0001-37652008000100012&lng=en&nrm=iso](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0001-37652008000100012&lng=en&nrm=iso). Accessed on: June 12, 2025.

**38** FEARNSIDE, Philip M. Amazon forest maintenance as a source of environmental services. *Anais da Academia Brasileira de Ciências*, Rio de Janeiro, v. 80, n° 1, pp. 101-114, Mar. 2008. Available at: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0001-37652008000100012&lng=en&nrm=iso](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0001-37652008000100012&lng=en&nrm=iso). Accessed on: June 12, 2025.

**39** CARVALHO, João Luis Nunes et al. Potencial de sequestro de carbono em diferentes biomas do Brasil. *Revista Brasileira de Ciência do Solo*, Viçosa, v. 34, n° 2, pp. 277-289, Apr. 2010. Available at: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0100-06832010000200003&lng=en&nrm=iso](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-06832010000200003&lng=en&nrm=iso). Accessed on: June 15, 2025.

**40** Ibid.

**41** MPF. *Atuação do Ministério Público Federal na Prevenção a Desastres Climáticos*. Brasília, 2025.

**42** Ibid.



federal spending has historically been directed predominantly toward response and recovery, with only a small fraction allocated to preventive measures such as infrastructure investments and nature-based solutions.<sup>43</sup>

From an environmental justice perspective, reparation must be proportional to the extent of the damage, encompassing not only the physical restoration of vegetation but also social costs, collective moral damages, and the cumulative effects of degradation. As Mazzilli (1997)<sup>44</sup> observes, compensation should include “not only material damages but also harm to morality, health, and the community.”

## Final considerations

The link between deforestation and climate change demands a new paradigm of responsibility: one that internalizes the environmental costs of human activities and prevents the burden of degradation from being socialized. Confronting environmental collapse requires an effective legal framework that combines full reparation, climate governance, and intergenerational justice.

Strict enforcement of the principles of precaution, polluter-pays, and strict liability is essential to breaking the cycle of degradation and vulnerability. Yet accountability mechanisms alone are not enough. They must be reinforced by coherent and integrated public policies capable of reducing deforestation, restoring degraded areas, and strengthening the resilience of the most vulnerable communities. Preserving climate stability and ecosystems ultimately means safeguarding the fundamental rights of present and future generations.

Brazil, one of the countries most vulnerable to the impacts of global warming, with projected droughts in the Northeast, intensified torrential rains in the South, and rising sea levels along its entire coast, must assume a leadership role in the fight against climate change. This entails making quantitative commitments to reduce deforestation, a measure that, despite past diplomatic resistance on grounds of sovereignty, is both fundamental and in the national interest. The inertia of the climate system underscores the urgency of action: measures must be taken well before critical thresholds are crossed, for warming will persist for decades even if anthropogenic emissions were to cease immediately.<sup>45</sup>

Deforestation control, while complex, is attainable with genuine political will, as evidenced by government measures that, at certain times, effectively reduced deforestation rates. Quantifying and recognizing the forest's environmental services, particularly carbon sequestration, can provide the financial incentives needed to curb deforestation while also safeguarding Brazil's essential water resources. It is crucial that environmental impact assessments of major infra-

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<sup>43</sup> Ibid.

<sup>44</sup> MAZZILLI, Hugo Nigro. *A defesa dos interesses difusos em juízo*. 9. ed. São Paulo: Saraiva, 1997.

<sup>45</sup> FEARNSTIDE, Philip Martin. Global warming in Amazonia: impacts and mitigation. *Acta Amazonica*, Manaus, v. 39, n° 1, pp. 137-148, Mar. 2009. Available at: <http://dx.doi.org/10.1590/S0044-59672009000100015>. Accessed on: June 11, 2025.

structure projects capture their full scope of effects, which extend well beyond direct routes to include the stimulation of deforestation and migration.<sup>46</sup>

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**46** FEARNSTIDE, Philip M. Desmatamento na Amazônia: dinâmica, impactos e controle. *Novos Cadernos NAEA*, Belém, v. 9, n° 2, pp. 5-30, Dec. 2006. Available at: <http://www.periodicos.ufpa.br/index.php/ncn/article/view/100/170>. Accessed on: June 13, 2025.

# THE FEDERAL PUBLIC PROSECUTOR'S OFFICE'S ROLE IN ENVIRONMENTAL PROTECTION AT THE BRAZIL-COLOMBIA-PERU TRI-BORDER AREA: LEGAL CHALLENGES AND STRATEGIES TO CONFRONT TRANSNATIONAL ENVIRONMENTAL CRIME

BY GUILHERME DIEGO RODRIGUES LEAL<sup>47</sup>

## How can we protect a forest that knows no borders?

The Amazon is one of the largest biomes on Earth<sup>48</sup>, playing a central role in regulating water cycles<sup>49</sup>, storing carbon<sup>50</sup>, and safeguarding unparalleled biodiversity. At the same time, it is among the territories most affected by illegal activities, environmental degradation, and state neglect.<sup>51</sup> In its western reaches, the Tri-border Area between Brazil, Colombia, and Peru emerges as a particularly vulnerable region, where the institutional weaknesses of three countries converge with the fluid dynamics of environmental crimes that disregard political boundaries.

This article begins from this symbolic and tangible territory of tension: a forest that is continuous, yet confronted by fragmented state responses. Using deforestation as an entry point, the article examines the institutional barriers to

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**47** Federal Prosecutor, head of the 1st Office of the Federal Prosecutor's Office in the Municipality of Tabatinga, Amazonas, with functional authority before the seven Coordination and Review Chambers of the Federal Public Prosecutor's Office. He also heads the 2nd Special Office for Inspection, Oversight, and Action in cases related to the Federal Penitentiary of Catanduvas, Paraná. In addition, he is responsible for the 2nd Special Office for Inspection and Oversight of External Control of Police Activity in the Northwestern Region. He is a member of the Working Group on Migration, Refuge, and Human Trafficking of the Federal Prosecutor's Office for Citizens' Rights, the National Penitentiary Fund (FUNPEN) Commission linked to the 7th Coordination and Review Chamber, and the Working Group of the National Committee of the Public Prosecutor's Office to Combat Slave-like Labor and Human Trafficking (Conatetrap). He is pursuing a Master's degree in Law at the National School for the Training and Improvement of Magistrates (ENFAM), in a position reserved for members of the Federal Public Prosecutor's Office, and is a postgraduate student in Human Rights at the Universidad Nacional del Oeste (Buenos Aires, Argentina) and in Jurisdiction in Border Areas, also at ENFAM.

**48** The Amazon spans approximately 7.8 million km<sup>2</sup>, stretching across nine countries and covering 44.5% of South America. It harbors about 10% of all known living species on Earth and accounts for roughly 5% of the planet's land surface. Greenpeace Brazil. (2015, June). *The Amazon's Silent Crisis: Licence to Launder* [Report]. Retrieved from <https://www.greenpeace.org.br/hubfs/Campanhas/Chega%20De%20Madeira%20Illegal/3.%20Crise%20Silenciosa%20da%20Amaz%C3%B4nia%20-%20Sta%20Efig%C3%AAnia.pdf>. Accessed on: June 16, 2016.

**49** GREENPEACE. *A floresta amazônica como "rios voadores."* Greenpeace Brazil, 2025. Available at: <https://www.greenpeace.org/brasil/blog/amazonia/>. Accessed on: June 7, 2025.

**50** AMAZÔNIA 2030. *Carbono e o destino da Amazônia*. Amazônia 2030 Publication, 2023. 23 p. Available at: <https://amazonia2030.org.br/wp-content/uploads/2023/09/Carbono-e-o-destino-da-Amazonia.pdf>. Accessed on: June 7, 2025.

**51** EBUS, Bram; EBERLE, Ulrich. Crimes against the Climate: Violence and Deforestation in the Amazon. Crisis Group Commentary, December 8, 2023. Available at: <https://www.crisisgroup.org/latin-america-caribbean/brazil-colombia/crimes-against-climate-violence-and-deforestation-amazon>. Accessed on: June 7, 2025.

combating it within the shared borderlands of these three countries. In doing so, it underscores the urgency of coordinated transnational strategies to address the complexity of environmental crime in the region.

Environmental degradation in the Tri-border Area takes multiple forms. Illegal gold mining, predatory logging, wildlife trafficking, and mercury contamination of rivers are only some of its most visible expressions. Non-governmental organizations such as the Igarapé Institute have warned of the consolidation of transnational criminal networks that exploit weak state presence, local corruption, and the logistical complexity of the region to operate with relative impunity: “A new study by the Igarapé Institute analyzing more than 300 Federal Police operations between 2016 and 2021 found that environmental crime in the Amazon region is not only organized but far more than a local problem. Indeed, this vertifiable criminal ecosystem behind Amazon plunder has expanded nationwide country, reaching 24 of Brazil’s 27 states as well as neighboring nations.”<sup>52</sup>

The border municipalities of the Upper Solimões register high rates of proportional deforestation within protected areas and Indigenous lands of the Brazilian Amazon, even though they do not appear among the 50 municipalities with the highest deforestation levels in Brazil between 2019 and 2024.<sup>53</sup> These impacts, often originating beyond Brazilian territory, nonetheless weigh heavily on entire communities within the country, Indigenous peoples, riverine populations, and extractivists whose physical and cultural survival depends directly on the ecological integrity of the forest and rivers.

This area, known as the Amazon Trapezium, stands out both for its rich biodiversity and for the significant presence of Indigenous and riverine communities.<sup>54</sup> Brazil, Colombia, and Peru together hold about 78% of the Amazon’s total area, according to the Amazonian Network of Georeferenced Socio-Environmental Information (RAISG).<sup>55</sup> They are therefore among the principal actors with the capacity either to exploit or to safeguard the region’s vast socio-environmental wealth. As one study observes, “the Tri-border Area is also deeply marked by differences of nationality, ethnicity, race, and religion among local and foreign populations, which give rise to tensions and conflicts of various kinds in the daily life of the territory.”<sup>56</sup>

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**52** IGARAPÉ INSTITUTE. Connecting the Dots: Territories and Trajectories of Environmental Crime in the Brazilian Amazon and Beyond. Press release, July 20, 2022. Available at: <https://igarape.org.br/en/new-study-by-igarape-institute-tracks-how-amazon-organized-crime-networks-spread-across-brazil/>. Accessed on: June 7, 2025.

**53** MAPBIOMAS ALERTA. *Relatório Anual do Desmatamento 2024* (RAD 2024). São Paulo: Map-Biomass Alerta, May 15, 2025. 200 p. Available at: [https://alerta.mapbiomas.org/wp-content/uploads/sites/17/2025/05/RAD2024\\_15.05.pdf](https://alerta.mapbiomas.org/wp-content/uploads/sites/17/2025/05/RAD2024_15.05.pdf). Accessed on: June 7, 2025.

**54** IBGE. Brasil tem 1,7 milhão de indígenas e mais da metade deles vive na Amazônia Legal. IBGE News Agency, August 7, 2023. Available at: <https://agenciadenoticias.ibge.gov.br/agencia-noticias/2012-agencia-de-noticias/noticias/37565-brasil-tem-1-7-milhao-de-indigenas-e-mais-da-metade-deles-vive-na-amazonia-legal>. Accessed on: June 7, 2025.

**55** NEXO JORNAL. Qual a extensão e a distribuição da Amazônia. October 24, 2023. Available at: <https://www.nexojornal.com.br/grafico/2023/10/24/qual-a-extensao-e-a-distribuicao-da-amazonia>. Accessed on: June 19, 2025.

**56** BARBOZA LACERDA, L. F. Social and environmental challenges of the triple border, Brazil, Colombia and Peru Amazon. *Revista Desenvolvimento Social*, [s.l.], v. 28, n° 2, pp. 226-240, 2023.

Still, the region faces complex environmental challenges, compounded by the activities of transnational criminal organizations engaged in illegal logging, gold mining, and drug and arms trafficking. Porous borders and limited state presence create favorable conditions for the expansion of these illicit practices, with severe consequences for both the environment and local communities. In April 2025, a joint operation by the Federal Police, IBAMA, and FUNAI in the Javari Valley destroyed 16 dredges used for illegal mining on the Jandiatuba River, highlighting the persistence of these activities despite previous enforcement efforts.<sup>57</sup>

In addition to mining, there is growing concern over river contamination from solid waste.<sup>58</sup> In May 2025, the Amazonas Public Prosecutor's Office launched an administrative proceeding to investigate the improper disposal of garbage in the Peruvian town of Islândia, which threatened the water quality of the Javari River and the health of residents in Benjamin Constant, on the Brazilian side.<sup>59</sup>

Research has also detected the presence of microplastics along the banks of the Javari River in Benjamin Constant, underscoring the region's growing pollution. A 2024 study revealed that 16.67% of the samples collected contained microplastics, while 83.33% were macroplastics, reflecting the ongoing environmental degradation.<sup>60</sup>

Within this scenario, the role of the Federal Public Prosecutor's Office (MPF) is particularly significant. As a permanent institution tasked with defending the legal order, the democratic regime, and inalienable social and individual interests, the MPF has become one of the leading institutional voices denouncing state inaction and pressing for responses proportionate to the complexity of the challenge. Yet the limits of national jurisdiction impose concrete barriers: the MPF cannot investigate or intervene beyond Brazil's borders, even when environmental harm originating abroad has direct repercussions domestically. Its action is thus restricted to a unilateral framework that stands at odds with both the transnational character of these crimes and the ecological interdependence of Amazonian territories.

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DOI: 10.46551/issn2179-6807v28n2p226-240. Available at: <https://www.periodicos.unimontes.br/index.php/rds/article/view/5044>. Accessed on: June 9, 2025.

**57** FUNDAÇÃO NACIONAL DOS POVOS INDÍGENAS (FUNAI). *Funai, PF e Ibama combatem garimpo ilegal na Terra Indígena Vale do Javari, no Amazonas*. Agência Funai, April 29, 2025. Available at: <https://www.gov.br/funai/pt-br/assuntos/noticias/2025/funai-pf-e-ibama-combatem-garimpo-ilegal-na-terra-indigena-vale-do-javari-no-amazonas>. Accessed on: June 7, 2025.

**58** PRIZIBISCZKI, Cristiane. Rios amazônicos recebem 182 mil toneladas de plástico por ano. *O Eco*, July 12, 2024. Available at: <https://oeco.org.br/noticias/rios-amazonicos-recebem-182-mil-toneladas-de-plastico-por-ano/>. Accessed on: June 7, 2025.

**59** MINISTÉRIO PÚBLICO DO ESTADO DO AMAZONAS (MPAM). Em Benjamin Constant, MP fiscaliza ações de saúde pública após suspeita de contaminação do Rio Javari. Agência MPAM, May 30, 2025. Available at: <https://www.mpam.mp.br/noticias-portal/18415-em-benjamin-constant-mp-fiscaliza-acoes-de-saude-publica-apos-suspeita-de-contaminacao-do-rio-javari>. Accessed on: June 7, 2025.

**60** ILVA, Agmar José de Jesus; SILVA, Karen Cristine Braulio da; TANANTA, Tarike Manuel Meneses; SANTOS, Edson Oliveira dos; OLIVEIRA, Elenilson Silva de. Ocorrência de microplásticos na orla do rio Javari, em Benjamin Constant, interior do Amazonas, Brasil. *Journal of Education, Science and Health*, v. 4, n° 1, pp. 1-20, Jan./Mar. 2024. DOI: 10.52832/jesh.v4i1.237. Available at: <https://bio10publicacao.com.br/jesh/article/view/237>. Accessed on: June 7, 2025.

This reality directly challenges traditional models of state action, rooted in rigid borders and compartmentalized jurisdictions. While the Federal Public Prosecutor's Office has been steadfast in defending the environment, its capacity to respond is consistently curtailed by the absence of effective legal and political instruments to confront cross-border degradation. It is as if an invisible barrier runs through the forest: the crimes flow across the rivers, but the institutions remain stranded on the banks.

Such institutional fragmentation perpetuates impunity, undermines traditional communities, and deepens an environmental crisis with regional and global climate repercussions.<sup>61</sup> In this context, the article aims to critically examine the limits of national jurisdiction in the face of the transnational character of ecological damage in the borderlands, identifying concrete obstacles and suggesting possible pathways to overcome them.

In the end, the central question is unavoidable: how can we protect a forest that knows no borders with institutions that cannot cross them?

### **Understanding the issue: sovereignty, borders, and ecosystems in tension in the transboundary Amazon**

The word *fronteira* (border) is defined as a “limit, marker, or dividing line between two regions, states, or countries.”<sup>62</sup>

Transboundary zones are contact areas between two or more countries, where social, ecological, and economic dynamics intersect, often in tension with the formally established political and legal boundaries.<sup>63</sup> In the Amazon, this intersection is especially pronounced. “The tri-border region of Brazil, Peru, and Colombia spans a vast transboundary area between the Solimões (Amazon) and Içá (Putumayo) rivers, encompassing the Colombian Amazon Trapezium and its adjoining areas in Brazil and Peru. In Colombia, it corresponds to the southernmost portion of the Department of Amazonas. In Brazil, it covers the northwest of the Upper Solimões region. In Peru, it includes the city of Caballococha, in the Province of Mariscal Ramón Castilla, at the southern tip of the Amazon Trapezium. The Colombian Amazon Trapezium includes the municipalities of Leticia, Puerto Nariño, and the southern part of Tarapacá, a non-municipalized area within the Department of Amazonas. On the Brazilian side, it comprises the municipalities of Amaturá, Atalaia do Norte, Benjamín Constant, Fonte Boa, Jutai, Santo Antô-

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**61** GROSSMAN, Daniel. Rio em fluxo: o impacto das mudanças do clima na Amazônia. *InfoAmazônia*, June 20, 2024. Available at: <https://infoamazonia.org/2024/06/20/rio-em-fluxo/>. Accessed on: June 7, 2025.

**62** FRONTEIRA. In: Michaelis. *Dicionário Brasileiro da Língua Portuguesa*. São Paulo: Melhoramentos. Available at: <https://michaelis.uol.com.br/moderno-portugues/busca/portugues-brasileiro/fronteira>. Accessed on: June 19, 2025.

**63** FERRARI, Maristela. Zona de fronteira, ciudades gêmeas e interações transfronteiriças no contexto do MERCOSUL. *Revista Transporte y Territorio*, v. 9, pp. 87-104, 2013. Available at: <https://dialnet.unirioja.es/descarga/articulo/4698157.pdf>. Accessed on: June 7, 2025.

nio do Içá, São Paulo de Olivença, Tabatinga, and Tonantins. In Peru, the area lies in the country's northwest, linked by the Marañón and Ucayali rivers, where the main course of the Amazon begins. The towns and cities of this region belong to the Province of Mariscal Ramón Castilla, in the Department of Loreto.”<sup>64</sup> Entire biomes, river basins, migratory flows, and economic networks operate as though borders did not exist. Institutional responses, however, remain rooted in a fragmented, nation-centered logic that ignores the continuity of natural systems.

In this light, borders should be understood as legal and geopolitical constructs that define the reach of state sovereignty. Historically, the concept of borders has been associated with diplomacy, armed conflict, and the exercise of political power. In the contemporary setting, however, borders have also come to be seen as spaces of integration and the promotion of social rights, regions that are marked not only by limits but also by opportunities for inclusion.<sup>65</sup> A border is, by definition, an abstract line drawn to organize state authority, yet it rarely corresponds to the human and ecological realities that unfold across it.<sup>66</sup> As Laura de Nazaré Rocha Andrade and Maria Luíza Machado Granziera observe, “borders make evident that the Amazon is a shared region and that decisions therefore belong to all countries, particularly when cooperation is at stake, even if each one claims it, uses it, and exploits natural resources in its own way.”<sup>67</sup>

Sovereignty is understood as the supreme power of a State to exercise authority over its territory, its population, and its laws.<sup>68</sup> It is this principle that legitimizes the state's monopoly on the use of force, the creation of legal norms, and the implementation of public policies. In the contemporary era, however, marked by global environmental crises and transnational threats, sovereignty is increasingly strained: its traditional rigidity stands in contrast to the fluidity of problems that demand joint, coordinated responses among States.

This paradox is particularly evident in the Amazon Trapezium. In this region, “Brazil and Colombia are separated from Peru by the Solimões River. The Colombian city of Leticia and the Brazilian city of Tabatinga, in turn, are divided only by a single street, Avenida da Amizade. Through boundary treaties signed between

**64** OBSERVATORIO REGIONAL AMAZÓNICO – ACTO. *Fronteira – Brasil Colômbia Peru*. Publication, 2022. Available at: <https://oraotca.org/pt/saude-nas-fronteiras/brasil-colombia-peru/>. Accessed on: June 7, 2025.

**65** BÜHRING, Marcia Andrea. (RE) Definição de Fronteira(s) e Cidades Gêmeas: Brasil e Uruguai. *Revista Brasileira de Direito Internacional*, Florianópolis, Brazil, v. 1, n° 1, pp. 213-229, 2015. DOI: 10.26668/IndexLawJournals/2526-0219/2015.v1i1.854. Available at: <https://www.indexlaw.org/index.php/direitointernacional/article/view/854>. Accessed on: June 8, 2025.

**66** BERARDO, Telma. Soberania, um Novo Conceito? *Revista de Direito Constitucional e Internacional*, São Paulo, n° 40, July/September 2002, p. 40.

**67** ANDRADE, Laura de Nazaré Rocha; GRANZIERA, Maria Luíza Machado. Abordagens paradiplomáticas na tríplice fronteira amazônica: Brasil, Colômbia e Peru. *Revista Tempo do Mundo*, Brasília: IPEA, v. 27, pp. 199-227, Dec. 2022. Available at: [https://repositorio.ipea.gov.br/bitstream/11058/13340/1/Tempo\\_Mundo\\_27\\_Artigo11\\_abordagens\\_paradiplomaticas.pdf](https://repositorio.ipea.gov.br/bitstream/11058/13340/1/Tempo_Mundo_27_Artigo11_abordagens_paradiplomaticas.pdf). Accessed on: June 8, 2025.

**68** SANTOS, W. M. dos. Soberania: um conceito em busca de definição. *Conjuntura Austral*, Porto Alegre, v. 7, n° 33-34, pp. 16-32, July/Dec. 2016. DOI: <https://doi.org/10.22456/2178-8839.59466>. Available at: <https://seer.ufrgs.br/index.php/ConjunturaAustral/article/view/59466>. Accessed on: June 7, 2025.

Colombia and Ecuador (1916), Colombia and Brazil (1907 and 1928), and Colombia and Peru (1922), the so-called ‘Amazon Trapezium’ was established, an expression that refers to the current geopolitical configuration of the Tri-border Area.”<sup>69</sup>

As Luiz Felipe Barbosa Lacerda observes<sup>70</sup>, on the Peruvian side, Loreto, the country’s largest department, covering 28% of its territory, represents Peru in the Tri-border Area, with a population of roughly 900,000. Colombia’s share of the Tri-border is through the Department of Amazonas, which includes the municipalities of Leticia (the capital) and Puerto Nariño, as well as eight corregimientos (El Encanto, La Chorrera, La Pedrera, Mirití-Paraná, Araracuara, San Rafael, Puerto Santander, and Tarapacá), together totaling 74,541 inhabitants. Brazil, in turn, is represented by the municipality of Tabatinga (Amazonas), with about 71,317 inhabitants.

For the author, the region “is an extremely diverse and complexly multifaceted territory, with social, environmental, educational, economic, cultural, and religious dimensions, all shaped by forms of coexistence and everyday life marked by cultural diversity.”<sup>71</sup>

The region has increasingly become a hub for illicit activities with severe environmental consequences, including deforestation, illegal mining, timber and wildlife trafficking, and drug smuggling. These activities are fueled by criminal networks that operate across national borders and thrive in the absence of effective oversight. State presence is sporadic, fragmented, and often ineffective in containing such degradation. Rivers like the Javari and the Solimões have turned into fluid corridors through which not only illegal goods move, but also ecological harm that ignores territorial boundaries. A recent study by the Igarapé Institute highlights that “since 2019 Indigenous communities are not caught in the crosshairs of criminal violence, but increasingly depend on criminal enterprises for their livelihood. Processing coca, harvesting illegal timber, and serving as labor on gold-dredging rafts are some of the few employment opportunities in these remote regions. Some participants are youths with little say in the matter.”<sup>72</sup>

The Federal Public Prosecutor’s Office (MPF) carries out environmental protection on firm constitutional grounds. Article 129, item III, of the Federal Con-

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**69** BARBOZA LACERDA, L. F. Desafios socioambientais da tríplice fronteira amazônica Brasil, Colômbia e Peru: Social and environmental challenges of the triple border, Brazil, Colombia and Peru Amazon. *Revista Desenvolvimento Social*, [s.l.], v. 28, n° 2, pp. 226-240, 2023. DOI: 10.46551/issn2179-6807v28n2p226-240. Available at: <https://www.periodicos.unimontes.br/index.php/rds/article/view/5044>. Accessed on: June 9, 2025.

**70** BARBOZA LACERDA, L. F. Desafios socioambientais da tríplice fronteira amazônica Brasil, Colômbia e Peru: Social and environmental challenges of the triple border, Brazil, Colombia and Peru Amazon. *Revista Desenvolvimento Social*, [s.l.], v. 28, n° 2, pp. 226-240, 2023. DOI: 10.46551/issn2179-6807v28n2p226-240. Available at: <https://www.periodicos.unimontes.br/index.php/rds/article/view/5044>. Accessed on: June 9, 2025.

**71** LACERDA, L. F. B. *Diagnóstico socioambiental da Tríplice Fronteira Amazônica Brasil-Colômbia-Peru*. São Leopoldo: Casa Leiria, 2019.

**72** IGARAPÉ INSTITUTE. *Stolen Amazon: The Roots of Environmental Crime in the Tri-Border Regions*. Rio de Janeiro: Instituto Igarapé, Aug. 2023. p. 10. Available at: <https://igarape.org.br/wp-content/uploads/2023/08/Stolen-Amazon-the-roots-of-environmental-crime-in-the-tri-border-regions.pdf>. Accessed on: June 7, 2025.



stitution entrusts the MPF with the power to initiate civil inquiries and public civil actions to safeguard the environment, among other rights and interests. This mandate is reinforced by the Public Civil Action Law (Law N° 7,347/1985) and Complementary Law N° 75/1993 (Organic Law of the Federal Prosecution Service), which expand and detail its functions, granting legitimacy to act in defense of ecological public assets. The environment, enshrined in Article 225 of the Constitution as a common good of the people, demands protection that transcends state or economic interests. It is a constitutional obligation imposed on all, with a special duty assigned to the Public Prosecutor's Office.

Yet the MPF encounters clear limitations when addressing environmental crimes and damages that cross borders. Its jurisdiction, defined by the principle of sovereignty, ends at the national frontier. As a result, deforestation and other crimes originating in Colombia or Peru, whose impacts reach Brazilian territory, often escape its direct authority. This creates an invisible barrier that hampers effective institutional responses, even when ecological and social consequences are evident and ongoing.

This jurisdictional barrier becomes even more pressing given the uneven presence of the state in the region. On one side, institutions such as the Federal Public Prosecutor's Office (MPF), IBAMA<sup>73</sup>, and FUNAI<sup>74</sup> strive to monitor and contain environmental damage. On the other, there is a lack of effective coordination among Amazonian countries to confront environmental crimes that operate through

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**73** The Brazilian Institute of the Environment and Renewable Natural Resources (Ibama) is a federal autarchy with legal personality under public law, and administrative and financial autonomy, linked to the Ministry of the Environment (MMA), pursuant to Article 2 of Law N° 7,735 of February 22, 1989. According to Article 5 of Law N° 11,516 of August 28, 2007, Ibama's main responsibilities include exercising environmental police power; implementing actions of national environmental policies, within the scope of federal authority, related to environmental licensing, environmental quality control, authorization for the use of natural resources, and environmental inspection, monitoring, and control, in accordance with the guidelines issued by the Ministry of the Environment; and carrying out supplementary actions within the competence of the Union, in compliance with the applicable environmental legislation.

**74** The National Foundation for Indigenous Peoples (Funai) is the official Indigenous affairs agency of the Brazilian State. Created by Law N° 5,371 of December 5, 1967, and linked to the Ministry of Indigenous Peoples, it serves as the coordinator and main executor of the Federal Government's Indigenous policy. Its institutional mission is to protect and promote the rights of Indigenous peoples in Brazil. Funai is responsible for conducting studies on the identification, delimitation, demarcation, land regularization, and registration of lands traditionally occupied by Indigenous peoples, as well as for monitoring and overseeing Indigenous lands. It also coordinates and implements policies for the protection of isolated and recently contacted Indigenous peoples. Another of its roles is to promote sustainable development policies for Indigenous populations. In this regard, Funai carries out actions related to ethnodevelopment, conservation, and environmental restoration in Indigenous lands, and works to control and mitigate potential environmental impacts caused by external interference in those territories. The agency is also tasked with fostering interinstitutional coordination to ensure differentiated access to social rights and citizenship for Indigenous peoples. This includes monitoring policies on social security and Indigenous education, and supporting traditional community-based educational processes, participation, and social oversight. Funai's work is guided by several principles, foremost among them the recognition of the social organization, customs, languages, beliefs, and traditions of Indigenous peoples, with the goal of ensuring their full autonomy and self-determination. In doing so, it contributes to the consolidation of a democratic and pluriethnic State in Brazil.

networks and move fluidly across borders. In Tabatinga, this fragility is particularly acute: the presence of these institutions is limited, weakening the state's response on the ground. As Barboza Lacerda observes, "despite the significant number of institutions and agreements mentioned, the situation in the Tri-border Area is troubling when it comes to socio-environmental research, oversight, and protection bodies that effectively engage in integrated actions. As the findings of this research indicate, there is little coordination between local and national institutions in addressing the socio-environmental challenges of the territory."<sup>75</sup>

The geography of impunity is amplified by institutional disparities among the countries of the region, where the absence of a strong state presence along border zones creates true power vacuums<sup>76</sup> – territories where the law does not reach, or, if it does, arrives too late.

In the Tri-border Area, the mismatch between legal frameworks and ecological realities is stark. Forests, rivers, and shared ecosystems do not recognize national sovereignty. This is not just a metaphor: migratory species, hydrological cycles, and food chains are continuous by nature. When a spring is contaminated in Peru, Brazilian rivers bear the consequences. When a trafficking route takes hold in Colombia, violence spills into Tabatinga. Deforestation in one area inevitably reverberates in another. Nature ignores borders, institutions do not.<sup>77</sup> As Olga Kelman Brocki Calhman and Monica de Aquino Galeano Massera da Hora observe, "relations between States that share transboundary water resources reveal a situation of interdependence, since the actions of one country may directly impact another."<sup>78</sup>

As Andrade and Granziera observe, "under a principle of international law, States hold the sovereign right to exploit their own resources in accordance with their environmental and development policies, but also bear the responsibility to ensure that activities within their jurisdiction or control do not cause harm to the environment of other States or to areas beyond national jurisdiction."<sup>79</sup>

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**75** BARBOZA LACERDA, L. F. Social and environmental challenges of the triple border, Brazil, Colombia and Peru Amazon. *Revista Desenvolvimento Social*, [s.l.], v. 28, n° 2, pp. 226-240, 2023. DOI: 10.46551/issn2179-6807v28n2p226-240. Available at: <https://www.periodicos.unimontes.br/index.php/rds/article/view/5044>. Accessed on: June 9, 2025.

**76** IGARAPÉ INSTITUTE. *Governar para não entregar: uma Agenda de Segurança Multidimensional para a Amazônia Brasileira*. Rio de Janeiro: Instituto Igarapé, Sept. 2022. Available at: <https://igarape.org.br/wp-content/uploads/2022/09/Agenda-de-Seguranca-Multidimensional-para-a-Amazonia.pdf>. Accessed on: June 7, 2025.

**77** FAPESP – Agência FAPESP. Desmatamento da Amazônia aumenta poluição em países da América do Sul. São Paulo, July 29, 2014. Available at: <https://agencia.fapesp.br/desmatamento-da-amazonia-aumenta-poluicao-em-paises-da-america-do-sul/19501>. Accessed on: June 19, 2025.

**78** CALHMAN, O. K. B.; DA HORA, M. A. G. M. The Amazon Basin in the Context of Shared Management of Transboundary Water Resources. *Journal of Water Resource and Protection*, v. 9, pp. 629-636, 2017. DOI: 10.4236/jwarp.2017.96042. Available at: <https://doi.org/10.4236/jwarp.2017.96042>. Accessed on: June 1, 2025.

**79** ANDRADE, Laura de Nazaré Rocha; GRANZIERA, Maria Luíza Machado. Abordagens paradiplomáticas na tríplice fronteira amazônica: Brasil, Colômbia e Peru. *Revista Tempo do Mundo*, Brasília: IPEA, v. 27, pp. 199-227, Dec. 2022. Available at: <https://repositorio.ipea.gov.br/bit>

## Transnational environmental law

The traditional concept of sovereignty<sup>80</sup>, while central to international law, has been criticized for its rigidity when confronted with transnational challenges. The notion of sovereignty as the absolute exclusivity of domestic authority must be revisited in light of contemporary realities. As Patrícia Pasqualini Philippi and Leonardo Zicarelli observe, “The word *transnational* – derived from the Latin prefix *trans*, meaning beyond, across, behind, in exchange for, or in reverse – conveys the idea of a space that crosses the national sphere, that permeates and transcends the State, moving beyond the sovereign conception of the State and, in turn, dissolving the public–private dichotomy. Transnationality thus emerges through the deterritorialization of political and social relations, driven by an overvalued capitalist economic system that shapes a planetary legal order at the margins of State sovereignty.”<sup>81</sup>

With the evolution of law and the dynamics of globalization, the concept of sovereignty has been reinterpreted in light of the increasing complexity of international organizations, while still upholding the principle of equality among peoples. Like many legal institutions, sovereignty is undergoing a continuous process of transformation. What are the limits of a State’s authority when its decisions affect interests that extend beyond its borders? To what extent can a country degrade its own natural and cultural heritage, or endanger the survival and well-being of the planet’s species, while invoking sovereignty and the territorial boundaries that define it? This is where MPF’s dilemma becomes evident: its mandate and powers are extensive within Brazilian territory, yet they dissolve the moment one crosses the lines of the political map.

Even so, Brazil has sought to create legal instruments for international environmental action. The Amazon Cooperation Treaty, incorporated into domestic law by Decree Nº 85,050/1980, establishes cooperation among Amazonian countries for the rational use of natural resources and the fight against environmental crimes.<sup>82</sup> More recently, the Leticia Pact for the Amazon, signed in 2019 by the presidents of Brazil, Colombia, Peru, Bolivia, Ecuador, Guyana, and Suriname in

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stream/11058/13340/1/Tempo\_Mundo\_27\_Artigo11\_abordagens\_paradiplomáticas.pdf. Accessed on: June 8, 2025.

**80** In discussing the fundamental characteristics of sovereignty, Darcy Azambuja identifies two main dimensions in which it manifests: the internal and the external. On the internal level, sovereignty represents the State’s supreme authority over its territory and population, expressed through the laws and decisions it imposes without interference from other powers. On the external level, sovereignty reflects the equality of States in the international arena, where none is subordinate to another, thereby preserving their autonomy in foreign relations. AZAMBUJA, Darcy. *Teoria Geral do Estado*. 41st ed. São Paulo: Editora Globo, 2001.

**81** PHILIPPI, Paulo P.; ZICARELLI, Leticia. O direito transnacional ambiental e a proteção do direito ao desenvolvimento humano. *Revista Eletrônica Direito e Política*, Itajaí, v. 8, nº 3, pp. 1603-1621, 2014. Available at: <https://periodicos.univali.br/index.php/rdp/article/view/5420>. Accessed on: June 19, 2025. DOI: <https://doi.org/10.14210/rdp.v8n3.p1603-1621>.

**82** BRAZIL. Decree Nº 85,050, of August 18, 1980. Enacts the Amazon Cooperation Treaty, concluded among the governments of Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela. Official Gazette of the Union, Aug. 19, 1980.

response to the forest fires that mobilized international public opinion, set out important guidelines for shared environmental governance.<sup>83</sup> In practice, however, implementation has been extremely limited. The joint monitoring platform envisioned by the pact is still not fully operational, and the commitments undertaken have not been organically incorporated into national legislation. To date, the pact remains essentially a statement of intent, without binding legal force.<sup>84</sup>

On the domestic front, beyond the idea of environmental law as a form of transnational law, the MPF relies on constitutional and infra-constitutional provisions to support its environmental work. These frameworks, however, are designed with a strictly national focus.<sup>85</sup> The MPF currently lacks mechanisms to engage directly in civil inquiries in neighboring countries, even when evidence and damages are clearly connected to events across the border.

This legal constraint is compounded by structural shortcomings in interinstitutional coordination. There are, for example, no established protocols for joint action among Public Prosecutors' Offices in border countries. Initiatives such as the Latin American Network of Environmental Prosecutors have not achieved robust institutionalization. In practice, responses remain fragmented, dependent on the initiative of individual prosecutors, and unsupported by permanent technical or legal structures. This gap also prevents the swift exchange of sensitive information, such as satellite imagery, expert reports, arrest warrants, or criminal records, that is essential to ensuring accountability for offenders.

On the ground, the picture is one of institutional frustration: MPF's role is widely recognized as essential, yet it consistently runs up against structural obstacles. Even when it coordinates with the armed forces, federal police, and environmental agencies, as in joint operations such as *Operação Verde Brasil*<sup>86</sup> and *Guardiões do Bioma*<sup>87</sup>, the absence of reciprocal action from Colombia and Peru weakens results. Organized crime is fully aware of this gap and exploits it with strategic precision.

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**83** PACTO DE LETÍCIA. Países amazônicos apoiam o fortalecimento da OTCA. Organização do Tratado de Cooperação Amazônica – OTCA, early July 2021. Available at: <https://otca.org/pt/pacto-de-leticia-paises-amazonicos-apoiam-o-fortalecimento-da-otca/>. Accessed on: June 7, 2025.

**84** PRIST, Paula Ribeiro et al. Collaboration across boundaries in the Amazon. *Science*, Washington, DC, v. 366, n° 6466, pp. 699-700, Nov. 8, 2019. DOI: 10.1126/science.aaz7489. Available at: <https://www.science.org/doi/10.1126/science.aaz7489>. Accessed on: June 7, 2025.

**85** In the case of the Amazon, this conception remains embryonic. Institutions still operate under the classical paradigm of state sovereignty, which confines their actions to the physical boundaries of the country. Yet the climate crisis, biodiversity loss, and the depletion of natural resources demand a rethinking of this model. The Amazon rainforest performs vital global environmental functions, such as regulating rainfall patterns and sequestering carbon, that require shared, transparent, and active governance. The paradox is that such governance remains stalled by the fragmentation of national jurisdictions.

**86** BRASIL. Ministério da Defesa. *Operação Verde Brasil 2 encerra com queda no desmatamento*. Brasília, Nov. 30, 2020. Available at: <https://www.gov.br/defesa/pt-br/centrais-de-contenudo/noticias/operacao-verde-brasil-2-encerra-com-queda-no-desmatamento>. Accessed on: June 19, 2025.

**87** BRASIL. Ministério da Justiça e Segurança Pública. *Operação Guardiões dos Biomas*. Available at: <https://www.gov.br/mj/pt-br/assuntos/sua-seguranca/seguranca-publica/operacoes-integradas/guardioes-do-bioma/operacao-guardioes-do-bioma>. Accessed on: June 19, 2025.

What emerges, then, is a normative and institutional vacuum between the rhetoric of cooperation and the reality of accountability. The challenge confronting the MPF is not only legal but also political: how to translate its national legitimacy into real transnational capacity? How to reconcile the logic of sovereignty with the urgency of shared environmental protection? And, above all, how to build legal, institutional, and operational bridges that allow the MPF to act in a coordinated way, respecting the limits of international law without becoming hostage to diplomatic inertia?

Jurisdictional fragmentation, i.e. the rigid division of each country's spheres of authority, disregards the continuity of the Amazon ecosystem and the vulnerability of the populations that depend on it. Despite international treaties and multilateral declarations that acknowledge the importance of environmental cooperation, there are still no genuinely effective binational mechanisms to protect traditional communities. What remains absent is institutionalization: oversight bodies act in isolation, without regular information-sharing, emergency protocols, or coordinated joint operations.

### **The MPF in the Tri-border Area: practical and legal limits of transnational environmental protection**

The Federal Public Prosecutor's Office (MPF) in the Brazilian Amazon, particularly in the Tri-border Area shared with Colombia and Peru, faces major challenges in addressing environmental crimes that originate or spill over from foreign territories.

The Amazon, as a transnational biome, is a living web of ecological, social, and cultural relations that transcend the lines dividing countries on a map. In the Tri-border Area, traditional communities depend on this interconnected environment for their survival. Indigenous peoples, riverine populations, and extractivists share not only the forest and rivers but also the impacts of environmental degradation, which often begins beyond national borders. This deep symbiosis with nature makes the lack of institutional responses even more critical, leaving communities exposed to environmental damage that crosses political boundaries while ignoring human ones.

One of the main institutional barriers lies in the principle of State sovereignty, which prevents the MPF from carrying out any direct investigation in foreign territory. As a result, even when deforestation occurs on the Colombian side, with direct or indirect repercussions for Brazil, such as the discharge of toxic waste affecting Brazilian communities along the Javari River, the MPF cannot undertake investigative or enforcement measures beyond the border. While legally justifiable, this limitation is ineffective in practice, given the fluid nature of environmental crimes that pay no heed to national boundaries.

It is important to recall that, although environmental law is often conceived as a field of global scope, comprising norms that regulate mutual relations among States, there is still no unified global legislation, nor consolidated supranational standards in South America. This normative gap hampers the construction of effective environmental protection capable of transcending national borders. The absence of peremptory norms with worldwide reach, imposing binding environ-

mental obligations and sanctions for noncompliance, helps perpetuate the traditional model of sovereignty, in which State action remains confined to the territory under its jurisdiction.<sup>88</sup>

The problem becomes more acute when illegal activities originate in neighboring countries but produce harmful effects inside Brazil. In such cases, the MPF confronts an accountability gap: how can it bring legal action against an actor whose conduct occurred beyond national jurisdiction, even when the damage is transboundary? The formal path is international legal cooperation, through instruments such as Mutual Legal Assistance Treaties (MLATs) and letters rogatory. In practice, however, these mechanisms are slow, bureaucratic, and rarely effective in situations that demand urgent responses, such as ongoing environmental destruction. The time lag between the crime and the institutional response enables perpetrators to escape liability, turning the border into a shield for impunity.

Another recurring challenge for the MPF is the difficulty of holding foreign nationals accountable for environmental crimes that impact Brazilian territory. Although Article 7 of the Brazilian Penal Code provides for the possibility of extra-territorial application of criminal law in certain circumstances, its use is exceptional and subject to strict conditions, such as requiring the offender's presence in Brazil. As a result, most transboundary environmental crimes go unpunished.

There are also significant obstacles to the exchange of data, evidence, and intelligence with foreign authorities. While formal cooperation mechanisms exist, such as the Amazon Cooperation Treaty Organization (ACTO), their effectiveness remains limited and largely dependent on the political will of signatory countries. In practice, there are no joint teams, no standardized investigative protocols, and no integrated databases capable of tracking cross-border criminal patterns.

At the Office of the Federal Prosecutor in Tabatinga<sup>89</sup>, for instance, it is common for environmental enforcement operations to be thwarted by reports that suspects had crossed into Colombian or Peruvian territory shortly before Brazilian authorities arrived. The absence of immediate communication channels with neighboring countries prevents effective pursuit. Even urgent alerts or requests are slowed by linguistic, administrative, and diplomatic hurdles.

In this context, the MPF has turned to alternative strategies, such as partnering with civil society organizations, employing remote sensing technologies to produce independent evidence, and appealing to international bodies. These initiatives, however innovative, remain exceptional and lack proper institutionalization.

Ultimately, the MPF's experience in the Tri-border Area exposes the limits of a legal framework designed for national contexts when faced with the realities of a transnational environmental dynamic. The absence of swift and effective cooperation mechanisms, coupled with jurisdictional fragmentation and the sluggish pace

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**88** PHILIPPI, Paulo P.; ZICARELLI, Leticia. O direito transnacional ambiental e a proteção do direito ao desenvolvimento humano. *Revista Eletrônica Direito e Política*, Itajaí, v. 8, n° 3, pp. 1603-1621, 2014. Available at: <https://periodicos.univali.br/index.php/rdp/article/view/5420>. Accessed on: June 19, 2025. DOI: <https://doi.org/10.14210/rdp.v8n3.p1603-1621>.

**89** The Office of the Federal Prosecutor in Tabatinga operates before the Federal Court of the municipality, whose jurisdiction covers the following cities: Amaturá, Atalaia do Norte, Benjamim Constant, Jutai, Santo Antônio do Içá, São Paulo de Olivença, Tabatinga, and Tonantins.

of diplomatic instruments, heightens institutional vulnerability. Beyond normative guarantees, there is an urgent need to rethink the operational foundations of environmental protection in border regions – otherwise, the MPF risks becoming a bystander to the very degradation it is formally mandated to prevent.

### **Institutional pathways to confront transboundary environmental degradation in the Amazon: proposals for coordinated and effective action in the Tri-border Area**

Recognizing that the environmental challenges of the Tri-border Area demand responses beyond national boundaries underscores the need to develop new tools of action for the Federal Public Prosecutor's Office (MPF) and other institutions charged with defending the Amazon. A purely national approach has proven inadequate in the face of phenomena such as illegal mining, cross-border deforestation, and the trafficking of natural resources, activities that operate in networks and thrive on the institutional and legal gaps between countries.

In this context, one of the most pressing proposals is the creation of bilateral or trilateral agreements that allow for immediate responses to ongoing environmental harm. These agreements could establish streamlined operational mechanisms, including joint protocols between environmental enforcement and prosecutorial agencies of the participating countries. Similar arrangements already exist in other regions, such as within the European Union, and could serve as a model for the Amazon. Their implementation, however, depends on strong political will and the consolidation of active environmental diplomacy, neither of which has yet emerged as a regional priority.

Another promising avenue is the negotiation of technical cooperation agreements to facilitate the exchange of data and evidence among neighboring countries' institutions. At present, gathering evidence abroad still relies on traditional instruments such as letters rogatory or Mutual Legal Assistance Treaties (MLATs), which are slow and ill-suited to the urgency of ongoing environmental damage. Shared databases or binational alert systems could enable faster tracking of criminal activities, such as the movement of illegal vessels or real-time deforestation. Nonetheless, institutional resistance to exchanging sensitive information across borders remains a significant obstacle, often justified on the grounds of sovereignty and national security.

The creation of joint environmental bases in border regions also stands out as a promising alternative. Such structures could integrate the MPF, the Federal Police, Ibama, Funai, and their foreign counterparts to enable coordinated action in critical areas. While similar initiatives already exist at border posts and through specific operations (such as Operação Ágata<sup>90</sup>), transforming them into permanent

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**90** BRASIL. Ministério da Defesa. *Resumo e resultados da Operação Ágata*. Brasília: Ministério da Defesa, 2024. Available at: [https://www.gov.br/defesa/pt-br/assuntos/exercicios-e-operacoes/operacoes-conjuntas/operacao-agata-1/arquivos/resumo\\_e\\_resultados\\_operacao\\_agata\\_base\\_para\\_arquivo\\_do\\_site\\_md\\_atzd\\_01\\_02\\_24.pdf](https://www.gov.br/defesa/pt-br/assuntos/exercicios-e-operacoes/operacoes-conjuntas/operacao-agata-1/arquivos/resumo_e_resultados_operacao_agata_base_para_arquivo_do_site_md_atzd_01_02_24.pdf). Accessed on: June 19, 2025.



institutions, with defined budgets and mandates, would require sustained institutional commitment and the overcoming of bureaucratic and political resistance among the countries involved.

Equally important is advancing the international legal accountability of actors responsible for environmental degradation beyond national borders. This entails not only diplomatic efforts to denounce violations in multilateral forums but also the pursuit of creative legal strategies, such as actions based on international human rights and environmental treaties. These approaches, however, face significant obstacles in the fragmentation of global environmental governance and the difficulty of imposing effective sanctions within the framework of national sovereignty.

Implementing these proposals, however, runs up against concrete political and institutional barriers. South American regional diplomacy still lacks cohesion, and national interests too often outweigh the logic of cooperation. Limited resources, high turnover among public officials, and the absence of clear environmental priorities in the agendas of neighboring governments further hinder the establishment of lasting policies. Cultural and institutional resistance to international cooperation also remains strong in regions historically shaped by mistrust and weak integration.

With its constitutional mandate and institutional reach, the MPF is well placed to play a leading role in advancing this agenda. More than putting forward isolated measures, the institution must help stimulate public debate, build interinstitutional solutions, and press political authorities to treat environmental protection as a strategic commitment, not only for Brazil, but also for the region and the world.

### **Final considerations: when the forest calls for cooperation, not sovereignty**

The complexity of environmental challenges in the Tri-border Area between Brazil, Colombia, and Peru requires a critical rethinking of traditional institutional models rooted in rigid jurisdictions. The Amazon, as a transnational biome, does not recognize the artificial boundaries imposed by political borders. Its forests, rivers, species, and human communities form a systemic ecological and cultural whole that transcends fragmented state logics. The degradation of this system, whether driven by organized criminal networks, the neglect of state authorities, or the absence of effective transnational Governance, demands responses that are equally integrated and interdependent.

This article has shown that, although the Federal Public Prosecutor's Office (MPF) holds strong constitutional and legal instruments to protect the environment within Brazilian territory, it faces serious limitations when environmental harm originates in neighboring countries. The barrier of State sovereignty, coupled with the sluggishness of formal mechanisms of international cooperation, prevents the institution from responding swiftly and effectively to crimes that move fluidly across rivers, trails, and interconnected communities of the continental Amazon.

The point here is not to delegitimize the principle of sovereignty, a cornerstone of contemporary international law, but to underscore its inadequacy in



addressing the transboundary nature of the environmental challenges facing the region. Sovereignty, understood in its classical sense, proves insufficient when confronted with ecological crimes whose dynamics transcend national borders and whose consequences fall upon shared ecosystems and communities.

In this context, the MPF faces an impasse: on one side, it is constitutionally mandated to safeguard the environment as a common good of the people; on the other, it is legally restricted to operate within the territorial limits of the Brazilian State. The result is institutional frustration, where the legitimacy of its mandate is not matched by the practical means to enforce it.

This makes it imperative to establish new legal and political arrangements that enable the MPF and other enforcement agencies to act cooperatively, in an integrated and timely manner, alongside their counterparts in neighboring Amazonian countries. As discussed in the previous chapter, this could be achieved through bilateral and trilateral agreements, joint operational bases, shared data systems, and standardized protocols for environmental response. The goal is not to renounce sovereignty, but to reinterpret it in light of the need for shared environmental governance.

It is also essential to advance an effective environmental diplomacy that prioritizes technical, scientific, and institutional cooperation in border regions, recognizing that combating environmental degradation is not simply a matter of territorial protection, but of collective survival. The Amazon is a planetary forest; its destruction is a global crisis. Brazil's leadership on the environmental agenda must therefore be exercised not only through international rhetoric, but through the creation of concrete structures that ensure the enforcement of existing environmental norms.

Within this framework, the Federal Public Prosecutor's Office has a pivotal role. Its mandate must be broadened, strengthened, and equipped with new legal instruments that allow it to respond to the ecological and social realities at hand. Isolated and reactive interventions must give way to a strategic public policy, grounded in robust institutional frameworks, sustained coordination, and a long-term vision.

In the end, the question that guided this article remains open. The answer, still in the making, inevitably requires moving beyond State models grounded solely in the logic of territoriality and embracing a cooperative, systemic, and transnational paradigm of environmental protection. Only then will it be possible to halt the spiral of degradation that threatens not only the peoples of the Amazon, but also the planet's ecological and climatic balance.





# **Weaving futures: between technology, culture, and socio- environmental justice**

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## **CARNE LEGAL PROGRAM: DATA INTELLIGENCE AND STRATEGIC PARTNERSHIPS TO COMBAT DEFORESTATION IN THE AMAZON**

BY RAFAEL DA SILVA ROCHA<sup>91</sup>

**D**uring World War II, a group of British specialists, composed of mathematicians, linguists, and engineers, dedicated their efforts to Bletchley Park, a secret facility on the outskirts of London. Their primary mission was to break the codes generated by the Enigma machine, which Nazi forces used to transmit strategic communications. This discreet and painstaking work proved crucial in anticipating attacks, redirecting military operations, and ultimately shaping the outcome of the conflict in favor of the Allies.

The Bletchley Park experience revealed that in large-scale conflicts, the strategic collection and analysis of data can be as decisive as direct action on the battlefield. At the time, the ability to transform vast amounts of information into coordinated decisions was an innovation with profound and lasting impact.

In the contemporary context, defined by the climate crisis and the advance of illegal deforestation in the Amazon, Brazil faces a comparable challenge. The immense territorial scale of the region, coupled with the complexity of its production chains, particularly cattle ranching, creates significant obstacles for traditional enforcement. In this setting, the strategic use of data and the establishment of collaborative networks of institutional intelligence emerge as indispensable.

Acknowledging the limits of conventional oversight, the Federal Public Prosecutor's Office (MPF) has spearheaded the development of a new model of environmental governance. This model rests on institutional partnerships and the intensive use of data, enhancing the capacity for territorial monitoring and control. By integrating databases such as Animal Transport Permits (GTAs) and the Rural Environmental Registry (CAR), alongside satellite imagery and advanced analytical tools, this approach seeks to consolidate a more effective system of territorial governance, one oriented toward the prevention and suppression of illegal deforestation.

This article analyzes how the coordinated action of the MPF, built on inter-institutional partnerships and data sharing, constitutes a key strategy in confronting illegal deforestation. As at Bletchley Park, success depends not only on the availability of information but on the institutional capacity to interpret it and convert it into coordinated action.

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## Brazil and its climate commitments: the NDC and the challenge of emission reductions

Brazil has positioned itself as a leading voice in the global environmental debate, particularly with the upcoming COP30 (Conference of the Parties to the United Nations Framework Convention on Climate Change) in Belém, Pará. The event highlights the urgent need for concrete action to protect the Amazon biome, which plays a vital role in maintaining the planet's climate balance.

In November 2024, Brazil submitted a revised version of its Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC)<sup>92</sup>. The updated pledge sets ambitious targets: reducing net greenhouse gas emissions by 59% to 67% by 2035, relative to 2005 levels. These significant commitments outline a robust decarbonization pathway, consistent with climate goals already established for 2025, 2030, and 2050. The new NDC encompasses all greenhouse gases, across all sectors and economic categories, reflecting a comprehensive commitment to advancing the transition toward a low-carbon economy.

According to data from the Greenhouse Gas Emissions Estimates System of the Climate Observatory (SEEG), deforestation in the Amazon alone accounts for 36% of Brazil's gross emissions, or 50% of net emissions, once CO<sub>2</sub> removals are deducted. For this reason, the land-use change sector, particularly in the Amazon, must be the central focus of emission reductions. Other sectors, such as energy, industrial processes, and waste, also present significant potential for mitigation, but these transitions take longer to implement and are unlikely to be deployed at the necessary scale in the short term.<sup>93</sup>

To address emissions from land use and forests, Brazil has committed to sustained, coordinated efforts aimed at eliminating illegal deforestation and promoting the preservation of native vegetation. Achieving this requires not only strengthening command-and-control measures but also creating positive incentives that make the maintenance and restoration of native vegetation on private rural properties economically viable.

It is therefore crucial that the Brazilian government continue – and intensify – deforestation prevention and control measures, while at the same time advancing planning and preparatory actions for structural transformations in other sectors. This remains the most reliable pathway to meeting the ambitious targets set out in Brazil's NDC.

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**92** BRASIL. Ministério do Meio Ambiente e Mudança do Clima. A NDC do Brasil. Determinação nacional em contribuir e transformar. Available at: <https://www.gov.br/mma/pt-br/assuntos/noticias/brasil-entrega-a-onu-nova-ndc-alinhada-ao-acordo-de-paris/ndc-versao-em-portugues.pdf>. Accessed: 25 June 2025.

**93** OBSERVATÓRIO DO CLIMA. Nota Técnica: O Brasil conseguirá cumprir sua “nova velha” NDC em 2025? Available at: [https://storage.epbr.com.br/2023/11/Nota-Te%CC%81cnica\\_-O-Brasil-conseguira%CC%81-cumprir-sua-nova-velha-NDC-em-2025.pdf](https://storage.epbr.com.br/2023/11/Nota-Te%CC%81cnica_-O-Brasil-conseguira%CC%81-cumprir-sua-nova-velha-NDC-em-2025.pdf). Accessed: 25 June 2025.

## Cattle ranching and deforestation in the Amazon: an overview of the production chain

Agribusiness, while a strategic sector for Brazil's economy, is also the leading driver of deforestation and habitat conversion in the country. In the Amazon, studies show that 75% of deforested areas on undesignated public lands have been converted to pasture – and remained as such even after a decade.<sup>94</sup>

It is worth underscoring, however, that the majority of Brazilian agricultural production is not directly linked to environmental infractions. Data indicate that just 2% of properties in the Amazon and Cerrado are responsible for 62% of the potentially illegal deforestation recorded nationwide.<sup>95</sup>

Nevertheless, major slaughterhouses and retail chains continue to face constant pressure for selling beef linked to farms with serious socioenvironmental irregularities, including illegal deforestation, invasions of public lands, and human rights violations.

The cattle production chain is highly complex. Over the course of their life cycle, cattle often pass through multiple properties before reaching slaughter. Because of this dynamic, slaughterhouses do not always maintain a direct relationship with the original breeder, frequently purchasing animals through intermediaries along the chain.

For traceability purposes, information on the origin and destination of cattle is recorded in the *Guias de Trânsito Animal* (GTAs, or Animal Transport Permits), which must be issued for every movement of animals between farms or from farms to slaughterhouses.<sup>96</sup> On this basis, a batch-level traceability system has been established, making it possible to identify the properties through which herds have passed, as well as their respective owners.

## Environmental monitoring and traceability: the role of the MPF in the *Carne Legal* Program

In response to pressure from markets, public authorities, and civil society, companies have developed monitoring and traceability systems<sup>97</sup> for their suppli-

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<sup>94</sup> SALOMÃO, Caroline S. et al. Amazônia em chamas: desmatamento, fogo e pecuária em terras públicas. Nota técnica nº 8. Brasília: Instituto de Pesquisa Ambiental da Amazônia (IPAM), 2021. Available at: <https://ipam.org.br/wp-content/uploads/2022/05/Amazo%C3%82nia-em-Chamas-8-pecua%C3%81ria-pt.pdf>. Accessed: 25 June 2025. pp. 7-8.

<sup>95</sup> RAJÃO, Raoni et al. The rotten apples of Brazil's agribusiness. *Science Magazine*, s.l., v. 369, nº 6501, pp. 246-248, 2020. Available at: <https://www.science.org/doi/10.1126/science.aba6646>. Accessed: 25 June 2025. p. 246.

<sup>96</sup> Law Nº 12,097/2009, Article 6, which establishes the concept and application of traceability in the production chain of beef and buffalo meat.

<sup>97</sup> Traceability is the ability to identify the origin of the raw materials, ingredients, and inputs used in the manufacture of a product, as well as to track its movement through the stages of production, distribution, and sale. For traceability to exist, records must be kept throughout a product's chain of custody, and those records must be accessed and analyzed at specific points. DRIGO, Isabel Garcia et al. *Do compromisso à ação: a trilha da carne bovina responsável na Amazônia brasileira*. Available

ers by cross-referencing data from Animal Transport Permits (GTAs) with the Rural Environmental Registry (CAR) and other publicly available databases.

Against this backdrop, the Federal Public Prosecutor's Office (MPF) created the *Carne Legal* Program. Its strategy centers on agreements with slaughterhouses in the Amazon region, under which they commit not to process cattle originating from farms linked to slave labor, illegal deforestation, or overlaps with Indigenous lands and protected areas.

From an oversight perspective, monitoring cattle movements from roughly one hundred companies, focusing only on the slaughterhouses with the greatest processing capacity, is a far more effective strategy to reduce deforestation than attempting to track hundreds of thousands of individual rural properties.<sup>98</sup>

To meet the criteria established in the agreements, slaughterhouses began implementing monitoring systems based on their own parameters, developed in collaboration with consultancies and non-governmental organizations. To standardize these practices, the Federal Public Prosecutor's Office (MPF), with technical guidance from the Institute for Forest and Agricultural Management and Certification (Imaflora) and participation from industry actors, introduced the Cattle Supplier Monitoring Protocol for the Amazon<sup>99</sup>.

This protocol sets out thirteen criteria, grouped into four categories:

- Geospatial analyses: illegal deforestation, Indigenous lands, protected areas, environmental embargoes for deforestation (vector), alterations to CAR boundaries, quilombola territories, and auxiliary properties;
- Official public lists: environmental embargoes and slave labor;
- Document checks: Rural Environmental Registry (CAR), environmental licenses, and Animal Transport Permits (GTAs);
- Productivity analyses: calculation of the maximum productivity index of supplier farms, designed to prevent “cattle laundering.”

As part of a comprehensive MRV (monitoring, reporting, and verification) system, the monitoring protocol must be implemented together with the audit

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at: <https://www.boinalinha.org/wp-content/uploads/2022/08/LIVRO-BOI-NA-LINHA-Do-com-promisso-a-acao-14x21cm-V12-WEB.pdf>. Accessed: 25 June 2025. p. 40.

**98** Researchers from Imazon and ICV identified 110 companies as responsible for 93% of cattle slaughter in the Legal Amazon, with slaughterhouses that had signed Conduct Adjustment Agreements (CAAs) controlling 70% of slaughter capacity. By contrast, at the time of the survey, 390,000 farms accounted for 93% of the region's cattle herd. BARRETO, Paulo et al. *Os Frigoríficos vão ajudar a zerar o desmatamento na Amazônia?* Belém/PA: Imazon; Cuiabá: Instituto Centro da Vida, 2017. Available at: <https://imazon.org.br/PDFimazon/Portugues/livros/Frigorificos%20e%20o%20desmatamento%20da%20Amaz%C3%B4nia.pdf>. Accessed: 25 June 2025. pp. 13-14.

**99** Available at: [https://www.boinalinha.org/wp-content/uploads/2024/08/Protocolo-Monitoramento-Gado-2ponto0-w5\\_FINAL.pdf](https://www.boinalinha.org/wp-content/uploads/2024/08/Protocolo-Monitoramento-Gado-2ponto0-w5_FINAL.pdf). Accessed: 25 June 2025.

protocol<sup>100</sup>, which defines guidelines and procedures for assessing compliance in cattle purchases. At the end of each cycle, the Federal Public Prosecutor's Office (MPF) consolidates the audit reports for the period, including those of companies that have not formally committed to supplier monitoring. This systematization enables a broad assessment of compliance across the production chain, regardless of preexisting obligations.

The second unified audit cycle of the cattle sector in the Legal Amazon, released in May 2025, reviewed cattle purchase transactions from January to December 2022 in six states: Acre, Amazonas, Mato Grosso, Pará, Rondônia, and Tocantins.<sup>101</sup> Slaughterhouses that signed the Conduct Adjustment Agreement (CAA) under the *Carne Legal* Program and commissioned independent audits showed only 4% irregularities in their Amazon operations. In contrast, companies that did not commission audits, whose data were analyzed through automated checks, recorded a noncompliance rate of 52%. The disparity is stark: irregularities among non-audited companies were 13 times higher than among those audited. In Pará, where six audit cycles have already been completed, the gap is similar: 8.24% irregularities for audited companies versus 58.3% for non-audited ones, underscoring the effectiveness of transparency and continuous monitoring.

Indirect suppliers remain the weakest link in the chain. In Pará, only 38% of first-tier indirect suppliers to signatory slaughterhouses were compliant, leaving 6.1 million head of cattle tied to potential irregularities: deforestation (38%), lack of CAR correspondence (35%), presence in embargoed areas (23%) or protected areas (3%), and, in rare cases, conditions analogous to slave labor (less than 1%).

Restricted access to complete GTA and CAR data enables schemes such as “triangulation” or “cattle laundering.” A blocked farm can transfer animals to another property that meets CAA requirements; those same animals are then sold to slaughterhouses, which lack visibility over earlier stages of the chain.

In this scenario, no slaughterhouse can fully ensure that its cattle did not pass through illegally deforested land or Indigenous territories before reaching the final farm of origin. Importantly, the problem is not limited to intermediaries. In many cases, ranchers issue Animal Transport Permits under the name of “clean” farms, often belonging to the same owner, relatives, or associates, thereby concealing the cattle's true origin and bypassing slaughterhouse control systems.

The Animal Transport Permit (GTA) is particularly vulnerable to fraud regarding the origin and destination of cattle, since it is a self-declared document. It is important to note that its issuance is mandatory for herd health control, not environmental oversight. Still, because GTAs must accompany every transfer of animals between rural properties or from farms to slaughterhouses, their data can be leveraged to map cattle movements and strengthen sector monitoring.

Experts identify two main pathways to improve beef traceability. One is to continue monitoring the supply chain by cross-referencing existing public data-

<sup>100</sup> Available at: [https://www.boinalinha.org/wp-content/uploads/2025/01/Protocolo\\_Auditoria\\_1.1\\_Julho24\\_W5112000\\_alt6\\_WEB.pdf](https://www.boinalinha.org/wp-content/uploads/2025/01/Protocolo_Auditoria_1.1_Julho24_W5112000_alt6_WEB.pdf). Accessed: 25 June 2025.

<sup>101</sup> Divulgação dos Resultados do 2º Ciclo Unificado de Auditorias na Cadeia Pecuária na Amazônia Legal. Available at: <https://www.mpf.mp.br/pa/sala-de-imprensa/documentos/2025/resultados-2o-ciclo-unificado-auditorias-tac-carne-legal-mpf/>. Accessed: 26 June 2025.



bases. For this approach to work, information would need to be consolidated into a transparent and effective platform capable of tracing animal origins from birth onward. The other is to implement individual animal tracking using technological devices such as chips, tags, or collars.

For now, the first pathway – cross-referencing existing public data – is the only viable option. No large-scale system for individual cattle traceability is expected to be feasible in Brazil in the near future.<sup>102</sup>

In this context, it is crucial to focus on strengthening batch-level traceability, particularly by improving systems that use Animal Transport Permits (GTAs) as their foundation. Although these documents are public in nature, their handling must respect safeguards for privacy and personal data protection, in line with the General Data Protection Law – LGPD (Law Nº 13,709/2018) and the Access to Information Law (Law Nº 12,527/2011). Reinforcing this data infrastructure and ensuring its transparency are essential steps to increase the effectiveness of monitoring within the beef supply chain.

### **Transparency and personal data protection: reconciling the use of GTAs with the LGPD**

Brazilian law places on the State a duty to guarantee access to environmental information, particularly when it is necessary for government enforcement or social oversight of illegally deforested areas. This principle was affirmed by the Superior Court of Justice in Incident of Assumption of Jurisdiction Nº 13/22, which established a presumption of environmental transparency. Under this framework, the Administration must justify any restriction, which remains subject to judicial review.<sup>103</sup>

At the same time, disclosure of information contained in Animal Transport Permits (GTAs) must observe the requirements of the General Data Protection Law (LGPD), safeguarding privacy and the informational self-determination of data subjects. Reconciling transparency with data protection demands a careful assessment of adequacy, necessity, and proportionality, always in light of the public purpose for which the data are processed.

In environmental enforcement, cross-referencing GTAs with other databases – such as embargo lists, the Rural Environmental Registry (CAR), land records, and remote sensing data – makes it possible to trace the movement of cattle originating from irregular areas. To balance this legitimate purpose with the protection of personal data, technical safeguards should be adopted to limit the public disclosure of sensitive information, such as producers' names and taxpayer identification numbers (CPF). In such cases, anonymization or pseudonymization may be applied, while ensuring that information essential to enforcement – such

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**102** In 2021, Bill Nº 345/2021 was introduced in the Chamber of Deputies to require the use of electronic identification for pasture-raised livestock. The proposal, however, was shelved after being deemed detrimental to Brazilian cattle ranching because it would increase production costs.

**103** Representative Case REsp 1,857,098, Reporting Justice Og Fernandes, First Panel, *Electronic Justice Gazette* (DJe), 24 May 2022.

as property names, sanitary establishment codes, and geographic coordinates – remains available.

Despite the public interest at stake, state animal health agencies have resisted sharing GTA data, citing the need to protect personal, commercial, and property-related information. This refusal, based on a restrictive reading of the Access to Information Law and the LGPD, disregards the fact that, when treated with appropriate safeguards, such data can and should be made available to oversight bodies and used in the public interest, without compromising the privacy of data subjects in the context of public disclosure.

In response to this resistance, the Federal Public Prosecutor's Office (MPF) has adopted a legally secure approach: issuing formal administrative requests to the competent authorities under its institutional prerogatives. This practice was endorsed by the First Conference on Climate Justice and Ecological Transformation, which recommended the sharing of GTA data without judicial authorization, provided that the legal requirements set out in Article 26 of the LGPD are observed.<sup>104</sup>

With this information in hand, the MPF coordinates technical networks for analysis and verification, securely sharing data with partner institutions – public and private – through technical cooperation agreements. These agreements include safeguards consistent with the General Data Protection Law (LGPD) and restrict use exclusively to defined public purposes. This approach is grounded in Article 26, §1, items I and IV of the LGPD<sup>105</sup>, which authorize data sharing with private entities engaged in decentralized public activities or through formal legal instruments.

By structuring a collaborative governance model, the MPF overcomes the barriers of institutional fragmentation, consolidating a strong technical and operational base supported by universities and civil society organizations. A partnership with the Federal University of Minas Gerais (UFMG), formalized through Technical Cooperation Agreement N° 27/2024, enables the use of advanced computational models for automated analysis of large volumes of georeferenced data – GTAs, CAR, embargoes, and the boundaries of protected areas and Indigenous lands – thereby enhancing oversight of slaughterhouses, particularly those that do not commission independent audits.

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**104** Guideline N° 3: "It is recommended that the Public Administration promote the shared use of data from Animal Transport Permits (GTAs), regardless of judicial authorization, provided that the requirements, safeguards, and procedures set out in Article 26 of Law N° 13,709/2018 (General Data Protection Law – LGPD) are observed." The full set of guidelines approved at the First Conference on Climate Justice and Ecological Transformation is available at: <https://acrobat.adobe.com/id/urn:aaid:sc:VA6C2:904b211b-6bd6-465a-8a42-f0ee21ea12bb>. Accessed: 27 June 2025.

**105** Article 26. The sharing of personal data by the Public Administration must serve specific purposes related to the implementation of public policies and the legal responsibilities of public agencies and entities, in compliance with the principles of personal data protection set out in Article 6 of this Law. §1. The Public Administration is prohibited from transferring personal data contained in databases to private entities, except: I– in cases of decentralized execution of public activities that require such transfer, exclusively for this specific and defined purpose, and subject to the provisions of Law N° 12,527 of 18 November 2011 (Access to Information Law); (...) IV– when authorized by law or when the transfer is supported by contracts, agreements, or similar legal instruments.

Organizations such as the Institute for Forest and Agricultural Management and Certification (Imaflora) and Friends of the Earth – Brazilian Amazon play a key role in structuring the audits required under the cattle sector’s Conduct Adjustment Agreements (CAAs). They help define audit schedules, train auditors, and maintain technical dialogue with slaughterhouses, while supporting the validation of data used in verification processes.

The Technical Chamber linked to the Cattle Sector CAA Support Committee also plays a strategic role. Tasked with consolidating the “audit kits,” this body contributes to the design and revision of protocols, incorporating field data and driving continuous improvements.

The entire institutional framework operates in strict compliance with the LGPD. Agreements mandate robust security measures, such as access controls and activity tracking. The MPF applies the principles of purpose limitation – since environmental enforcement is fully consistent with the original purpose of GTA data collection – and data minimization, restricting the use of information to what is strictly necessary.

Transparency is reinforced through the public disclosure of agreements, objectives, and adopted safeguards, including privacy notices published on the websites of participating institutions. All instruments contain confidentiality clauses and expressly prohibit the use of data for purposes other than those contractually defined.

This informational architecture balances, with technical and legal safeguards, both the protection of data subjects and the effectiveness of environmental enforcement. The Carne Legal Program shows that transparency and data protection are not opposing values, but complementary pillars of a public policy that is technically robust, evidence-based, lawful, and institutionally sound. In this paradigm, access to information – with appropriate filters for the general public and full access guaranteed to oversight bodies – moves beyond a mere tool of control to become a driver of transformation in defense of the environment and fundamental rights.

## **Next steps for strengthening traceability and environmental governance in the cattle supply chain**

Despite the institutional progress driven by the Federal Public Prosecutor’s Office (MPF), notably in building technical partnerships and deploying data strategically for environmental monitoring, serious structural and operational challenges continue to limit effective traceability in the beef supply chain.

A central obstacle is the lack of integration between the Rural Environmental Registry (CAR) and Animal Transport Permit (GTA) databases, managed by different state agencies with varying interoperability standards. The absence of linkage between these records prevents the creation of a continuous and verifiable traceability chain, hindering the detection of illegal practices such as cattle laundering in deforested areas.

Moreover, Brazil’s current system relies on batch-level traceability, which generates increasing uncertainty when assessing indirect suppliers. With each commercial transaction, animals from multiple origins are aggregated, frag-

menting movement histories and making individual traceability impossible. This weakens enforcement capacity and undermines the credibility of commitments by slaughterhouses and exporters to exclude suppliers with socioenvironmental liabilities from their supply chains.

To overcome these limitations, three priority actions are proposed. The first is the mandatory integration between the GTA and the CAR a measure already adopted in the state of Pará by Decree Nº 1,052/2014 and Joint Normative Ruling Nº 01/2016. This requirement should be extended nationwide so that each movement of cattle is linked to a property previously validated for environmental compliance, strengthening controls over land-tenure compliance and animal health.

The second action is to make GTA data publicly available, with personal data such as name and CPF (individual taxpayer number) anonymized for the general public, while full access is guaranteed to oversight authorities. This would enable social oversight of the origins of the beef being marketed without violating the personal data protection principles set out in the LGPD.

Finally, the third and most ambitious pillar is the creation of a national system for the individual traceability of cattle that consolidates, in a unified, up-to-date, and interoperable database, information on each animal's identification, its movements over its lifetime, the documents accompanying those movements, and the links to registered rural properties. This is a widely recognized need among government sectors, exporters, and civil society organizations, particularly in light of international pressure for deforestation-free supply chains. Building this infrastructure should be led by the Ministry of Agriculture and Livestock (MAPA), with the direct involvement of state animal-health agencies, environmental authorities, slaughterhouses/meatpacking plants, private tracking systems, and the MPF.

Implementing these improvements will therefore require a coordinated, cross-sector effort that engages multiple institutions and segments of society. Beyond building technically robust databases, it will be necessary to advance regulatory harmonization, finance technological solutions, build capacity among the actors involved, and establish shared governance mechanisms. Only with this systems approach will it be possible to ensure a reliable, efficient, and transparent traceability system, commensurate with the socioenvironmental challenges facing the Amazon and Brazil's agricultural and livestock production.

## Conclusion

The Federal Public Prosecutor's Office (MPF), through its leadership of the *Carne Legal* Program, demonstrates a viable path for tackling some of the country's most complex environmental challenges. Beyond its supervisory role, the MPF has proactively embraced its function as a catalyst for public policy, fostering cooperation networks and advancing standards of legality.

The success of this approach lies in the combination of institutional strengthening, the strategic use of data, and the capacity to engage with diverse actors across the State and civil society. The Climate Dialogues initiative, conducted in partnership with FUNBIO, exemplifies this collaborative model, serving as a plat-

form for building consensus, disseminating knowledge, and shaping shared strategies to combat illegal deforestation and climate change.

The central lesson emerging from this experience is clear: effective environmental governance in the Amazon increasingly depends on structures capable of linking data, institutions, and decision-making in real time. Achieving this requires investment in expanding livestock supply chain traceability, integrating public databases, and strengthening audit and verification mechanisms. These measures not only enhance oversight but also build greater confidence among markets and society in the legality of production.

The *Carne Legal* Program should be seen not as a final destination, but as an institutional model in continuous evolution. Its greatest legacy lies in demonstrating that effective legal solutions can be built even in fragmented regulatory environments – when guided by strategic vision, technical expertise, and a steadfast commitment to the public interest.

The MPF will remain dedicated to advancing this agenda, but lasting success requires the engagement of the entire justice system, the productive sector, oversight institutions, and political leadership. Only through coordinated action and a shared sense of purpose will it be possible to transform the Amazon into a territory of legality, responsibility, and opportunity – where development is achieved with justice, and the forest endures for generations to come.

## THE “CAA” ON CATTLE RANCHING AND CATTLE RAISING IN INDIGENOUS LANDS

BY RICARDO AUGUSTO NEGRINI<sup>106</sup>

### Conduct Adjustment Agreements (CAAs) in cattle ranching

**I**n 2009, the Federal Public Prosecutor’s Office in the State of Pará filed several civil lawsuits<sup>107</sup> against individuals and companies in the cattle ranching sector that raised or purchased cattle from farms where deforestation had been detected after the enactment of the Forest Code (July 2008). In a pioneering effort, the objective was to hold accountable not the direct perpetrators of deforestation, but rather those who indirectly benefited from it economically.

At the time, more than thirty lawsuits were filed against dozens of defendants, seeking roughly two billion reais in compensation for environmental damage.<sup>108</sup> In parallel, the Federal Public Prosecutor’s Office issued recommendations to dozens of companies, urging them to refrain from contributing to deforestation in Pará. The main targets were slaughterhouses, tanneries, and retailers.<sup>109</sup>

Almost immediately, retail chains Pão de Açúcar, Carrefour, and Walmart suspended their contracts with slaughterhouses in the region, while footwear companies Nike and Timberland announced they would stop purchasing leather from the Amazon without proof of lawful origin.<sup>110</sup>

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**107** The civil lawsuit (ACP, the acronym in Portuguese) is a type of legal action designed to protect diffuse, collective, or homogeneous individual rights — in other words, interests that affect a large number of people. This action is used to hold accountable those responsible for harm caused to the environment, health, education, consumers, public assets, or human dignity, among others. Entities authorized to file such lawsuits include the Public Prosecutor’s Office, the Public Defender’s Office, the Federal Government, States, the Federal District, Municipalities, autonomous agencies, state-owned enterprises, foundations, mixed-capital companies, and associations that meet certain legal requirements.

**108** IMAZON. Os desafios para uma pecuária mais sustentável na Amazônia. Available at: [https://imazon.fly.storage.tigris.dev/wp-backup/PDFimazon/Portugues/estado\\_da\\_amazonia/os-desafios-para-uma-pecuaria-mais-sustentavel-na.pdf](https://imazon.fly.storage.tigris.dev/wp-backup/PDFimazon/Portugues/estado_da_amazonia/os-desafios-para-uma-pecuaria-mais-sustentavel-na.pdf). See also: Federal Public Prosecutor’s Office presentation available at: [https://www2.mppa.mp.br/sistemas/gcsubsites/upload/41/Apresenta%C3%83%C2%A7ao%20MPF%20-%20Workshop%20-%2028\\_10\\_11\(4\).pdf](https://www2.mppa.mp.br/sistemas/gcsubsites/upload/41/Apresenta%C3%83%C2%A7ao%20MPF%20-%20Workshop%20-%2028_10_11(4).pdf).

**109** FEDERAL PUBLIC PROSECUTOR’S OFFICE, presentation available at: [https://www2.mppa.mp.br/sistemas/gcsubsites/upload/41/Apresenta%C3%83%C2%A7ao%20MPF%20-%20Workshop%20-%2028\\_10\\_11\(4\).pdf](https://www2.mppa.mp.br/sistemas/gcsubsites/upload/41/Apresenta%C3%83%C2%A7ao%20MPF%20-%20Workshop%20-%2028_10_11(4).pdf). See also ARIMA, Eugenio Y.; BARRETO, Paulo; ARAÚJO, Elis; SOARES-FILHO, Britaldo. Public policies can reduce tropical deforestation: Lessons and challenges from Brazil. *Land Use Policy*, v. 41, 2014, p. 467.

**110** FEDERAL PUBLIC PROSECUTOR’S OFFICE, presentation available at: [https://www2.mppa.mp.br/sistemas/gcsubsites/upload/41/Apresenta%C3%83%C2%A7ao%20MPF%20-%20Workshop%20-%2028\\_10\\_11\(4\).pdf](https://www2.mppa.mp.br/sistemas/gcsubsites/upload/41/Apresenta%C3%83%C2%A7ao%20MPF%20-%20Workshop%20-%2028_10_11(4).pdf).

On the financial front, BNDES introduced socio-environmental traceability requirements for supporting the cattle ranching sector, and the International Finance Corporation (IFC), the World Bank's private-sector arm, canceled a contract with the meatpacker Bertin (later absorbed by JBS), valued at around ninety million reais at the time.<sup>111</sup>

Initially, cattle ranchers and slaughterhouses strongly opposed the Federal Public Prosecutor's Office's stance, with outspoken criticism from agribusiness politicians such as Blairo Maggi and Kátia Abreu.<sup>112</sup> Before long, however, it became clear that the market's reaction was irreversible and that the reputational damage to Brazilian agribusiness could deepen if the conflict persisted.

A few months after the civil lawsuits were filed, several slaughterhouses signed Conduct Adjustment Agreements (CAAs) with the Federal Public Prosecutor's Office in Pará, pledging, in essence, to refrain from purchasing products from farms where socio-environmental irregularities were identified. The agreements also established measures to increase consumer transparency regarding the origin of beef, required rural producers to register with the Rural Environmental Registry (CAR), and mandated regular audits to certify compliance with the CAAs.<sup>113</sup>

Between 2009 and 2018, deforestation in the Amazon remained below eight thousand square kilometers per year, the lowest levels recorded since the PRODES monitoring program began in 1988.<sup>114</sup> This decline cannot be attributed solely, or even primarily, to the CAAs; it stemmed from a combination of factors, including the implementation of the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDam), the creation of protected areas, and enforcement operations by IBAMA. Even so, the agreements led by the Federal Public Prosecutor's Office helped reinforce this downward trend.<sup>115</sup>

The cattle ranching agreements remain in force today, with the main slaughterhouses operating in the states of the Legal Amazon adhering to them and undergoing annual audits.<sup>116</sup> As a result of these agreements, the lawsuits once filed against actors in the cattle-related deforestation chain were extinguished, shifting the response to the problem from a primarily legal approach to one driven by market logic, with slaughterhouses, for the most part, taking on the responsibility of preventing deforestation.

<sup>111</sup> Ibid.

<sup>112</sup> IMAZON. *Os desafios para uma pecuária mais sustentável na Amazônia*. Available at: [https://amazon.fly.storage.tigris.dev/wp-backup/PDFamazon/Portugues/estado\\_da\\_amazonia/os-desafios-para-uma-pecuaria-mais-sustentavel-na.pdf](https://amazon.fly.storage.tigris.dev/wp-backup/PDFamazon/Portugues/estado_da_amazonia/os-desafios-para-uma-pecuaria-mais-sustentavel-na.pdf). Accessed on: June 15, 2025.

<sup>113</sup> ECODEBATE. MPF, governo e setor pecuarista assinam acordo no Pará. Available at: <https://www.ecodebate.com.br/2009/07/09/mpf-governo-e-setor-pecuarista-assinam-acordo-no-par/>. Accessed on: June 15, 2025.

<sup>114</sup> Data from the National Institute for Space Research (INPE). Available at: [http://terrabrasilis.dpi.inpe.br/app/dashboard/deforestation/biomes/legal\\_amazon/rates](http://terrabrasilis.dpi.inpe.br/app/dashboard/deforestation/biomes/legal_amazon/rates). Accessed on: June 8, 2025.

<sup>115</sup> ARIMA, Eugenio Y.; BARRETO, Paulo; ARAÚJO, Elis; SOARES-FILHO, Britaldo. Public policies can reduce tropical deforestation: Lessons and challenges from Brazil. *Land Use Policy*, v. 41, pp. 465-473, 2014.

<sup>116</sup> See the *Boi na Linha* platform, which monitors compliance with the so-called cattle ranching commitments in the Legal Amazon: <https://www.boinalinha.org/>.

Although initially focused on addressing the surge in deforestation in previous years, the MPF also turned its attention to other socio-environmental violations in the Amazon's cattle supply chains, particularly invasions of Indigenous Lands and other protected areas, as well as labor in conditions analogous to slavery.

With respect to Indigenous Lands, the original text of the CAA, still in force for most signatory companies in the State of Pará, stipulates that companies must not purchase cattle from breeding, rearing, or fattening farms “located in Indigenous Lands recognized by a declaratory ordinance of the Ministry of Justice or subject to interdiction by an act of the Presidency of the National Indian Foundation (FUNAI).”

In 2020, the Amazon Cattle Supplier Monitoring Protocol<sup>117</sup> came into effect, now in its second version. Developed through a partnership between the MPF and the Institute for Forest and Agricultural Management and Certification (Imaflora), the document was intended, on the one hand, to provide prosecutors managing the CAAs with greater detail and organization of the rules and guidelines consolidated over time, and, on the other, to give slaughterhouses and retailers clearer and more uniform procedures for complying with both the agreements with the MPF and the Public Livestock Commitment established with civil society.

Regarding Indigenous Lands, the Protocol states: “Analyses must be conducted using a geomonitoring system that integrates georeferenced farm maps (from the official CAR database) with the cartographic database of the National Indigenous Peoples Foundation (FUNAI), which is constantly updated. Using satellite imagery, the system must identify overlaps with Indigenous Lands at any stage of the demarcation process: Declared, Ratified, Regularized, or Under Interdiction. This service may be carried out by the company itself or by a specialized firm under contract.”<sup>118</sup>

This requirement was designed to address the persistent economic pressure on potentially productive areas within Indigenous territories. The solution established in the CAAs is straightforward: prohibit the purchase of cattle originating from Indigenous Lands, even when the demarcation process is still underway. The premise is clear: cattle ranching, an activity foreign to the traditional practices of Indigenous peoples in the region, constitutes an unlawful invasion of their territory, causing harm both to the ecosystem and to the community's way of life.

It is worth emphasizing that the restriction set out in the agreements and detailed in the Monitoring Protocol admits no textual exceptions, unlike other so-called “blocking” rules, such as deforestation checks, which allow for corresponding “unblocking” once the impediment is resolved. Neither the text of the CAA nor the Monitoring Protocol leaves room for rural properties overlapping Indigenous Lands to take part in the cattle supply chain.

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<sup>117</sup> Available at: <https://www.boinalinha.org/wp-content/uploads/2025/03/Protocolo-Monitoramento-Gado-2ponto0-w5111720-ALT22-WEB.pdf>. Accessed on: July 4, 2025.

<sup>118</sup> Ibid.



Still, the cultural dynamics and ongoing interaction between Indigenous peoples and surrounding populations raise questions that call for deeper reflection. Namely: what are the limits of the prohibition contained in the agreements? Could cattle ranching ever be legitimately carried out within Indigenous Lands? In this regard, the possibility of Indigenous leaders themselves expressing interest in cattle raising requires an analysis of the principle of self-determination in contrast with the diffuse social right to ecological balance and the ecological function of protected areas.

## The right to self-determination and the forging of cultural identity

The self-determination of Indigenous and traditional peoples is recognized as a pre-existing and historical right, fundamental to their continued existence as distinct peoples, to freely defining their political status, and to pursuing economic, social, and cultural development in accordance with their own needs and interests.<sup>119</sup> These groups demand participation in the State while also insisting on remaining culturally distinct societies, preserving their autonomy and self-government as conditions for survival.<sup>120</sup> The principle of self-determination encompasses the right of peoples to decide the course of their development based on their culture and spirituality, as well as on the use of their natural resources – standing in opposition to acculturation and assimilation.<sup>121</sup>

The international recognition of this right is significant. The United Nations Declaration on the Rights of Indigenous Peoples establishes self-determination (Art. 3) and self-government (Art. 4) as minimum standards for the survival, dignity, and well-being of Indigenous peoples.<sup>122</sup> Likewise, ILO Convention N° 169, ratified by Brazil in 2004, requires States to consult Indigenous peoples before adopting legislative or administrative measures that affect them<sup>123</sup>, affirming their right to set their own development priorities (Art. 7).

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**119** FIGUEROA, Isabela; SILVA, Vini Rabassa da. Proteção social e povos indígenas na Colômbia e no Brasil: tensões entre cidadania e autodeterminação. *Revista Derecho del Estado*, Universidad Externado de Colombia, n° 44, Sept./Dec. 2019, p. 144; CABRAL, Marcelo Budal. *Mineração em terras indígenas: autodeterminação dos povos, princípio da Harmonia com a Natureza e interpretação constitucional*. Dissertation (Master's in Agrarian Law) – Faculty of Law, Federal University of Goiás, Goiânia, 2023, p. 50 et seq; IUBEL, Aline. *Mineração e(m) Terras Indígenas: reflexões a partir do alto rio Negro*. Maloca: *Revista de Estudos Indígenas*, Campinas, SP, v. 3, n° 00, p. e020005, 2020. Available at: <https://econtents.bc.unicamp.br/inpec/index.php/maloca/article/view/13692>. Accessed on: July 2, 2025.

**120** FIGUEROA, Isabela; SILVA, Vini Rabassa da. Proteção social e povos indígenas na Colômbia e no Brasil: tensões entre cidadania e autodeterminação. *Revista Derecho del Estado*, Universidad Externado de Colombia, n° 44, Sept./Dec. 2019, p. 135.

**121** BRITO, Antonio Guimarães. *Direitos Indígenas nas Nações Unidas: para uma atualização nas relações internacionais*. 2nd ed. Curitiba: CRV, 2021, pp. 63-64.

**122** UNITED NATIONS. Declaration on the Rights of Indigenous Peoples. AG Res. 61/295, UN Doc A/61/L.7, 2007.

**123** INTERNATIONAL LABOUR ORGANIZATION. Convention N° 169 on Indigenous and Tribal Peoples. Geneva: 1989. See also RIBEIRO, Maria Inês Ferreira da Costa de Almeida. *Mineração e Garimpo em Terras Indígenas*. Rio de Janeiro: CETEM/MCTIC, 2016, p. 36.

A corollary of self-determination is the prerogative of alternative development, or ethnodevelopment<sup>124</sup>, shaped by Indigenous practices, customs, beliefs, and traditions within the framework of their worldview. Such development may remain rooted in tradition or depart from it, supported by the freedom of choice inherent in self-determination. As Robério Nunes dos Anjos Filho observes: “Not even the possibility that Indigenous peoples might choose a form of development fully consistent with the majority standard can be excluded a priori. It is necessary to guarantee the freedom of Indigenous peoples to decide freely on such matters concerning their development, which fully aligns with the paradigm of human development that, as we have seen, encompasses the possibility of people choosing the way of life they wish to live, and requires that they have the conditions and opportunities needed to achieve those choices.”<sup>125</sup>

It is often emphasized that the intrinsic relationship of Indigenous peoples with land is a cornerstone of self-determination. Land is of central importance: their physical and cultural survival depends on it, encapsulated in the expression that “there is no Indian [sic] without land. Everything he is, he is in the land and with the land.”<sup>126</sup> Identity, social organization, customs, beliefs, and traditions are directly linked to a specific territorial space (Art. 231 of the Federal Constitution).<sup>127</sup> Safeguarding and exercising autonomy over territory are therefore indispensable conditions for the existence and continuity of their culture<sup>128</sup>, a view that stands in contrast to the Western conception of land as a mere economic asset.<sup>129</sup>

When it comes to cattle ranching, history shows that attempts to introduce large-scale livestock raising in Indigenous villages of the Amazon have ended in “resounding failures or, at best, only partial successes.”<sup>130</sup> Since the twentieth century, such initiatives have been promoted through public policies aimed at the “civilization” and “industrial progress” of Indigenous peoples, often disregarding the fact that, for many communities, the equivalence between game meat and livestock meat is not obvious.<sup>131</sup>

The reasons for these outcomes vary, but are largely cultural and ontological in nature. They include the establishment of kinship or filial bonds between hu-

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**124** ANJOS FILHO, Robério Nunes dos. *Direito ao desenvolvimento de comunidades indígenas no Brasil*. Master's dissertation – University of São Paulo, 2009, p. 591.

**125** Ibid, p. 592. Emphasis in the original.

**126** Excerpt from the opinion of Justice Carlos Alberto Menezes Direito, Federal Supreme Court of Brazil, in Petition 3388 (judgment on the demarcation of the Raposa Serra do Sol Indigenous Reserve).

**127** INTER-AMERICAN COURT OF HUMAN RIGHTS. Advisory Opinion 23 of November 15, 2017. Available at: <http://www.mpf.mp.br/atuacao-tematica/sci/dados-da-atuacao/corte-idh/Opiniao-Consultiva23versofinal.pdf>. Accessed on: December 20, 2021. Paragraph 48.

**128** GOMES, Daniela. *O Direito Indígena ao Solo: limites e possibilidades*. 2. ed. Rio de Janeiro: Lumen Juris, 2020, p. 279.

**129** BRITO, Antonio Guimarães. *Direitos Indígenas nas Nações Unidas: para uma atualização nas relações internacionais*. 2. ed. Curitiba: CRV, 2021, p. 69.

**130** VELDEN, Felipe Vander. Sobre fracassos e êxitos relativos: técnica, política e ontologia em projetos de criação animal em aldeias indígenas de Amazonia. *Runa*, v. 40, n° 1, 2019, p. 395.

**131** Ibid, p. 401.

mans and non-human animals, which makes the slaughter of livestock animals for consumption uncommon.<sup>132</sup> For many Indigenous peoples of the Amazon, domestic or familiar animals are not generally regarded as “meat”; only hunted animals are.<sup>133</sup> Additional challenges arise from the mismatch between the assumptions underlying such projects and Indigenous modes of production – which frequently differ from external models – as well as from the lack of training and follow-up.<sup>134</sup>

At the same time, it must be acknowledged that culture is a dynamic process, always in flux.<sup>135</sup> Just as so-called “Western” culture, associated with white populations in Europe, the United States, and Brazil, is not the same today as it was a century ago, the culture of an Indigenous people cannot, and should not, be confined to a stereotype of past centuries. In other words, it is not for the dominant population to decide how or when Indigenous ways of living, producing, and creating may change, much less to demand that they remain “traditional” in the sense defined by white society.

Because cultural patterns are mutable and adaptable, and because the ways of life of Indigenous communities in the Amazon are so diverse, no static model of economic production can categorically exclude cattle ranching. Nor would it be reasonable to presume that such activity must be restricted to subsistence alone, without risking a modern, if subtle, form of cultural colonialism.

From a postcolonial perspective, the legal and moral grounds for prohibiting certain economic practices may be questioned, particularly when such practices are deemed by the surrounding population, as signatories of the agreements, to be non-traditional or insufficiently “Indigenous,” according to the widely entrenched notion of the expected relationship between Indigenous peoples and the land.

Nonetheless, addressing this issue requires consideration of additional parameters, as the mere assertion of the principle of self-determination is not, on its own, sufficient.

## Indigenous lands as protected spaces for environmental preservation

The right to an ecologically balanced environment, enshrined in Article 225 of the 1988 Constitution, has progressively evolved in constitutional interpretation toward a biocentric/ecocentric paradigm, in which nature itself may be recognized as a subject of autonomous rights.<sup>136</sup> In Advisory Opinion OC-23/17, the In-

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<sup>132</sup> Ibid, pp. 401-402.

<sup>133</sup> Ibid, p. 400.

<sup>134</sup> Ibid, pp. 401-402.

<sup>135</sup> PINEZI, Ana Keila Mosca. Infanticídio indígena, relativismo cultural e direitos humanos: elementos para reflexão. *Aurora*, São Paulo, v. 8, p. 3, 2010. Available at: [https://www4.pucsp.br/revistaaurora/ed8\\_v\\_mai\\_2010/artigos/download/ed/2\\_artigo.pdf](https://www4.pucsp.br/revistaaurora/ed8_v_mai_2010/artigos/download/ed/2_artigo.pdf). Accessed on July 5, 2025.

<sup>136</sup> SARLET, Ingo Wolfgang; WEDY, Gabriel de Jesus Tedesco. Algumas notas sobre o direito fundamental ao desenvolvimento sustentável e a sua dimensão subjetiva e objetiva. *Revista Brasileira de Políticas Públicas*, Brasília, v. 10, n° 3, 2020, p. 24; CABRAL, Marcelo Budal. *Mineração em terras indígenas: autodeterminação dos povos, princípio da Harmonia com a Natureza e interpretação*

ter-American Court of Human Rights (IACtHR) affirmed that the right to a healthy environment safeguards environmental components (such as forests, rivers, and seas) as legal interests in their own right, irrespective of any direct risk to individuals (paragraph 47). This interpretation, binding in nature, represents a significant advance toward ecological justice.<sup>137 138 139</sup>

Yet environmental protection extends beyond the recognition of rights vested in universal holders; it infuses the entire Constitution with a renewed interpretive framework grounded in the imperative of ecosystem preservation. As Walter Claudius Rothenburg notes: “Once we accept that a balanced biosphere is the physical precondition for life, its preservation must be accorded an essential and privileged constitutional status. This reorientation will affect all core elements of the Constitution: the overarching aims of public policy, fundamental rights, and institutions.”<sup>140</sup>

In this regard, it is important to recognize that, from an ecocentric perspective, or at least from a mitigated anthropocentrism, the widely disseminated concept of sustainable development “is intrinsically tied to the respect, protection, and promotion of human dignity in its ecological dimension, but also to the dignity of non-human life, as well as to the human and fundamental rights and duties (in this case, also of nature) that are associated with it.”<sup>141</sup>

Against this backdrop, the vital role of Indigenous lands in global environmental conservation stands out, as they are increasingly recognized as guardians of forests and biodiversity.

The 2021 report “Forest Governance by Indigenous and Tribal Peoples: An Opportunity for Climate Action in Latin America and the Caribbean”, prepared by the Food and Agriculture Organization of the United Nations (FAO) in partnership with the Fund for the Development of Indigenous Peoples of Latin America and the Caribbean (FILAC)<sup>142</sup>, draws on more than three hundred studies demonstrat-

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constitucional. Master’s Dissertation in Agrarian Law – Faculty of Law, Federal University of Goiás, Goiânia, 2023, p. 108.

**137** CABRAL, Marcelo Budal. *Mineração em terras indígenas: autodeterminação dos povos, princípio da Harmonia com a Natureza e interpretação constitucional*. Master’s Dissertation in Agrarian Law – Faculty of Law, Federal University of Goiás, Goiânia, 2023, p. 256.

**138** For other cases examined by the Inter-American Court of Human Rights, see: INTER-AMERICAN COURT OF HUMAN RIGHTS. Caso Comunidad Indígena Yakye Axa vs. Paraguai. Judgment of June 17, 2005. Available at: [https://www.corteidh.or.cr/docs/casos/articulos/seriec\\_79\\_por.pdf](https://www.corteidh.or.cr/docs/casos/articulos/seriec_79_por.pdf). Accessed on: Apr. 22, 2023.

**139** INTER-AMERICAN COURT OF HUMAN RIGHTS. Caso do Povo Saramaka vs. Suriname. Judgment of November 28, 2007. Available at: <https://www.cnj.jus.br/wp-content/uploads/2016/04/cc1a1e511769096f84fb5effe768fe8c.pdf>. Accessed on: Sept. 11, 2021.

**140** ROTHENBURG, Walter Claudius. A Constituição Ecológica. In: KISHI, Sandra Akemi Shimada et al. (Eds.). *Desafios do direito ambiental no século XXI: estudos em homenagem a Paulo Affonso Leme Machado*. São Paulo: Malheiros, 2005, pp. 817-818.

**141** SARLET, Ingo Wolfgang; WEDY, Gabriel de Jesus Tedesco. Algumas notas sobre o direito fundamental ao desenvolvimento sustentável e a sua dimensão subjetiva e objetiva. *Revista Brasileira de Políticas Públicas*, Brasília, v. 10, n° 3, 2020, p. 27.

**142** FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO). Forest governance by indigenous and tribal peoples. An opportunity for climate action in Latin America and the

ing a direct link between demarcated areas for Indigenous and tribal peoples and lower rates of deforestation compared with non-protected or partially protected areas.<sup>143</sup> By way of example, between 2003 and 2016, the carbon stock in Indigenous lands of the Amazon Basin fell by 0.3%; in other protected areas, the reduction was 0.6%; whereas in non-protected areas without Indigenous populations, the decline reached 3.6%.<sup>144</sup>

As highlighted by Roberto Lemos dos Santos Filho, this means that, each year in the forest regions of Bolivia, Brazil, and Colombia, the existence and protection of Indigenous lands prevented between 42.8 and 59.7 million tons of CO<sub>2</sub> emissions during the period in question, equivalent to removing between 9 and 12.6 million vehicles from circulation annually.<sup>145</sup>

One of the scientific studies underpinning the FAO report found that, between 2001 and 2005, Indigenous lands were at least as effective as areas under strict protection in curbing deforestation under moderate pressure, and more effective than any other type of protection under high pressure.<sup>146</sup> Another study concluded that, compared with Indigenous lands, other protected areas experienced three to four times greater forest cover loss or change between 2000 and 2014.<sup>147</sup>

Furthermore, evidence shows that the rate of species loss is slower in Indigenous territories than in other areas.<sup>148</sup> These findings are closely tied to the fact that Indigenous cultures often embrace a vision of “harmony with nature”, in contrast to systems of material accumulation.<sup>149</sup> They are also linked to the practical reality that the vast stretches of native forest cover in such protected areas make extractive logistics more difficult, since the opening of roads to transport production would inevitably render large areas vulnerable to anthropogenic degradation.<sup>150</sup>

It is also worth emphasizing that the recognition of Indigenous peoples’ ancestral rights to their lands is inseparably bound to this essential relationship

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Caribbean. (online). Santiago: FAO, 2021. Available at: <https://www.fao.org/documents/card/en/c/cb2953en>. Accessed on: June 15, 2025.

<sup>143</sup> Ibid, p. 27 et seq.

<sup>144</sup> Ibid, p. 31.

<sup>145</sup> SANTOS FILHO, Roberto Lemos dos. *Da demarcação e manutenção de terras indígenas como meio eficaz para a proteção do meio ambiente e de culturas tradicionais singulares*. Master’s Dissertation – Universidade Católica de Santos, 2023, p. 104.

<sup>146</sup> NOLTE, Christoph; AGRAWAL, Arun; SILVIUS, Kirsten M.; SOARES-FILHO, Britaldo S. Governance regime and location influence avoided deforestation success of protected areas in the Brazilian Amazon. *Proceedings of the National Academy of Sciences of the United States of America*, v. 110, n° 13, 2013, p. 4958.

<sup>147</sup> CORRIGAN, Colleen et al. Quantifying the contribution to biodiversity conservation of protected areas governed by indigenous peoples and local communities. *Biological Conservation*, v. 227, 2018, p. 405.

<sup>148</sup> CABRAL, Marcelo Budal. *Mineração em terras indígenas: autodeterminação dos povos, princípio da Harmonia com a Natureza e interpretação constitucional*. Master’s Dissertation in Agrarian Law – Faculty of Law, Federal University of Goiás, Goiânia, 2023, p. 74.

<sup>149</sup> Ibid, p. 119.

<sup>150</sup> LIMA, Mendelson et al. The forests in the indigenous lands in Brazil in peril. *Land Use Policy*, v. 90, 104258, 2020, p. 2.

between the peoples and their locus of reference, which forms the foundation of their belief systems and ways of life. Today, Indigenous lands cannot be understood apart from their environmental dimension, which imbues them with meaning as a fundamental principle that strengthens legal protections and safeguards the very continuity of Indigenous peoples.

## Conclusion

The key to reconciling the self-determination of Indigenous peoples with the ecological function of demarcated lands lies in recognizing the different factors that shape the legal framework governing Indigenous lands in Brazil. First, it must be stressed that the right to an ecologically balanced environment belongs to Indigenous peoples as much as to any other population. In their case, however, this right must be exercised in a way that prevents the depletion of natural resources vital to traditional ways of life. Considering the well-documented severity of the environmental impacts of cattle ranching as practiced in Amazonian pastures, permitting such activity within Indigenous lands could result in the progressive degradation of the very resources demarcation was intended to safeguard. This would jeopardize the environmental services provided by these areas and, in turn, compromise climate and biodiversity balance, with consequences for humanity as a whole.

Second, it should be noted that, although rooted in a specific historical context, the conception of the distinctive relationship between Indigenous peoples and their lands was central to defining both the constitutional recognition of their rights and their scope. In contrast to what applies to other urban or rural communities, granting a specially protected territory to an Indigenous community also affirms an entire system of values and references, one that has no equivalent in cultural models based on private property and material accumulation, such as those underlying cattle ranching in the Amazon.

In this respect, it is necessary to analyze the concept of “lands traditionally occupied by Indigenous peoples” (Article 20, XI, and Article 231 of the Federal Constitution) in light of the four conditions set forth in Article 231, §1:

- permanent habitation;
- use of the land for the productive activities of the Indigenous population;
- the indispensability of the land for preserving the environmental resources essential to Indigenous well-being; and
- the necessity of the land for the physical and cultural reproduction of the community, in accordance with its practices, customs, and traditions.<sup>151</sup>

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**151** SILVA, José Afonso da. *Comentário contextual à Constituição*. São Paulo: Malheiros, 2010, p. 888. In the same vein: BRITO, Adam Luiz Claudino de; BARBOSA, Erivaldo Moreira. *A gestão ambiental das terras indígenas e de seus recursos naturais: fundamentos jurídicos, limites e desafios*.

Thus, the constituent made it clear that land qualifies as Indigenous only insofar as it is tied to the preservation of the environmental resources found there, which are understood as inseparably linked to traditional use. On this point, José Afonso da Silva clarifies: “Even the expression ‘traditionally,’ far from denoting a merely temporal aspect, refers to the traditional way in which Indigenous peoples occupy and use the land, and to their traditional mode of production – in short, to their traditional relationship with the land. There are more stable communities, others less stable, and some that move across broader spaces, and so on. Hence the conclusion that everything must take place in accordance with their uses, customs, and traditions.”<sup>152</sup>

Because the environmental dimension is indispensable to understanding the spaces allocated to Indigenous peoples, and because the right to ethnodevelopment is likewise guaranteed as an expression of self-determination, the central issue is not simply whether Indigenous communities may engage in cattle ranching for sale to slaughterhouses, but whether such activity risks becoming predatory or violating ecological limits and the rights assured to Indigenous peoples. The self-determination of an Indigenous community is bounded by the very conditions of its existence, which underscores the imperative that any choices respect both the community’s autonomous rights and the biocapacity of its territory. Otherwise, the very premises that justified recognition of the Indigenous land risk being undermined.

Mediating the rights at stake is neither straightforward nor self-evident. It requires balancing competing values from within the cosmovision of the Indigenous people concerned. If the challenge lies in developing models of economic activity consistent with ecological harmony, while avoiding the replication of exploitative practices that have historically violated both Indigenous rights and environmental balance, then it follows that prior environmental impact assessments are essential to measure the scope of risks involved. Where such risks threaten the survival of ecosystems essential to Indigenous lands, they may even render the undertaking technically unfeasible.

In addition to impact assessments, free, prior, and informed consultation should be regarded as the most effective mechanism for addressing competing perspectives, in the best interests of the protected community, pursuant to ILO Convention N° 169, even where the measure does not strictly qualify as a “legislative or administrative” action capable of affecting the community in question. In this context, even when the initiative originates from Indigenous leadership itself, the potential impacts of the activity warrant the qualified participation of the broader community. This ensures that the decision truly reflects the community’s right to cultural development, rather than the possible influence of external economic pressures.

The consultation process, which must respect the autonomous protocols established by the community itself, should take place prior to any concrete steps

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*Veredas do Direito*, Belo Horizonte, v. 12, n° 24, July/Dec. 2015, pp. 102-103.

**152** SILVA, José Afonso da. *Comentário contextual à Constituição*. São Paulo: Malheiros, 2010, p. 889. BRITO, Adam Luiz Claudino de; BARBOSA, Erivaldo Moreira also state that “the term ‘traditional’ (...) refers to property regimes that are not associated with the capitalist mode of production.”



toward implementing potentially harmful economic activities. It must be conducted in language accessible to all members – preferably with the support of anthropologists and specialists in Indigenous affairs to facilitate engagement with the non-Indigenous population – and be guided by good faith on all sides.<sup>153</sup>

Ultimately, the issue at stake is decision-making. In the context of agreements entered into by slaughterhouses with the Federal Public Prosecutor’s Office (MPF), purchasing decisions are generally driven by the legal and reputational risks to be managed by the company that signed the Conduct Adjustment Agreement (CAA), which is subsequently subject to audits contracted to verify compliance with its clauses. In this specific case, however – one not contemplated in the Monitoring Protocol, which, as noted, establishes no exceptions to the rule prohibiting the purchase of cattle originating from Indigenous lands – the legitimacy of the situation must be assessed by the MPF itself, as the party to the commitment. For this purpose, the MPF may also rely on expert and technical support to conduct whatever analyses it deems necessary.

At this stage, it must also be recognized that a refusal by the Indigenous community during consultation would amount to a veto, and the MPF could not act contrary to such a decision, given its constitutional mandate to defend the rights and interests of Indigenous peoples (Article 129, V, of the Federal Constitution). Conversely, if the consultation produced a favorable indication for implementing cattle ranching for commercial purposes, the MPF would still be required to examine the supporting technical documentation, particularly the impact studies, in light of its constitutional duty to safeguard “public and social property, the environment, and other diffuse and collective interests” (Article 129, III, of the Constitution).

In light of these considerations, it must be maintained that the rule established in the cattle-ranching CAAs, which prohibits such activity on Indigenous lands a priori, is justified by the range of risks involved, particularly the risk of degrading the natural resources that underpin the recognition and demarcation of the territory, as well as the difficulty of determining, without due process, the legitimate will of the affected Indigenous population. Any exception to this rule would therefore require strict procedural and technical safeguards to ensure the protection of the environment, the traditional uses and customs of Indigenous land, and the community’s self-determination. Such safeguards must be evaluated on a case-by-case basis and are not compatible with the inclusion of generic formulas in the Monitoring Protocol authorizing purchases, as this would risk consolidating an open invitation to the economic pressures that are known to encircle these specially protected territories.

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**153** BRITO, Felipe Pires M. de. A concretização da consulta prévia, livre e informada e a Convenção OIT 169 no sistema jurídico brasileiro. In *Revista da Advocacia Pública Federal*, v. 7, n° 1, December 2023, pp. 75-76.



## THE NECESSARY ECONOMIC TRANSITION IN THE AMAZON: FROM PREDATORY RANCHING TO A SUSTAINABLE BIOECONOMY

BY GABRIEL DE AMORIM SILVA FERREIRA<sup>154</sup> AND RAPHAEL LUIS PEREIRA BEVILAQUA<sup>155</sup>

**T**he energy transition, widely debated worldwide, has emerged as the essential path to safeguarding the planet's living conditions. Replacing a fossil fuel-based matrix with clean and sustainable sources, with low or zero greenhouse gas emissions, is the scientifically established course for averting a climate abyss.

Confronting global warming is, without doubt, the most urgent environmental challenge of our time, and will remain so for decades to come, for the survival of our species, and of countless others, depends on our capacity to prevent planetary heating from reaching intolerable levels.

In this context, the Amazon, the world's largest tropical forest, is undergoing a critical process of transformation and deforestation. Its pivotal role in global climate regulation places it at the forefront of environmental debates, particularly given its vast potential for greenhouse gas emissions should fires, such as those seen in 2024, continue.

This study seeks to examine the causes of environmental degradation in the Amazon, using as a reference the historical and contemporary processes of colonization in Rondônia, a State in northern Brazil that forms part of the Legal Amazon.

With 14 years of experience as Federal Prosecutors in Rondônia, working on critical issues such as agrarian reform, social rights, Indigenous and traditional peoples, collective environmental protection, and environmental crimes, we offer a precise assessment of the main drivers of deforestation in the Amazon and propose a more effective path to confront this challenge.

Our analysis emphasizes the economic dimension of deforestation, since the prevailing development model in the region – based on large-scale cattle ranching, grain monocultures, mining, and predatory logging – remains the primary force behind rapid land-use change.

Furthermore, from a critical perspective, we will analyze how the historical flaws of agrarian and environmental policies in the Amazon, combined with the limitations of command-and-control approaches, have deepened the problem, making its resolution increasingly complex and difficult.

In sum, while the United States, Europe, China, and other industrialized nations debate the energy transition, fueling markets for electric vehicles and solar panels, the Amazon and Brazil must urgently embrace the need for an economic

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transition to halt the “termite-like decay” of the world’s largest tropical forest and to foster economies that value the forest standing.

## **A snapshot of the problem: environmental devastation in Rondônia**

According to MapBiomas data, the Amazon lost 14% of its native vegetation between 1985 and 2023, amounting to 55.3 million hectares of deforestation.

Pastureland has consolidated as the principal driver, responsible for more than 90% of cleared areas, expanding by 363% over the period, from 12.7 million to 59 million hectares. By 2023, 14% of the Amazon had been converted to pastureland.

Beyond pastureland, agriculture has also expanded dramatically, with cultivated areas increasing by 4,647% (a 47-fold rise), from 154,000 hectares to 7.3 million hectares. Soybeans drive this expansion, accounting for 80.5% of agricultural land and occupying 5.9 million hectares in 2023. Taken together, the growth of agribusiness, including silviculture, has resulted in a 417% increase over the past 39 years.

The AMACRO region (Acre, Amazonas, and Rondônia) is particularly affected, concentrating 13% of the Amazon’s net loss of native vegetation. Rondônia, specifically, stands among the States with the most extensive pastureland expansion and the lowest share of remaining native vegetation. These figures highlight the intense pressure on the biome’s natural resources, raising the risk of crossing a tipping point with irreversible impacts on the Amazon forest.

According to 2023 data, Rondônia retained only 59% of its native vegetation within the Amazon biome, compared with 85% in Acre, 95% in Amazonas, 95% in Amapá, 93% in Roraima, and 77% in Pará.

Tocantins (21%), Maranhão (46%), and Mato Grosso (60%) have also undergone intense deforestation, though their territories are not entirely located within the Legal Amazon.

In 1985, Rondônia still preserved 93% of its native vegetation. By 2023, that figure had fallen to 59%, a loss of 34 percentage points that reveals a sharp and accelerated trajectory of deforestation in the State.

### **► The deforestation chain in the Amazon and in Rondônia**

Deforestation in the Amazon does not occur in a uniform manner, nor is it the result of isolated acts. Rather, predatory economic cycles take root, interconnect, and progressively strip away native vegetation until the landscape is fully altered and degraded.

This so-called deforestation chain is a vicious cycle, unfolding in successive stages that convert forest into farmland. It typically begins with illegal selective logging of high-value timber on public lands, which thins the forest cover.

Next, land grabbing consolidates occupation and completes the “clearing” of the area through fire and clear-cutting, using heavy machinery, tractors, and the so-called *correntão* (a technique in which large chains dragged between tractors knock down extensive stretches of forest). The land is then converted into pasture, with small-scale cattle ranching serving to “justify” a permanent claim over the newly seized territory.

Over time, this illegal occupation gives way to large-scale, extensive, and predatory cattle ranching. Characterized by low productivity and limited techno-

logical intensity, it demands ever larger tracts of land, fueling continuous expansion into new areas of native forest.

Often, cattle ranching is subsequently replaced by grain monocultures (soy and corn), which require even more land and, worse, have caused widespread cases of pesticide contamination in water bodies, crops, and human populations, seriously harming public health, particularly among Indigenous peoples and rural workers.

At the same time, or at any stage of this chain, illegal mining (diamonds, cassiterite, gold, etc.) inflicts the most severe degradation, causing massive ecosystem destruction and the contamination and alteration of waterways such as streams and rivers.

These economic activities share a common trait: all are embedded in a broader pattern of predatory colonization of the Amazon. This process, already exhausted in the more populated regions of the country, now advances at full speed in a region once considered inaccessible, uninhabited, and hostile.

Logging, reminiscent of the pau-brasil cycle, mining, echoing the gold cycle in Minas Gerais, and monoculture (plantation agriculture), as in the coffee and sugar cycles, were historically the dominant activities driving colonization in the South, Southeast, and Northeast. They left behind a profound environmental liability, as evidenced by the small remnants of the Atlantic Forest, and are now draining and eroding the Amazon.

As part of the necessary economic transition, it is essential to halt this colonizing dynamic, whereby the rest of the country treats the Amazon as an internal colony of exploitation, much as the Portuguese Crown did with Brazil for nearly four centuries. It must be recognized, moreover, that many of these activities, especially at large scale, primarily serve the interests of “investors” from the country’s Center-South.

Addressing this new colonialism requires, above all, protecting and empowering the peoples of the Amazon. As will be shown, this can take many forms, including a genuinely popular agrarian reform and the strengthening of sustainable, forest-based agro-extractive economies (açaí, Brazil nuts, babassu, cupuaçu, among others).

Before turning to these pathways forward, however, it is essential to examine more closely how each of the predatory economic activities outlined above operates in practice.

#### ► Timber “theft”:

the first stage of deforestation and the dynamics of laundering

As a Federal Prosecutor, I had the opportunity to witness firsthand the intricate networks of illegal logging within Indigenous lands and protected areas in the Amazon region of Rondônia.

Criminal enforcement agencies – the Public Prosecutor’s Office and the Judicial Police – typically learn of these crimes through arrests *in flagrante delicto*. Such arrests are most often carried out by the military police and environmental enforcement bodies such as IBAMA and ICMBio. Offenders are frequently caught with chainsaws in hand, felling trees and cutting them into logs within the forest itself. In other cases, truck drivers transporting the illegally harvested timber to sawmills in nearby towns are intercepted.

Loggers and truck drivers represent the most fragile and vulnerable links in this criminal chain. As manual laborers, they earn the least, yet face the greatest risk of arrest and prosecution.

They are commonly charged under Article 50-A of Law Nº 9,605/98, which criminalizes deforestation, economic exploitation, or degradation of forests on public or unallocated lands without authorization. When the clearing occurs on federal land, they may also be prosecuted for misappropriation of federal property under Article 2, sole paragraph, of Law Nº 8,176/91, since timber, by accession, constitutes federal public property.

By contrast, establishing the liability of business owners is exceedingly difficult, even though illegally harvested timber is processed in sawmills and distributed to other regions of Brazil for industrial use. In practice, sawmill and timber company owners, together with their managers and accountants, are the key actors sustaining this scheme.

Environmental crimes and the misappropriation of federal property are only the tip of the iceberg. For timber to reach industry and the final consumer, mainly in the southern and southeastern States, it must first be given a veneer of legality. Without it, the Federal Highway Police would intercept the cargo on federal roads, resulting in the arrest of truck drivers transporting illegal timber.

When a sawmill owner does not participate directly in the extraction but purchases timber after it has been illegally harvested, he may be liable for the crime of receiving stolen goods (Article 180, §1, of the Penal Code) or for misappropriation of federal property, where habitual commercial practice is not proven. In most cases, however, timber entrepreneurs act as the intellectual authors of the crime, aligning with the extractor's intent from the outset and thereby committing the same offenses.

The real challenge for investigators lies in uncovering and proving timber laundering. To move timber under the guise of legality, sophisticated fraud schemes are employed, often so intricate that they prove nearly insurmountable to criminal investigation.

All movements of timber and forest products must be recorded in IBAMA's Forest Origin Document System (SISDOF) or in equivalent state-level systems. Each shipment must be accompanied by a Forest Origin Document (DOF), which provides detailed information such as volume, species, origin, and destination. SISDOF operates through virtual credits that must correspond exactly to the timber physically present, for example, in a sawmill yard or on a truck bed.

If a company has 100 m<sup>3</sup> of *jatobá* (Brazilian cherry) logs and 30 m<sup>3</sup> of wood chips recorded in SISDOF, inspectors should be able to verify precisely that volume and type of timber.

Fraud, therefore, begins with the creation of these forest credits in the system.

Although credits are formally required to originate from management plans authorized by environmental agencies, in practice fictitious entries are often inserted into SISDOF without the plan ever being implemented (or only minimally so). These fraudulent credits are then used to launder<sup>156</sup> timber illegally extracted from public lands.

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**156** Translator's Note: In Portuguese, the term *esquentar* ("to heat up") is often used colloquially to describe the act of giving a false appearance of legality to illicit goods—in this context, "laundering" timber.

Intercepted conversations in criminal investigations make clear that, for these groups, the real challenge is not extracting the timber itself, which is considered “very easy” to obtain from public lands, but securing the corresponding virtual credits necessary to “legalize” it.

It is common to find shell companies created to operate within a wider network, transferring fictitious credits among themselves in SISDOF and serving as a smokescreen to conceal timber taken from Indigenous lands and protected areas. Business owners often declare that the credits derive from a lawful management plan or were transferred from another company (typically a front), when in fact the timber originated from public lands.

This practice constitutes outright timber theft, a plundering of the collective patrimony of the Brazilian people, designed to secure the illicit enrichment of a small number of timber entrepreneurs. It is, in essence, the private appropriation of a collective good.

When criminal investigations succeed in probing this scheme more deeply, business owners are charged with money laundering under Article 1 of Law Nº 9,613/98 and, in many cases, with participation in a criminal organization under Law Nº 12,850/13. Yet only rarely is it possible to prove their involvement, even though they are the true intellectual authors of the environmental crimes described.

Illegal logging is, in fact, the first step in the deforestation chain. No one clears an entire tract of forest without first exploiting the valuable timber it contains. Thus, before complete deforestation for conversion into pasture or other uses, the largest and most valuable trees are removed by these criminal groups. The sophisticated fraud outlined above is what enables timber extracted, for example, from Indigenous lands to arrive “laundered” in São Paulo and, after processing by industry, be transformed into a cabinet or a table, its illicit origin rendered nearly untraceable.

It should be noted that in some Indigenous lands that have suffered acute processes of acculturation and historical oppression, certain individuals may be co-opted to permit illegal extraction on their territories without the consent of the wider community. This is a regrettable reality, but it does not reflect the stance of most Indigenous peoples, who remain, for the most part, steadfast guardians of the forest.

It is also worth emphasizing that, even in cases of selective logging, the forest retains the potential to regenerate, since this activity, while degrading, does not completely clear the area. Within a few years, natural regeneration could occur. The problem, however, is that logging is often followed by **grilagem (land grabbing)**<sup>157</sup>, which consolidates deforestation and converts the forest to other uses.

This next stage of the process will be examined in the following segment.

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**157** TN: *Grilagem* is a Brazilian term that refers to the illegal occupation and appropriation of land, typically involving falsified documents and the use of violence or coercion to establish possession.

### ► Land grabbing and the “caretaker cattle”<sup>158</sup> tactic

Land grabbing (*grilagem*) of public lands in Rondônia often follows selective logging, consolidating the devastation of the forest. To illustrate how this process unfolds, one need only consider the case of the Bom Futuro National Forest (FLONA Bom Futuro).

There, land grabbing became dangerously institutionalized. After a long period of criminal invasion and illegal occupation, and even after an expensive and ultimately successful eviction effort, a political arrangement led by local elites in Brasília resulted in the enactment of Law Nº 12,249 by the National Congress. Through Articles 113 and subsequent provisions, this law handed a provisional victory to land grabbing of public lands in the State.

The “victory” in question was the removal of part of the Bom Futuro National Forest (FLONA) from protected status and its authorization for transfer to the State of Rondônia. The State, in turn, allowed the invaders to remain, thereby consolidating the illegal occupation and, in effect, rewarding the practice of land grabbing. This regrettable episode is not an isolated occurrence; it reflects a broader historical pattern of private appropriation of public lands, often with the complicity of the Brazilian State itself.

Land grabbing can take many forms, but in Rondônia today it typically occurs through associations created specifically to organize the invasion of public lands. Almost always, these are forested areas already degraded by selective logging, and in some cases, logging and invasion take place simultaneously. Such associations are used by unscrupulous actors to persuade impoverished rural workers that they can obtain a plot of land. The promise is simple: by occupying a public area (usually a National Forest, Biological Reserve, or National Park), the family will be entitled to a lot. For this, the association charges a fee ranging from one to five thousand reais, payable in installments by each family that settles on a “lot” of public land. The assurance is that, over time, the government will regularize the area and the occupant will receive legal title. It is important to note that this practice by associations arguably constitutes the crime of fraud under Article 171 of the Penal Code, as it involves a scheme designed to deceive vulnerable workers with promises that are highly unlikely ever to materialize.

Thus, even if the occupation fails, the fraudulent leaders will already have secured significant profit from the families deceived and manipulated as instruments of their scheme.

It should also be noted that the invasion of public land with the intent to occupy it arguably constitutes the offense set forth in Article 20 of Law Nº 4,947.

In this type of land grabbing, it is common to find small wooden shacks, subsistence plots, and a few head of cattle established to simulate possession of the land. The consolidation and eventual “regularization” of these alleged lots, however, are only possible with the acquiescence, and often the active involvement, of parliamentarians and local political leaders. Ultimately, when such criminal prac-

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**158** TN: The expression *boi zelador* (literally, “caretaker cattle”) refers to a tactic used by land grabbers in which a few head of cattle are placed on illegally occupied land as a way to claim and “guard” possession. This token presence of livestock is then invoked to create the appearance of productive use and justify claims of tenure.

tices are validated – whether through fraudulent land registry transactions or the enactment of laws – history shows that the poor families used to occupy the area gradually give way to large estates. This process, frequently marked by violence, results in land concentration driven by political leaders who, until then, had participated in land grabbing “under the table”.

In sum, land grabbing today often begins under the pretext of a “struggle for agrarian reform,” through the seemingly legitimate demands of vulnerable workers for access to land, but ultimately ends with large estates concentrated in the hands of powerful actors, yet another form of private appropriation of public wealth.

During this process of land grabbing, which takes place either concurrently with or following selective logging, the planting of pasture grass and the introduction of small-scale, low-intensity cattle ranching serve to “clear” what was once a thriving forest.

This form of ranching typically involves placing a few head of cattle on the land to justify supposed possession and reinforce claims of tenure. Informally, the practice is known as *boi zelador* (“caretaker cattle”), since the mere presence of livestock is used as a persuasive argument for occupation – often by individuals who do not even reside on the “lot.”

The practice of “caretaker cattle” is integral to this specific form of land grabbing and often causes severe, and sometimes irreversible, environmental damage. This is because the pasture grass introduced (particularly *brachiaria*) greatly impedes the regeneration of native forest.

Although the discussion began with the example of the Bom Futuro National Forest (FLONA), similar processes have unfolded across the State of Rondônia. In federal areas alone, cases include the Jaru Biological Reserve and the Pacaas Novos National Park, where, fortunately, land grabbing was unsuccessful and eviction processes were carried out with care and rigor.

### ► Nomadic and extractive cattle ranching

As a Federal Prosecutor in Rondônia, I encountered a reality acknowledged even by agronomists and other professionals in the sector: cattle ranching in the State resembles an extractive activity rather than an efficient economic enterprise. At its core, it is a predatory and unsustainable model.

In discussions with technicians and representatives of sectoral agencies, I observed that the dominant profile in the region is that of the “nomadic rancher.” This producer exhausts the productive potential of an area, leading to soil degradation and, consequently, pasture decline. As the grass loses its nutritional value, cattle stop gaining weight. Instead of investing in technology and proper management, the prevailing response is simply to open new pasturelands.

The result is stark economic inefficiency. The longer time required for cattle to reach slaughter weight delays meat sales and profit generation. Moreover, the extended production cycle substantially raises costs, since maintaining cattle on pasture entails additional expenses for medicine, veterinary care, and feed. In this scenario, cattle on pasture function as inventory, an asset that generates maintenance costs without producing commensurate returns. Faced with declining productivity, clearing new forest areas for pasture becomes the cheapest and easiest solution for ranchers.



Once vegetation is cleared, Amazonian soil, initially fertile due to the sediments accumulated by the forest over the years, allows newly planted pasture grasses to grow vigorous and nutrient-rich. This temporary fertility, however, fuels uncontrolled expansion into new forest areas.

It is therefore common to find rural properties with unauthorized deforestation in legal reserves and Permanent Preservation Areas (APPs), resulting in administrative fines, civil liability, and, in many cases, criminal prosecution. Another frequent practice is the grazing of cattle within Indigenous lands and protected areas adjacent to private properties, which likewise gives rise to the sanctions mentioned above.

The overlap of Rural Environmental Registries (CAR) with these protected areas, while facilitating the initial detection of illegality, is undermined by the widespread use of *laranjas* (straw owners). In practice, the CAR is registered in the name of third parties who are not the real agents of cattle ranching or deforestation, making it exceedingly difficult to identify and hold accountable the true offender.

The average cattle rancher in Rondônia – and likely throughout much of the Legal Amazon – operates a low-intensity system, with minimal technological input and no technical assistance. Rooted in a nomadic and extractive tradition, this model depends on a constant supply of new pastureland, almost always opened at the expense of adjacent forested areas.

In recent years, a clear trend has emerged in Rondônia: many medium- and small-scale ranchers, after experiencing prolonged losses (driven by factors such as low productivity and declining calf prices, among others), have abandoned ranching and leased their land to grain producers, generally arriving from Brazil's Center-South.

As a result, grain monocultures, especially soy and corn, have steadily replaced cattle ranching in Rondônia, bringing with them a range of environmental impacts that will be analyzed in the next segment.

### ► The scars of grain monocultures in Rondônia

In recent years, I have received numerous reports of severe pesticide contamination. These accounts describe mass fish deaths in rivers, significant crop losses, and health impacts on humans, such as skin lesions, irritation, nausea, and headaches. Investigations revealed that the vast majority of these cases were directly associated with the use of so-called agricultural “defensives” (pesticides) on soy and corn farms.

Aerial spraying of these chemicals has produced a series of additional problems. Beyond contamination itself, it disrupts nearby communities, as aircraft frequently fly over residential areas, generating considerable noise pollution.

A particularly damaging effect is drift, the movement of pesticide clouds into areas adjacent to grain fields. While most common with aerial spraying, drift also occurs during ground applications carried out by tractors.

In our investigations, we found that most grain farms occupy areas previously deforested for cattle ranching. With the growing trend in Rondônia of abandoning ranching in favor of leasing land for agriculture, soy has increasingly moved into already degraded areas. Yet even when it takes hold on previously cleared land, grain monoculture produces other, often more severe, environmental harms, since the contamination of people and water bodies is not typically associated with ranching.



Another common impact of grain monoculture is soil degradation to the point of desertification. This results from the logic of producers, often outside investors, who focus on maximizing short-term profits with little concern for the environmental liabilities left behind.

Beyond these harms, there are also serious consequences for neighboring farms. Complaints from small family producers reveal that pesticide spraying on large adjacent properties frequently drives pests into their own fields. In practice, when pesticides are applied on large-scale farms, insects migrate and concentrate in nearby organic crops, causing significant losses and a drastic reduction in productivity.

The outcome is that cultivating organic crops near large grain farms becomes virtually impossible. This, in turn, undermines the quality of the food we consume, as even family farmers are often forced to apply pesticides to their fields.

In the short term, contamination produces the harms already noted: the death of animals, including bees; the loss of neighboring crops; reduced productivity for small producers; and skin lesions and irritation in people.

Over the long term, prolonged exposure to these hazardous substances is known to cause cancer, particularly among rural workers who often apply pesticides without personal protective equipment. There is a growing concern that the rising incidence of cancer in Rondônia is connected to the increased use of pesticides in the region, although definitive research has yet to confirm this link.

It is important to note that local authorities have actively promoted grain monocultures through subsidies, tax exemptions, and the simplification, or outright waiver, of environmental licensing requirements. In doing so, the State has been complicit, and indeed a participant, in the environmental and public health harms caused by large-scale grain production.

Porto Velho also stands out as a key export hub, since the Madeira River, a major tributary of the Amazon, is extensively used by large companies to transport commodities on massive barges to Manaus and from there to the Atlantic Ocean.

Ultimately, the environmental liabilities remain in Rondônia, where the population bears the costs to collective health, while profits are funneled to investors who, for the most part, reside in Brazil's Center-South. In 2023, for example, soy production overtook cattle ranching as the State's leading source of revenue, an indication that the expansion of monocultures is likely to intensify in the coming years.

Beyond the deforestation of the Amazon rainforest, we now confront the environmental and public health crisis brought about by pesticides. This is yet another activity that exposes the profoundly misguided economic model currently imposed on the Amazon, a grave mistake of Brazilian society.

#### ► Wildcat mining (*garimpo*): pollution and slave labor

In 2024, I carried out an institutional visit to Campos Amazônicos National Park, a unique region that contains an enclave of *cerrado* within the Amazon rainforest, at the border of the States of Amazonas, Rondônia, and Mato Grosso.

Inside the Park, we encountered an area now overtaken by wildcat cassiterite mining. Fresh tractor tracks along the dirt roads revealed the recent presence of miners who, having been alerted by lookouts, had left shortly before our arrival. Along the way, we found countless prospecting pits. Where cassiterite had been located in significant volumes, the scene was devastating: an artificial desert carved

into the heart of the forest, with vast clearings marked by pools of water and piles of sand.

Cassiterite occurs mixed with sand, and water is essential for separating the minerals. To that end, with the aid of heavy machinery, miners divert small *igara-pés* (streams) to form large ponds at the extraction sites.

The result is stark: what was once lush forest is reduced to sand and stagnant, contaminated pools of water.

We also found makeshift camps serving as bases for mining workers. Conditions in these camps are inhumane, with frequent reports of malaria, inadequate food, and severely limited access to safe drinking water. Discussions with colleagues from the Labor Prosecutor's Office (MPT) confirmed that labor conditions analogous to slavery are commonly documented in wildcat mining operations.

Although I do not work directly with mining, it is evident that the case of Campos Amazônicos National Park is far from isolated. Wildcat mining is a highly profitable activity, particularly for the entrepreneurs who own the heavy machinery it requires.

On the Madeira River, for example, gold mining has long drawn large numbers of people while enriching only a few dredge owners. Manual laborers, meanwhile, risk their lives, whether through mercury contamination or the danger of arrest, while those who recruit and exploit them reap exorbitant profits.

In several criminal investigations, we uncovered complex schemes of money laundering linked to wildcat mining. Informally, conversations with residents of Porto Velho revealed that many local businesses were opened with mining proceeds, serving to lend an appearance of legality to profits derived from this illicit activity.

Beyond contaminating rivers and fish, and thereby threatening food security and public health, particularly among riverine populations, wildcat mining causes extensive environmental degradation. The damage to soil and subsoil is vast and often irreversible, compounded by deforestation.

Ultimately, the majority of those arrested, prosecuted, and convicted are manual laborers caught in the act. Rarely do criminal investigations succeed in identifying and holding accountable the true owners of the heavy machinery used in wildcat mining. As a result, there is strong suspicion that many of the workers criminalized are, in fact, victims of conditions analogous to slavery.

Once again, it becomes clear that command-and-control measures often serve less to protect the environment than to criminalize masses of vulnerable workers, people already burdened by harsh living and working conditions. In the case of mining, this reality is even more stark than in agriculture or cattle ranching.

This prompts us to question whether criminal law is truly the most effective tool for addressing the grave environmental challenges of the Amazon. In fact, in some instances it has unfortunately been the only tool employed, particularly by the Federal Public Prosecutor's Office.

A crucial question then arises: does criminalizing workers offer a real solution to deforestation in the Amazon, or does it merely deepen the socio-environmental crisis? Are the Federal Public Prosecutor's Office and other state agencies helping to resolve the issue, or are they, in reality, part of the problem?

We will examine these questions over the course of this article.

## The historical roots of deforestation in Rondônia: “anti-land reform,” “population export,” and the rise of “rural slums”

Environmental degradation in Rondônia is inseparable from its complex history of colonization. Beginning in the 1960s, and intensifying under the civil-military dictatorship (1964–1985), Rondônia and the broader Legal Amazon became the focus of state-driven planning whose impacts are still visible in today’s deforestation. This period was defined by a policy of “exporting land reform to the North,” which in practice functioned as an “anti-land reform,” opening the way for large-scale forest devastation and a lasting crisis of land tenure.

To understand the roots of the problem, it is vital to situate the so-called “anti-land reform” and “population export” within their historical context. Confronted with escalating social tensions and land conflicts in Brazil’s more urbanized South, Southeast, and Center-West, the military government resorted to a superficial fix. Instead of pursuing genuine land reform that would challenge entrenched landholding structures and the power of the wealthy landholding elites (*latifundiários*, in Portuguese), the regime redirected the surplus rural workforce to the Amazon. Rondônia thus became the principal destination for this displaced population, workers pushed out by agricultural mechanization and an export-oriented economic model that shed labor in the South.

This policy was designed not only to ease social pressures and rural unrest in the country’s more dynamic regions, but also to project an image of development through the occupation of so-called “empty territories.”

The “Land Statute” (Law 4,504 of 1964), though presented as a measure to quell peasant uprisings and promote social justice in the countryside, paradoxically served another purpose. In practice, it enabled large estates to be “reclassified” as “rural enterprises,” granting them public incentives that, rather than advancing land redistribution, reinforced the prevailing landholding structure and sidestepped any direct confrontation with powerful landowners.

In parallel with this strategy of “exporting people,” colonization projects in Rondônia proved deeply inadequate and, in many cases, became drivers of land grabbing and deforestation. Land distribution often took place without even minimal infrastructure – roads, basic services, agricultural support, and, most critically, legal security of tenure. The result was the emergence of genuine “rural slums,” where settlers were left to fend for themselves in a hostile and unfamiliar environment.

The land-allotment policy likewise proved disastrous. Initially, the government distributed small parcels of about 100 hectares, plots that were largely unviable for sustainable production without adequate support. Later, it shifted to selling larger 500-hectare lots to merchants, entrepreneurs, and, notably, logging interests.

Because the smaller parcels often fell below the fiscal module<sup>159</sup> of 60 hectares – the minimum considered necessary for sustainable production – many

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**159** TN: The fiscal module (*módulo fiscal*) is a unit of land measurement in Brazil, defined by law for each municipality, that represents the minimum area considered necessary for a rural property to be economically viable.

families were forced to sell their holdings at negligible prices. This dynamic accelerated land grabbing and land concentration on a massive scale, entrenching two of the region's most systemic and destructive problems.

Land grabbing – the criminal appropriation of public lands through forged documents, falsified titles, and, often, the bribery of public officials – emerged as one of the primary means of wealth accumulation in the state. This practice not only stripped away public assets but also fostered chronic legal insecurity, fueling land conflicts and rural violence. Weak enforcement and the labyrinth of bureaucracy surrounding land regularization created fertile ground for illegality to become the rule rather than the exception.

The direct connection between these historical policies and large-scale deforestation is undeniable. Lacking the infrastructure to transport small- and medium-scale agricultural production, and shut out of formal markets, many settlers saw no alternative for survival but to clear vast tracts of forest. The illegal timber trade financed this process, while extensive cattle ranching soon followed. Requiring vast areas of land and relatively little technical investment, ranching rapidly took hold as the dominant activity, with pastures historically covering nearly 80% of rural properties in Rondônia.

The influx of migrants, unable to be absorbed into a sustainable economy or formal labor market, was driven into chaotic patterns of land occupation, and, inevitably, into deforestation.

Today, Rondônia stands at the forefront of the so-called “arc of deforestation,” a geographic scar cutting deeper into the forest. The expansion of cattle ranching and large-scale grain monocultures, particularly soy, continues to be the driving force of destruction.

The data leave little doubt. By 2017, the state's cattle herd had already surpassed 14 million head, while soy cultivation, though more recent, expanded at a staggering pace, projected to cover nearly 400,000 hectares in the 2019–2020 harvest. This surge in agribusiness reflects the consolidation of a model that, from the outset, has depended on clearing the forest.

The agrarian policy of the military dictatorship thus laid the foundation for a landscape defined by “land free for plunder, men free for labor, and a working class too subdued to mount effective resistance.”

Together, these conditions created a “paradise” for capital and investors chasing quick profits at the expense of environmental and social wealth. Fragile environmental protections, combined with tensions involving migrants in search of land and a tutelary model of “integrating” Indigenous peoples that disregarded their territorial rights, were further aggravated by government directives that at times explicitly encouraged predatory activities such as mining within Indigenous lands.

The outcome is persistent land-tenure chaos, where land grabbing and speculation with precarious property deeds – the infamous *títulos podres* (“rotten titles”) – have become dominant mechanisms of wealth accumulation. In some cases, the Judiciary has been inadvertently co-opted to mediate, and at times legitimize, this process of dispossession, facilitating the reconcentration of land in the hands of a few and perpetuating the advance of deforestation.

In short, the policy of “exporting land reform” to the North, particularly to Rondônia, gave rise to a chaotic and intrinsically destructive pattern of occupa-

tion, producing a fractured land-tenure system and a continuous cycle of deforestation fueled by legal fragility, systemic land grabbing, and the expansion of large-scale agribusiness that privileges profit over sustainability. In this case, history stands as an unforgiving mirror of the present.

The situation risks worsening with the enactment of Law 14,757/2023, which abolishes the resolatory clauses in Public Land Alienation Contracts (*Contratos de Alienação de Terras Públicas* – CATPs). These contracts, used during the civil-military dictatorship to distribute large tracts of land, included clauses that imposed productivity targets to guarantee the fulfillment of property's social function. When such targets were not met, the land was to revert automatically to public ownership.

The track record of the Federal Public Prosecutor's Office in matters of agrarian reform and land regularization, along with analyses from the now-defunct *Terra Legal* program and INCRA, demonstrates that these clauses were almost invariably ignored. The unconstitutional attempt to revive CATPs threatens millions of hectares of still-unexploited land and risks further deepening the deforestation crisis. In response, the Federal Public Prosecutor's Office in Rondônia and the Federal Prosecutor for Citizens' Rights have petitioned the Prosecutor General's Office to challenge the law.<sup>160</sup>

## Misguided environmental policy: the Amazon was never an empty land

In 2024, the complexity of Rondônia's environmental and social challenges came into sharp relief during two public hearings triggered by residents of the communities of Nazaré and Gleba Rio Preto, in the lower Madeira River region. These communities exposed, in stark terms, the consequences of an environmental policy built on flawed premises.

The riverside community of Nazaré petitioned for the opening of a road through the Cuniã Ecological Station to connect with highway BR-319, seeking to overcome the isolation imposed by reliance on river transport, a dependence that hinders both the flow of local production and access to public services in Porto Velho.

At the same time, residents of Gleba Rio Preto requested the use of existing roads inside the Jacundá National Forest, currently reserved for the operations of a logging concessionaire. Their goal was to break the isolation created by the presence of three protected areas and two rivers.

Although the Federal Public Prosecutor's Office opposed both demands, on the grounds that they were legally incompatible with conservation rules, the profound hardships faced by these communities became unmistakably evident.

This experience showed that the federal government's environmental policy, particularly between the 1980s and 2010s, was in many respects misguided. In this

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<sup>160</sup> BEVILAQUA, Raphael Luis Pereira. *Títulos “podres” de imóveis rurais e o regime de desposseção de ativos públicos mediado pelo Poder Judiciário no Estado de Rondônia*. 2020. 196 f. Dissertation (Master's in Law) – Law School, Rio de Janeiro State University, Rio de Janeiro, 2020.

period, numerous protected areas were created, most of them strict protection zones, whose rules were incompatible with resource use, gathering, and above all with the continued presence of long-established residents.

The most serious misstep, despite the genuine intent to safeguard the environment, was the absence of meaningful dialogue with populations that had lived in these territories for generations. As a result, several strict protection areas were established in places already occupied by riverside communities and even Indigenous peoples, both contacted and isolated. The Guaporé Biological Reserve and the Pacaás Novos National Park are clear examples, created in areas with a long-standing presence of isolated Indigenous groups.

In the lower Madeira region, where the communities of Nazaré and Gleba Rio Preto are located, the creation of three protected areas effectively hemmed in local residents, who were excluded from this environmental policy. While the Lago Cuniã Extractive Reserve eventually encompassed and protected many families, the riverside communities along the Madeira were left outside its boundaries, trapped between protected areas and the river.

As a consequence, communities that had long depended on forest resources such as açaí, cupuaçu, Brazil nuts, and timber were cut off from continuing to access them. Fishing, another traditional livelihood, was heavily disrupted by the Jirau and Santo Antônio hydroelectric dams, which depleted fish stocks, compounded by the longstanding mercury contamination caused by wildcat gold mining in the Madeira River. Their isolation has only deepened, and in 2024 it was further aggravated by a historic drought that rendered the river unnavigable for weeks.

This environmental policy rested on the same mistaken premise as the agrarian policy discussed earlier: the assumption that the Amazon was an uninhabited land, a demographic void.

The design of protected areas ignored the historic presence of traditional populations such as riverside dwellers and Indigenous peoples, as well as older INCRA settlements like *Gleba Rio Preto*.

By cutting off access to forest-based extractive resources, either through strict protection areas or through sustainable-use areas granted to logging companies, local communities were left with little option but to adopt alternative livelihoods outside their traditional repertoire, including small-scale cattle ranching and more extensive forms of agriculture.

It is not uncommon for members of these communities, coopted by local political leaders, to be caught in environmental crimes such as illegal logging or wildcat gold mining, driven less by choice than by the absence of viable economic alternatives.

The prioritization of strict protection areas over sustainable-use areas, which might have included and safeguarded local residents, ended up compounding economic and agrarian challenges, pushing poor workers into the orbit of illicit practices promoted by logging businesses, land grabbers, and mining operators.

In sum, the creation of protected areas was an essential step toward preserving the Amazon forest in Rondônia. Its importance and necessity are beyond question. Yet because it was poorly planned and failed to account for the historic presence of local populations, it aggravated social and agrarian dilemmas that ultimately fostered conditions conducive to environmental crime.

## The shortcomings of command-and-control measures in tackling Amazon deforestation

Command-and-control measures, which involve enforcement, sanctions, investigations, and the prosecution of environmental offenders, are undeniably essential. Yet, on their own, they cannot address the complex drivers of deforestation and environmental degradation in the Amazon. In a territory of such colossal scale, the task of “watching and punishing” is Herculean; it is simply impossible to sustain constant policing across the vast expanse of public forests targeted daily by environmental crime.

Compounding this challenge is the Brazilian state’s failure to maintain even a minimal institutional presence in the North. This is reflected not only in the limited capacity of oversight bodies such as the Federal Police and IBAMA, both operating with far fewer staff than in the South and Southeast, but also in the chronic shortage of personnel in agencies tasked with social policy, such as INCRA.

Administrative accountability for environmental crimes still depends heavily on the physical presence of IBAMA or ICMBio agents in affected forest areas. These operations demand significant resources for equipment, vehicles, fuel, and daily allowances for staff, making it impossible to carry them out with the frequency required to deter criminal activity. While the state spends heavily to reach these remote regions, wildcat mining and logging operations extract immense profits from the same territories, rendering crime far more economically viable than enforcement.

Even when sporadic arrests and convictions occur, they usually involve manual laborers, while the entrepreneurs behind environmental crime continue their illicit activities. The system tends to neutralize only the most easily replaced actors in the chain.

New frauds are devised daily to circumvent oversight in logging, cattle ranching, and land grabbing. A perpetual game of cat and mouse. The Federal Police routinely destroy dredges used in wildcat mining, yet the activity persists in areas rich in gold, diamonds, and other minerals. Likewise, while drivers and laborers in illegal logging are prosecuted almost daily, timber theft from Indigenous lands carries on unabated.

The need to expand the state’s presence in the Amazon and intensify enforcement is indisputable. Yet criminal prosecution alone does little to dissuade those who profit most. Worse, the punitive system ends up targeting vulnerable workers, while the true architects of environmental crime remain largely untouched. The economic elite, often shielded by local political elites who actively undermine environmental oversight, tends to emerge unscathed. Overburdened with cases against “small fish,” law enforcement rarely reaches those who profit most from environmental destruction.

The criminal justice system, comprising the police, the Federal Public Prosecutor’s Office, and the Judiciary, has proved incapable of addressing the complex social, political, and economic dynamics that sustain environmental crime. More troubling still, the straightforward application of criminal law falls almost exclusively on an extremely vulnerable working class, branding them with the scars of imprisonment or conviction and making their transition to lawful livelihoods even more difficult.



It is true that penalties for environmental crimes are low and often disproportionate when compared to other offenses in the Penal Code that protect less valuable legal interests than the environment. Yet we strongly oppose harsher penalties. In the Amazon, criminal law is an expensive and deeply inefficient instrument for combating deforestation. Worse, it exacerbates preexisting social problems by criminalizing already vulnerable workers, stripping them of a clean record, and turning them into repeat offenders. Raising penalties would serve only to accelerate mass incarceration in rural areas, a phenomenon already well established in Brazil's major cities.

What is required instead is stronger environmental oversight combined with a more consistent presence of the Brazilian state in the North, especially through expanded social policies and agrarian reform. Reducing the vulnerability of rural workers in the Amazon is key to depriving environmental crime networks of the cheap labor on which their illicit activities depend.

In sum, criminal prosecution on its own is not only ineffective but counterproductive, as it deepens social problems that already exist.

Still, the application of criminal law can be less damaging if investigations and proceedings focus on the economic and political elites who truly command criminal networks. Within the factual and legal limits that constrain enforcement bodies, the task is to direct attention where it matters most: to those who orchestrate these illicit activities.

Here, a principle from medicine is instructive: treat the cause, and the symptoms will disappear. If the causes are economic, any non-economic measure will amount to nothing more than a palliative. Punitive power functions in this way – it may temporarily relieve a headache, or, if mishandled, cause even greater pain – but the symptom will inevitably return if the underlying condition is left untreated.

If deforestation is a disease, then its cure undeniably lies in the design of a different economic policy for the Amazon.

## **Damage mitigation: legal strategies against deforestation in the Amazon**

For the Federal Public Prosecutor's Office (MPF), defending legality and upholding the 1988 Constitution are central to our mission, a role that becomes even more critical in the Legal Amazon. Here, the national legal order frequently meets resistance from local elites, as seen in the recurring passage of state laws later struck down as unconstitutional by State Courts of Justice and, at times, by the Federal Supreme Court. In this context, the MPF has advanced legally grounded strategies to curb and contain environmental degradation, deploying instruments that target the multiple links of the economic chains dependent on deforestation.

To restrain predatory cattle ranching, the MPF launched the *Carne Legal* initiative, also known as the “TAC da Carne” (Conduct Adjustment Agreement for the Beef Sector). This approach rests on the principle that slaughterhouses purchasing cattle from illegally deforested areas are classified as indirect polluters under Article 3, item IV, of Law Nº 6,938/1981, and can therefore be held civilly liable.

Through Conduct Adjustment Agreements (CAAs), voluntary settlements negotiated between the MPF and companies, slaughterhouses are required to adopt



protocols for monitoring their suppliers. The aim is to prevent the purchase of cattle raised in violation of socio-environmental standards. By focusing on the accountability of buyers rather than chasing after each individual rancher, this strategy has proven more effective: it targets the financial lifeblood of the production chain, striking noncompliant producers where it hurts most, their bottom line.

A further tactic involves CAAs, or when necessary, legal action against financial institutions that provide loans to ranchers operating under such conditions. Denying access to credit or demanding early repayment of existing loans has compelled producers to adapt, for example, by reforesting illegally cleared reserves or removing cattle from Indigenous lands. In this way, compliance with environmental law becomes a prerequisite for financing. Beyond slaughterhouses and banks, the MPF has also expanded its efforts to the retail sector, including major supermarket chains.

Particularly in Rondônia, where the dominant ranching profile is “nomadic” and “extractivist,” even modest shifts toward sustainable practices, such as pasture rotation, better grass management (for example, intercropping legumes with brachiaria grass), supplemental feeding, integrated forestry–crop–livestock systems, and genetic improvement, would be enough to raise productivity. In practice, this means producing more beef on less land and reducing the pressure to clear new forest for pasture. Yet most producers have not adopted these methods.

In the grain sector, a similar approach to *Carne Legal* has taken shape in the *Protocolo Verde dos Grãos* (Green Grains Protocol), a commitment by companies operating in the intermediary stages of the soy supply chain.

Another example is the recently recognized work of Federal Prosecutor André Porreca, who, applying the same logic, secured agreements with Mercado Livre and other digital platforms to prohibit the sale of mercury on their sites, an intelligent and effective measure aimed at cutting off access to a metal essential for wild-cat gold mining.

These initiatives all share a common “DNA”: they place responsibility on indirect polluters, compelling them to change their practices and, in turn, making it harder for direct polluters to continue illicit activities. Still, while smarter and more effective than merely prosecuting individuals, such strategies can only mitigate the problem; they cannot resolve deforestation in the Amazon once and for all.

At the root of the crisis lies the prevailing economic model, driven by extensive cattle ranching, monoculture grain production, and mining. Even when carried out within the bounds of the law, as in the case of the sustainable ranching practices cited above, these activities are inherently harmful to the environment because they almost always depend on the clearing of native vegetation.

The definitive solution, then, calls for a thorough rethinking of the prevailing economic practices across the states of the Legal Amazon, a theme taken up in the next segment.

## Economic solutions for valuing the standing forest

A kilo of Brazil nuts can sell for as much as R\$130, curiously, a price higher than that of many cuts of beef in the same supermarket’s cold section.

This stark contrast lays bare an alarming paradox: why is the Brazil nut tree, the source of such a prized product, considered a threatened species in 2025, while Rondônia's cattle herd, an activity long recognized as a driver of deforestation, has surged past the staggering mark of 18 million head?

This disparity exposes a fundamental flaw in how we value the forest. The key link in the chain, the extractivist who gathers the Brazil nuts, often receives only a fraction of the final market price. The gulf between what the consumer pays and what reaches those who live from the forest weakens incentives to keep it standing, making more destructive activities, such as extensive cattle ranching, seem more appealing in the short term.

The experience of federal protected areas in Rondônia, such as the Rio Cau-tário Extractive Reserve, illustrates this clearly. There we met Alexandre, an extractivist who works with a wide range of forest products: açaí, Brazil nuts, cupuaçu, dragon's blood, andiroba, and copaíba. Alexandre told us he sells a liter of copaíba oil for R\$80. Extracted from a majestic forest tree, this oil is highly valued in the pharmaceutical and cosmetics industries. With antifungal and antibacterial properties, it can even be applied directly to the skin for healing.

Yet a quick internet search shows that 30 ml of the same raw oil can sell for up to R\$100 (with prices ranging from R\$30 to R\$130, depending on the supplier). In other words, in the best-case scenario, that single liter could reach the consumer at R\$3,333 instead of the R\$80 Alexandre receives.

The gap is staggering. As the primary producer, Alexandre is paid far below the true value because he depends on middlemen, intermediaries who buy products in the community and resell them to industry. This example makes it plain that sustainable extractivism, even without complex processing or with only minimal transformation, can generate products of substantial market value. They reach the consumer with high added value, though very little of it stays in the hands of those who harvest them.

This reality could be dramatically changed through public policies that genuinely support extractivism and agroforestry, finally granting the standing forest the economic value it deserves.

Today in Rondônia, rural workers who manage to accumulate even modest capital often choose to invest in cattle. They buy a few head of livestock and take a risk on an activity that is widely known to be polluting and fundamentally incompatible with the preservation of the Amazon forest.

This harmful logic could shift if those same workers could see the intrinsic value and economic benefits of keeping the forest standing. Were sustainable forest extractivism made more accessible and profitable, through proper training and government support, the choice would likely be very different.

The potential of fishing should not be overlooked either. The distinctive flavor of Amazonian fish, especially Rondônia's *tambaqui*, already attracts both tourists and locals to regional restaurants.

It is essential that the State foster the bioeconomy and traditional forest-based livelihoods. This means not only promoting but also establishing industries that work directly with extractivists, easing the enormous logistical barriers they face today.

It is important to remember that the Amazon forest, at its core, is an agroforest, long managed by Indigenous peoples who planted and spread the very trees

that sustained them. Recent studies from the *Amazônia Revelada* project, which uses LIDAR (Light Detection and Ranging) technology, have revealed clear evidence of this ancestral stewardship.

Equipping communities with machinery to process forest products locally is a key strategy for adding value at the source and ensuring that a greater share of income remains with local populations.

No less crucial is the pursuit of a genuine popular land reform that strengthens and supports family farming outside forested regions. Such a measure would help curb land grabbing and reduce the flow of cheap labor into criminal activities. As noted in earlier chapters, reducing the vulnerability of rural workers in the Amazon is vital to prevent their exploitation by environmental crime networks engaged in illegal mining, predatory logging, and land grabbing. A combination of popular land reform, investment in family farming, and the promotion of agro-extractive value chains offers an economically viable and effective path to slowing deforestation and environmental degradation.

Still, this kind of solution extends beyond the scope of the justice system. It demands planning and implementation at the political level. This is a debate that Brazilian society must embrace, especially in the political arena, where structural solutions for the country are forged.

What is needed, therefore, is a structural response: one that channels time and energy into long-term strategies, rather than relying on short-term fixes which, besides failing to solve the problem, often make it worse when poorly managed.

## THREATS AND LEGAL SOLUTIONS TO ADDRESS IMPACTS ON PROTECTED AREAS AND OTHER PRESERVED LAND

BY LEANDRO MITIDIERI FIGUEIREDO<sup>161</sup>

**P**rotected Areas (known in Brazil as *Unidades de Conservação* – UCs), established under the National System of Protected Areas (*Sistema Nacional de Unidades de Conservação da Natureza* – SNUC), have the primary objective of protecting natural ecosystems and conserving biodiversity, water resources, and cultural heritage. Through this comprehensive strategy, they contribute to combating climate change, maintaining water balance, and promoting sustainable development across different regions.

Across the Amazon, Caatinga, Cerrado, Atlantic Forest, Pampa, and Pantanal, Brazil is home to an extensive network of Protected Areas totaling more than 258 million hectares<sup>162</sup>, equivalent to 19.07% of the country's continental territory. These areas vary in size, objectives, and categories of protection, and must also safeguard the ways of creating, producing, and living of traditional peoples.

At present, Brazil has 336 federal Protected Areas<sup>163</sup>, most of them located in the Amazon. However, many of these areas, though formally created, have not been fully implemented. It was in this context that, in 2013, the Federal Public Prosecutor's Office (MPF) established the Working Group (WG) on Protected Areas. At the time of its creation, the WG considered 333 Protected Areas and set as one of its main objectives the effective implementation of federal PAs.

Despite the creation of PAs, the group identified several challenges to making these territories effective, including the absence of management plans, advisory councils, and the so-called territorial consolidation. This process encompasses land tenure regularization, removal of irregular occupants, installation of signage, and other measures necessary to ensure that the area is genuinely protected. Only when these minimum elements are in place can a PA truly function in practice.

Between 2003 and 2009, Brazil came very close to achieving Aichi Target 11<sup>164</sup> ahead of schedule. The target, established under the Convention on Biological Diversity (CBD) in 2010, required signatory countries to protect 17% of terrestrial ar-

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**162** Data available in the Brazilian Protected Areas Panel: <https://cnuc.mma.gov.br/powerbi>.

**163** As of September 2023, except for Private Natural Heritage Reserves (RPPNs): [https://www.gov.br/icmbio/pt-br/assuntos/dados\\_geoespaciais/mapa-tematico-e-dados-geoestatisticos-das-unidades-de-conservacao-federais/AreaUCsFederaisCategoria\\_Set2023.pdf](https://www.gov.br/icmbio/pt-br/assuntos/dados_geoespaciais/mapa-tematico-e-dados-geoestatisticos-das-unidades-de-conservacao-federais/AreaUCsFederaisCategoria_Set2023.pdf).

**164** In total, there are 20 Aichi Targets, established with the objective of safeguarding the planet's biodiversity.

eas and 10% of marine areas by 2020. Although Brazil had a significant number of PAs, many of them had been formally created but not fully implemented.

Progress, already slow, faced a major reversal beginning in 2016, when legislative initiatives emerged seeking to reduce, extinguish, or recategorize PAs, a process known internationally by the acronym PADDD<sup>165</sup>. The debate was especially prominent in relation to PAs in southern Pará and led to significant mobilization by the Federal Public Prosecutor's Office (MPF). Since 2016, more than 20 bills have been introduced across Brazil aimed at extinguishing, reducing, or recategorizing PAs.

A landmark case is that of Itatiaia National Park, the first Protected Area established in Brazil. Created in 1937, the park has yet to achieve territorial consolidation, as its land tenure regularization remains incomplete. Compounding this challenge was Special Appeal Nº 1996696, which questioned the validity of its founding decree. The landowners argued that, because expropriation had not been carried out within five years, the decree had lapsed. The debate over the validity of this decree extends well beyond the park itself: in addition to threatening the existence of this specific PA, such an interpretation would place all other Protected Areas, and the National System of Protected Areas (SNUC) as a whole, at risk.

A more recent example occurred in 2022, when a bill<sup>166</sup> was approved reducing the territory of Brasília National Forest by 3,700 hectares, justified as a measure to resolve conflicts with settlements.

Within the MPF, two chambers are directly engaged in these issues: the Fourth Chamber, dedicated to environmental matters, and the Sixth Chamber, dedicated to Indigenous Peoples and Traditional Communities. These mandates are closely interlinked and are therefore treated in an integrated manner. This approach reflects the reality that Brazil's Protected Areas must be understood alongside Indigenous Lands (ILs) and other traditional territories, such as quilombola lands.

Brazil has 573 Indigenous Lands, of which roughly two-thirds of the territories claimed by Indigenous Peoples have been regularized. Quilombola territories, however, show far less progress. Since the enactment of the 1988 Constitution, only 314 titles have been issued, 143 by the federal government and 171 by states and municipalities. Considering that the Palmares Cultural Foundation has issued approximately 3,010 self-definition certificates and that 1,807 cases remain pending at the federal level, only about 10% of quilombola land claims have been met (INCRA data, 2022 and 2024).

Altogether, Protected Areas, Indigenous Lands, and quilombola territories represent 19.07%, 11.6%, and 0.2%, respectively, of Brazil's national territory. Even when accounting for overlaps between PAs and traditional lands, only about 30% of the country's territory can be considered protected (<https://brasil.mapbiomas.org/>).

This scenario underscores the small proportion of protected lands compared to the vast areas available for agricultural exploitation. It highlights the paradox of failing to safeguard even this limited share of protected territories, areas that are, in fact, essential for ensuring the sustainability of agricultural activities on the remaining lands.

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<sup>165</sup> Protected area downgrading, downsizing, and degazettement.

<sup>166</sup> Bill Nº 2,776/2020.

One explanation lies in Brazil's long-standing model of land concentration, which has historically reinforced pressures on protected territories. Today, the country's ten largest landholdings occupy 73% of the national territory, and just 0.3% of rural properties control 25% of all agricultural land.

It is worth recalling that Brazil's *Casa Grande e Senzala*<sup>167</sup> model stood in contrast to diversified farming and productivity. The abundance of land, the tropical and subtropical climate, and the near absence of local labor during the early stages of colonization gave rise to the "large-scale exploitation unit," in which the growth of Brazil's agricultural economy was tied to the intensification of labor exploitation<sup>168</sup>. Over time, however, Brazil transformed into a global agricultural power. By the late 1970s, the country had shifted from being a food importer to becoming one of the world's largest producers and exporters, largely due to state policies grounded in technological innovation, led by EMBRAPA<sup>169</sup>.

Productivity comparisons, however, are revealing. The Netherlands, roughly the size of the Brazilian state of Espírito Santo, recorded agribusiness exports of USD 111 billion in 2021, nearly USD 10 billion more than Brazil in the same year. As reported by The Washington Post in November 2021<sup>170</sup>, the Netherlands has become the world's second-largest exporter of agricultural products by value, behind only the United States. Its prominence is even more notable in the climate context: the country is also a leading exporter of agricultural and food technology, pioneering breakthroughs in cell-based cultivated meat, vertical farming, seed technology, and robotics for milking and harvesting. These innovations are aimed at reducing water use and curbing carbon and methane emissions<sup>171</sup>.

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**167** TN: *Casa Grande e Senzala* (literally "Big House and Slave Quarters") is the title of a classic 1933 work by Brazilian sociologist Gilberto Freyre. The expression has since become a shorthand for Brazil's colonial and post-colonial system of large landed estates, where the "casa grande" symbolized the wealth and power of plantation owners, and the "senzala" referred to the slave quarters that housed enslaved Africans.

**168** FURTADO, Celso. *Essencial*. São Paulo: Companhia das Letras, 2013, pp. 300-301. The thesis of late industrialization was championed by ECLAC (Economic Commission for Latin America and the Caribbean), created in 1949 by the United Nations. Celso Furtado, one of its economists, argued that the behavior of the capitalist economy differed when observed in countries that exported industrial products (the central economies) as opposed to those that exported primary products (the peripheral economies). Later, in 1955, the Higher Institute of Brazilian Studies (Instituto Superior de Estudos Brasileiros – ISEB) advanced the same lines in the project that became known as "national developmentalism." The main architects of the national development project were Hélio Jaguaribe, Guerreiro Ramos, Cândido Mendes de Almeida, Álvaro Vieira Pinto, and Nelson Werneck Sodré, who argued that Brazil could only overcome its stage of underdevelopment through the intensification of industrialization. Available at: <http://cpdoc.fgv.br/producao/dossies/JK/artigos/Economia/ISEB>. Accessed on: Jan. 30, 2017.

**169** BARROS, José Roberto Mendonça de; BARROS, Alexandre Lahóz Mendonça de. A geração de conhecimento e o sucesso do agronegócio brasileiro. *Revista de Política Agrícola*, Year XIV, no. 4, Oct./Nov./Dec. 2005. Available at: <https://seer.sede.embrapa.br/index.php/RPA/article/download/546/pdf>. Accessed on: Nov. 24, 2023.

**170** Available at: <https://summitagro.estadao.com.br/colunistas/o-exemplo-holandes/>. Accessed on: Nov. 24, 2023.

**171** Available at: <https://www.washingtonpost.com/business/interactive/2022/netherlands-agriculture-technology/>. Accessed on: Nov. 24, 2023.

In contrast to the Dutch example, a recent study shows that areas deforested or converted to cattle ranching in Brazil have increased by 60%, even as the total pasture area has declined and overall beef production has fallen. This apparent paradox is explained by the expansion of unproductive ranching driven primarily by land speculation<sup>172</sup>.

From Gilberto Freyre to Sérgio Buarque de Holanda, there is no shortage of interpretations for Brazil's divergence from other countries, yet the land question remains central. Some influential theses argue that Brazil, like many underdeveloped nations, is a prisoner of geography, an idea popularized in Tim Marshall's best-selling *Prisoners of Geography*. Viana Moog had already pointed to geography as a factor, but his work became best known for the classic contrast between the American pioneer settler, motivated by the desire to develop new land, and the Brazilian *bandeirante* conqueror, motivated by the desire to exploit. The American pioneer's condition, however, is best explained by the search for land, as many had been expelled from England during the enclosures.

On this issue of land, Brazil and the United States took very different paths. Brazil's 1850 Land Law deliberately restricted access to new land acquisitions, especially for Black people on the verge of emancipation. In the United States, by contrast, Abraham Lincoln initiated an agrarian reform that distributed 270 million acres, an effort that, remarkably, far exceeded Cuba's agrarian reform, which began in 1959 and covered about 15 million acres.

The impact of Lincoln's Homestead Act cannot be overstated. This federal law granted a quarter-section of undeveloped land in the West to any family or individual over 21 willing to migrate to the region. As in Brazil, a landed aristocracy resisted surrendering its privileges, and the Act was the outcome of years of disputes and failed legislative attempts. Only in 1862, without opposition from the South, then embroiled in the Civil War, did the Homestead Act finally prevail.

Brazil, however, followed a different path. Here, barons and *bacharéis* (legal elites) proved far more adept at preserving the *Casa Grande e Senzala* model, in which land ownership was synonymous with political power, including the right to vote. In this sense, Brazil forged one of the most resilient aristocracies in the world, as the country still ranks among the twenty nations with the most unequal household income distribution, according to the Gini index.

This brings us to land concentration: Latin America is the most land-concentrated region in the world, and Brazil has the fifth-highest concentration in the region, according to an Oxfam study based on FAO data and national censuses. The few estates that dominate land ownership are largely devoted to soybeans, eucalyptus, and sugarcane for export, often at the expense of domestic food pro-

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<sup>172</sup> "Data from Trase reveal that areas deforested or converted to cattle ranching increased from 590,000 hectares (ha) in 2016 to 948,700 ha in 2020—a 60% increase. However, over the same period, the total pasture area declined from 164 million hectares (Mha) to 162.5 Mha, and total beef production also fell from 10.2 million to 9.8 million tons. The expansion of unproductive ranching for the purposes of land speculation may explain this apparently contradictory trend. This indicates that ranching, whether for beef production or land speculation, continues to be the main driver of deforestation and land conversion." Available at: <https://insights.trase.earth/insights/exportacoes-brasil-sileiras-de-carne-bovina-e-desmatamento/>. Accessed on: Nov. 24, 2023.



duction. Indeed, 70% of the food consumed in Brazil comes from family farming, according to IBGE data.

Mining represents one of the most significant challenges for Protected Areas, as it is fundamentally incompatible with the very notion of conservation. Unlike other activities, mining does not allow for environmental recovery, since exploited territories cannot be restored. Importantly, the push for reduction, extinction, or recategorization is not confined to Protected Areas. There has also been strong pressure to expand mining into Indigenous Lands (ILs). Article 231, paragraph 7, of the Federal Constitution admits this possibility, provided that it is expressly authorized by Congress. Even so, numerous bills and persistent attempts have sought to weaken this safeguard.

One of the most striking strategies emerged within the National Council of Traditional Peoples and Communities (CONPCT), established to coordinate with the National Policy on Traditional Peoples and Communities. In recent years, wildcat miners have petitioned the council to be formally recognized as a traditional people. This illustrates the various dangerous fronts seeking to circumvent constitutional protections in order, for example, to authorize mining in ILs.

An important precedent on the flexibilization of rules for Protected Areas was established in Direct Action of Unconstitutionality (ADI) 4717, filed by the Office of the Prosecutor General of the Republic. In a unanimous decision, the Plenary of the Federal Supreme Court (STF) held that the reduction of Protected Areas cannot be carried out through a provisional measure. Another positive development is Bill 5,174/2019, which makes it mandatory to conduct prior technical studies and consultations before any proposal to reduce or recategorize a PA.

The principle of non-regression in environmental law is one of the key banners of the MPF. The Working Group on Protected Areas has even issued a technical note on the subject. While not new, since the Federal Supreme Court (STF) has already established jurisprudence on the matter, it remains highly significant. Brazil has made advances in environmental conservation and, in theory, cannot backtrack. This principle extends not only to environmental protection but also to human rights more broadly. Nevertheless, repeated attempts to weaken the Forest Code underscore the importance of reinforcing this doctrine.

Brazil has signed not only the Convention on Biological Diversity but also committed to the 20 Aichi Targets and to reducing greenhouse gas emissions. These international treaties contain norms for the protection of nature and are therefore regarded as human rights treaties. As Flávia Piovesan points out, Brazilian law has adopted a mixed system, under which international human rights treaties are subject to a differentiated legal regime compared to other international agreements, pursuant to Article 5, §§1 and 2, of the Federal Constitution.<sup>173</sup>

Given the doctrinal and jurisprudential controversy surrounding the hierarchy of international human rights treaties, Constitutional Amendment 45/2004 established that such treaties must follow the same approval process as constitutional amendments in order to have equivalent status, namely, passage in each chamber of Congress, in two rounds, with a three-fifths majority of the members.

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173 PIOVESAN, Flávia. *Temas de direitos humanos*. São Paulo: Saraiva, 2010, p. 51.



This did not, however, resolve the debate with respect to treaties ratified before the amendment, and multiple interpretations continue to coexist. The turning point came in 2008, with the judgment of Extraordinary Appeal 466,343, which broke with STF jurisprudence dating back to 1977 that had equated international treaties with ordinary legislation. The decision conferred a special and privileged hierarchy on international human rights treaties, endorsing Justice Gilmar Mendes' thesis of "supralegality," placing them above ordinary legislation but below the Constitution.<sup>174</sup>

This special and privileged status gives rise to the so-called "international conventionality control," to be exercised not only by international human rights bodies but also by the Federal Supreme Court and domestic courts, invalidating internal norms that conflict with international human rights standards.<sup>175</sup>

Environmental policies are often framed as obstacles to progress. Restrictions in this field, which undeniably have economic implications, are frequently attacked for allegedly preventing development. What is needed, however, is a closer examination of the concept of sustainability.

The so-called Agricultural Revolution, which began roughly 10,000 years ago, marked a turning point as human societies began devoting most of their time and energy to cultivating certain plants and domesticating animals. This transition from nomadism to sedentary life enabled the rise of the first cities.

If the Agricultural Revolution settled humankind on the land, millennia later another revolution would displace it: the Green Revolution. This term refers to the sweeping modernization of agriculture, driven by innovations such as improved seeds, mechanized farming, fertilizers, and pesticides.

The Green Revolution fueled a global surge in grain production that outpaced population growth. Yet despite these technological advances and the sheer volume of food produced, the Food and Agriculture Organization of the United Nations reports that "between 702 and 828 million people worldwide faced hunger in 2021."

The Small Farmers' Movement argues that simply distributing money or food fails to address the root of the problem, as social exclusion is inherent to the current model of production, a model that, in fact, generates poverty. While overall calorie consumption has risen, dietary diversity has declined. The large-scale production of a limited range of commodities requires heavy investment and ever-expanding land use to achieve economies of scale and lower costs. This logic systematically excludes small-scale family farming and traditional peoples. The search for alternative models is therefore not only an environmental issue but also a matter of sustaining family and traditional agriculture, by reducing or eliminating pesticide use, preserving local marketing circuits, and ensuring communities' food sovereignty.

Agroecology and the bioeconomy stand out as examples of such alternatives, offering economic activities that deliver financial returns while keeping the forest standing. Numerous studies have long pointed out that an economy built on

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**174** Ibid, p. 57.

**175** RAMOS, André de Carvalho. O Supremo Tribunal Federal e o Direito Internacional dos Direitos Humanos. In: SARMENTO, Daniel; SARLET, Ingo Wolfgang (Coord). Direitos fundamentais no Supremo Tribunal Federal: balanço e crítica. Rio de Janeiro: Lumen Juris, 2011. p. 19.

standing forests, without new dams or large highways, would create more jobs and generate more income than the current extractive model. This has become one of today's central debates: purely preservationist approaches that ignore the needs of much of the population are no longer viable, especially in a country as unequal as Brazil.

It is not surprising that government support is essential for advancing these alternative models. This may appear to undermine arguments about their economic viability, but it must be recalled that all agricultural activities in Brazil have historically relied on substantial public support, incentives, subsidies, and financing. For instance, from the institutionalization of rural credit under Law 4,829 of 1965 through at least 1994, agribusiness financing in Brazil was characterized by a strong dependence on official resources and significant government intervention in the market.

Biotechnology also deserves attention. It involves the technological application of biological systems, living organisms, or their derivatives to create or modify products or processes for specific purposes. The use of genetic resources, in turn, refers to research and development activities concerning their genetic and/or biochemical composition, including through biotechnology. Biotechnology is closely connected with traditional peoples and communities, as it often draws on traditional knowledge associated with genetic resources. In this respect, biotechnology represents another potential economic pathway that keeps the forest standing. The challenge, once again, lies in ensuring the fair and equitable sharing of benefits with the providers of these genetic resources.

According to the Ministry of Agriculture, Brazilian agribusiness exports reached a record high of more than USD 140 billion in 2023. This was achieved even before the regulatory rollbacks on pesticide requirements introduced by the so-called "Poison Bill," now enacted as Law 14,785/2023, came into effect.

This suggests that there is no real need to reduce Protected Areas in Brazil. Instead, the priority should be to expand alternatives such as agroecology, the bio-economy, and biotechnology.

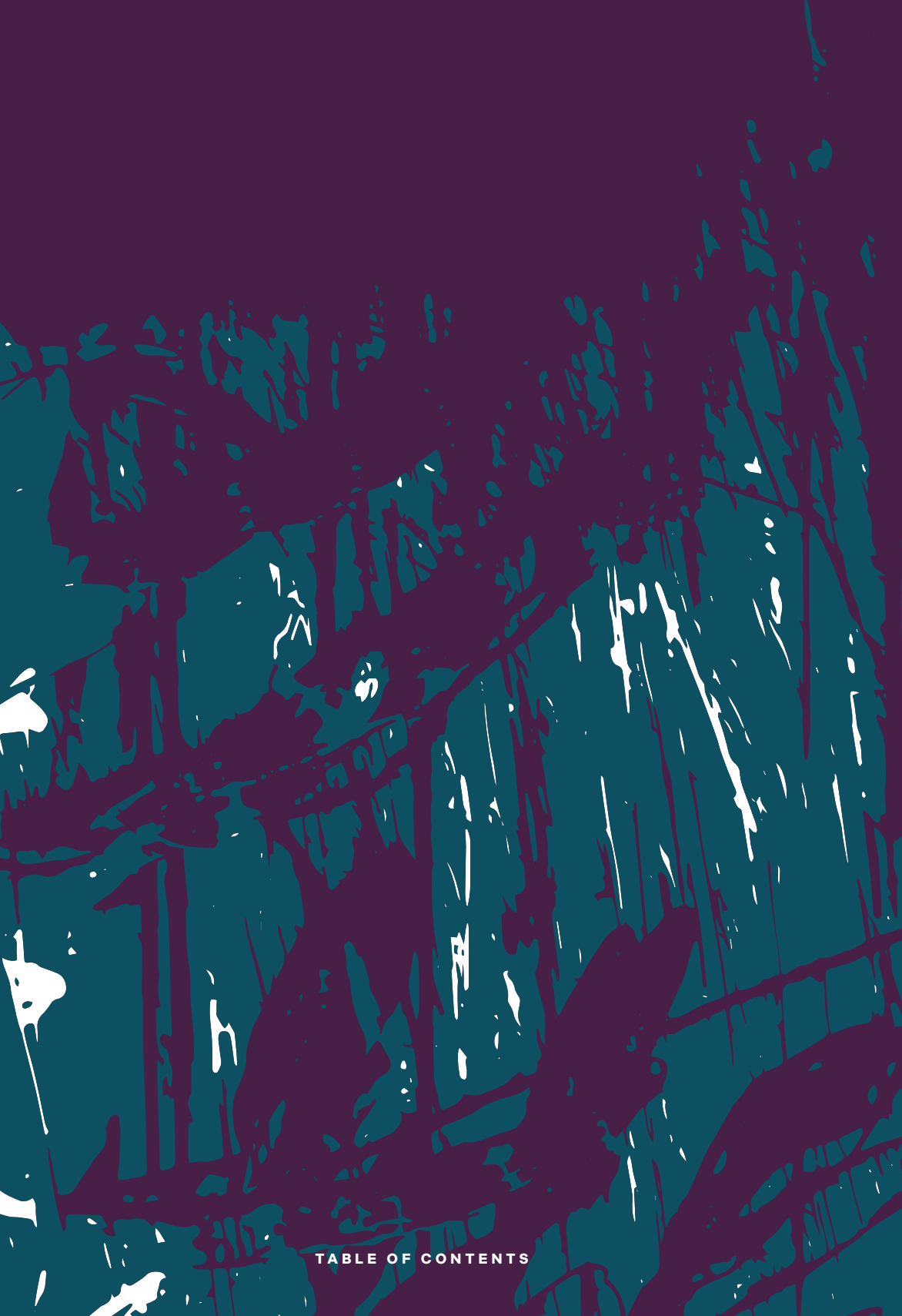
The content of the articles is the sole responsibility of the authors and does not necessarily reflect the views of the Brazilian Biodiversity Fund (FUNBIO). FUNBIO serves as the organizer of this initiative, which provides a platform for diverse voices—including representatives of the Brazilian justice system and, in this volume, members of civil society.



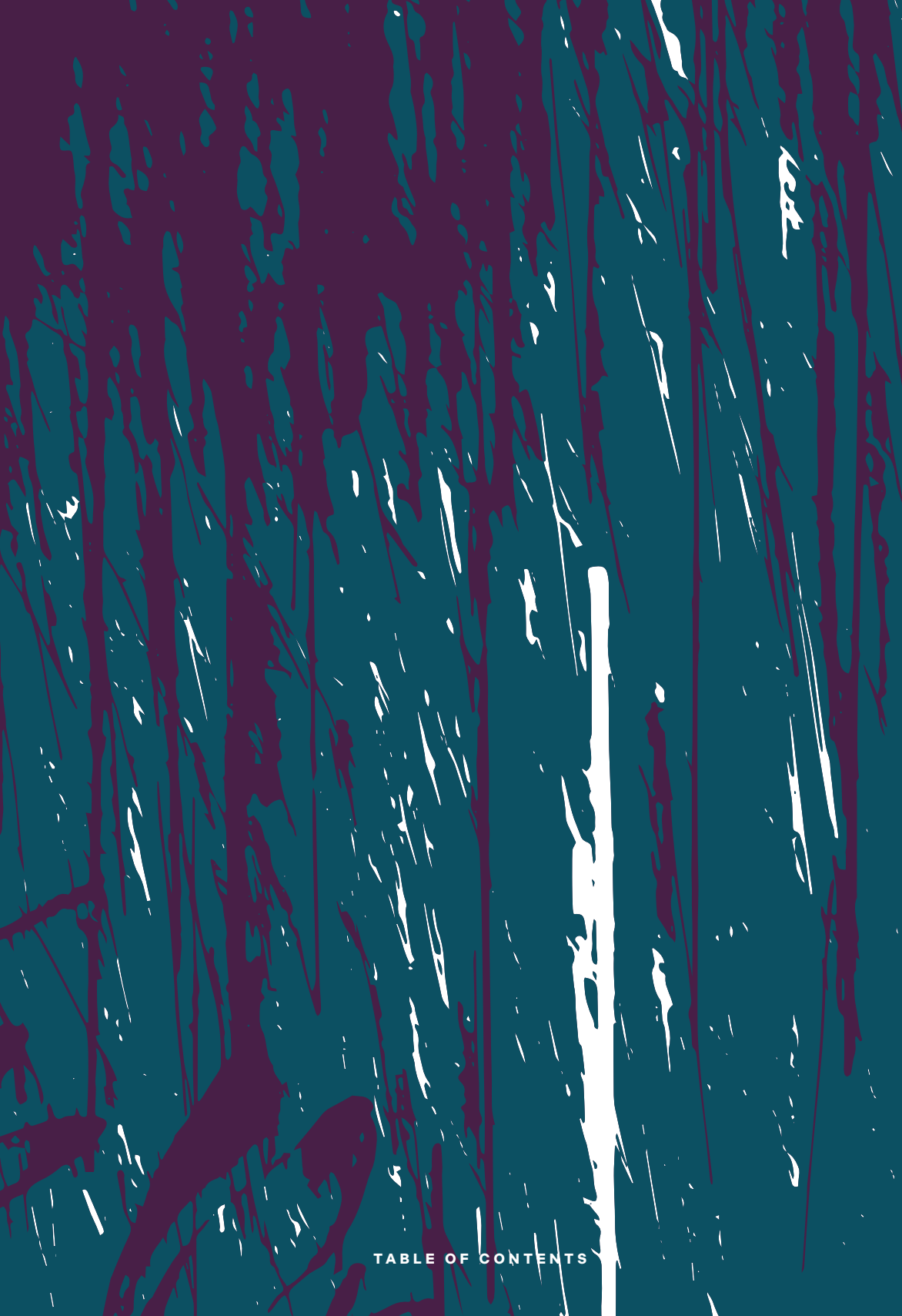


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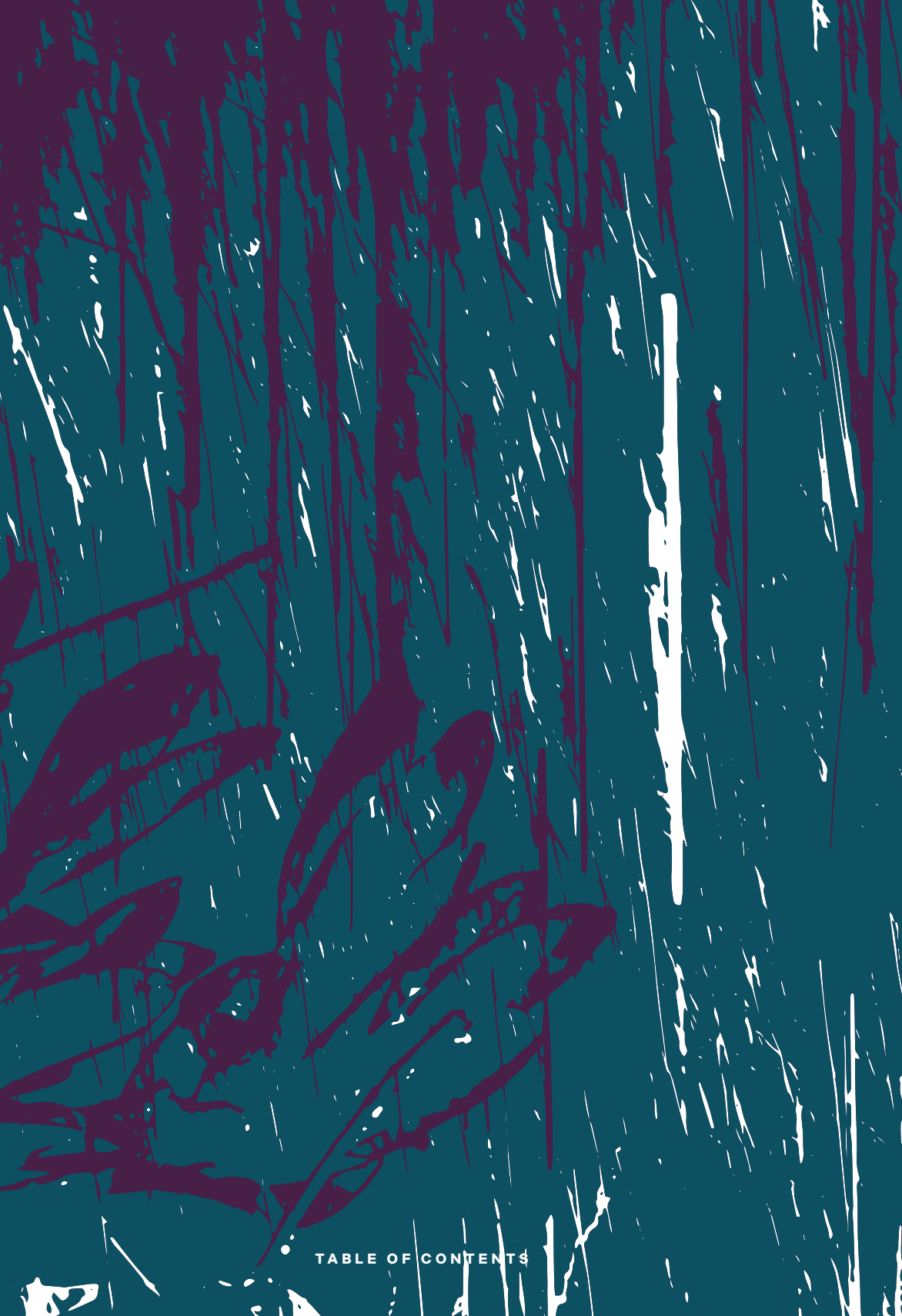


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