

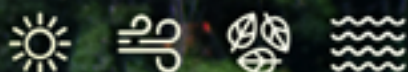
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MINISTÉRIO PÚBLICO
DO ESTADO DO PARÁ

ABRAMPA
ASSOCIAÇÃO BRASILEIRA DOS MINISTÉRIOS DO
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Climate Justice & SUSTAINABILITY

The Brazilian Public
Prosecutor's Office
in Action



CONSELHO
NACIONAL DO
MINISTÉRIO PÚBLICO

Brasília, 2026

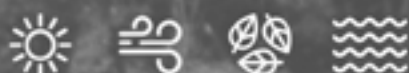
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PRESENTATION

The Brazilian Public Prosecutor's Office plays a unique and strategic role in the defense of the environment. Since the enactment of the 1988 Federal Constitution, which established a new paradigm for the protection of diffuse and collective rights, the environment has become one of the pillars of the constitutional mandate of the Public Prosecutor's Office — not only as a fundamental right, but also as a good essential to life, dignity, and human existence itself.

Article 129, item III, of the Constitution of the Republic assigns to the Public Prosecutor's Office the institutional duty of promoting civil inquiries and public civil actions for the protection of the environment. This responsibility is reinforced throughout the Brazilian legal-constitutional system, which recognizes the intergenerational nature of the right to an ecologically balanced environment. In this context, the Public Prosecutor's Office acts as a true guardian of the rights of present and future generations.

This mission becomes even more relevant in the face of the climate crisis we are experiencing. Brazil, while home to one of the richest biodiversities on the planet, is also one of the countries that emits the most greenhouse gases — and the main source of these emissions is not the energy or industrial sector, but rather illegal deforestation and forest fires, particularly in the Amazon and Cerrado biomes. This gives the environmental actions of the Public Prosecutor's Office direct repercussions on the global climate agenda.

It is with great pride, therefore, that we launch this institutional publication of the Environment Commission of the CNMP (CMA/CNMP), in partnership with the Brazilian Association of Environmental Public Prosecutors (ABRAMPA) and the National Group of Public Prosecutors for Environment and Climate Affairs of the CNPG (GNMAC/CNPG), gathering some of the most relevant initiatives developed by branches and units of the Brazilian Public Prosecutor's Office in defense of climate sustainability.

This document presents concrete initiatives that reflect the diversity and depth of environmental prosecution across Brazil — whether in State Public Prosecutors' Offices, in the Federal Public Prosecutor's Office, or in the Labor Public Prosecutor's Office. These are projects that stand out for their creativity, effectiveness, and commitment to socio-environmental transformation, and that demonstrate the value of coordinated, place-based, and evidence-driven action.

Among the themes addressed are strategies for prevention, enforcement, mitigation, adaptation, and environmental recovery, focusing on crucial topics of the climate agenda:

- Combating deforestation and forest fires, which are the main sources of Brazil's emissions;
- Solid waste management, with a focus on reverse logistics, the inclusion of waste pickers, and circular economy;
- Protection of fauna and flora, especially against wildlife trafficking and illegal deforestation;
- Defense of water resources, including aquifers, springs, and strategic river basins;

- Response to socio-environmental disasters and climate risks, through both preventive and emergency actions;
- Promotion of food security and land rights for traditional and urban communities.

Each of these areas represents not only a field of institutional work but a commitment to the country's future and to climate justice — which requires our institution to maintain a vigilant focus on social vulnerabilities, territorial inequalities, and the disproportionate impacts of climate change on Indigenous peoples, Afro-Brazilian communities (quilombolas), riverine populations, marginalized urban residents, and other vulnerable groups.

By gathering these examples, we seek not only to highlight good institutional practices, but also to inspire new actions, foster networks of cooperation, and expand the dialogue between the Public Prosecutor's Office and both Brazilian and international society, especially in the context of the upcoming COP 30, to be held in Belém, Brazil, in 2025.

I extend my heartfelt thanks to all the colleagues and institutions who contributed to this publication. May this material serve as an instrument of mobilization, institutional strengthening, and collective commitment to environmental protection, democracy, and the future we wish to build.

IVANA LÚCIA FRANCO CEI

CNMP Councilwoman

President of the Environment Commission



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OPERATIONAL SUPPORT CENTER OF THE PROSECUTOR’S OFFICES FOR ENVIRONMENTAL PROTECTION AND HOUSING AND URBANISM – OFFICIAL LETTER NO. 359/2025 CAOPMAHU 311

INTRODUCTION

To think about and present the role of the Brazilian Public Prosecutor's Office (Ministério Público – MP) in relation to Climate Justice and Sustainability requires an initial reflection of utmost importance concerning the role of justice institutions in the implementation of environmental and climate legislation, and how, in different countries, this role does or does not gain greater relevance, and how this implementation does or does not have an impact on the climate issue.

The Latin American experience and, more specifically, the Brazilian experience, has demonstrated that, in general, in these countries, the legal system brings modern and advanced legislation that, within the scope of Positive Law (in legislation), guarantees a right to an ecologically sustainable environment, provides material and instrumental rights for the defense of this right and of vulnerable populations.

However, in practical terms, the situation is often not reflected in the same way; such rights, whether due to institutional deficiency, lack of resources, or even a lack of political will and opposing economic interests, are not implemented. For this reason, the pursuit of Climate Justice begins to gain greater relevance.

The Brazilian Public Prosecutor's Office has always been one of the great protagonists in the judicial and extrajudicial defense of diffuse interests, including the environment, becoming one of the justice-related institutions with the highest number of public civil actions filed and agreements made (conduct adjustment agreements - TACs).

Due to this role and the need to address the defense of diffuse interests in environmental matters, there has been great progress in specialization, with the creation of specialized Prosecutor's Offices initially, and subsequently, with the advancement in the creation of Prosecutor's Offices by Hydrographic Basins, for the defense of Conservation Units, among others.

However, even though this environmental defense has been carried out for many years, especially after the Federal Constitution of 1988, only more recently have the members of the Public Prosecutor's Office begun to realize that many of their historical actions had a great impact on the country's climate agenda. Firstly, on the issue of emission mitigation, and even more recently, on the adaptation of Cities.

The constitutional function of the Public Prosecutor's Office, enshrined in article 127 of the Federal Constitution, entrusts it with the defense of the legal order, the democratic regime, and indivisible social and individual interests. This fundamental attribution is intrinsically articulated with environmental and climate protection, especially through article 225, which guarantees everyone the right to an ecologically balanced environment, a common good of the people and essential for a healthy quality of life. More than a mere law enforcer, the MP assumes the role of an inducer of public policies, articulating and calling upon public and private institutions for coordinated and permanent action.

The action of the Public Prosecutor's Office in themes that represent fundamental actions for mitigating greenhouse gas emissions is historical, for example, the fight against the extinction of illegal landfills (large methane emitters), the fight against illegal deforestation and fires (the largest cause of emissions in the country), as well as the historical fight in the implementation of the

Forest Code, demanding the protection and restoration of permanent preservation areas and legal reserves, which impacts both the preservation of natural areas that fix carbon and the restoration that sequesters it.

More recently, in the face of the major disasters that have occurred due to climate extremes, there has been a greater awareness among members of the Public Prosecutor's Office to also act on the issue of adaptation, revisiting already consolidated actions, also with this perspective.

For years, the Public Prosecutor's Office has been acting in combating illegal land subdivisions, occupations of risk areas, demanding drainage improvements, the need to respect urban land use, especially impermeabilization rates, among others, from an Urban Environmental Law perspective. But now, this action gains a new guise with a vision of the need for cities to adapt to this new climate reality.

On the other hand, including in labor matters, in a scenario of growing uncertainties and risks, the strategic, coordinated, and technically qualified action of the Public Prosecutor's Office strengthens the guarantee that workers and vulnerable communities are not rendered invisible in facing the climate crisis. The construction of resilient work environments, safer cities, and the protection of vital ecosystems are inseparable parts of the defense of a balanced environment and the promotion of public health.

Furthermore, increasingly, within the climate agenda, the Public Prosecutor's Office is also starting to act in cases where the theme of climate and emissions becomes central, such as ABRAMPA's work in preparing Technical Notes, as is the case for the need to include the climate aspect in Environmental Licensing, which has already served as a basis for public civil actions and judicial decisions in this regard.

The holding of COP30 in Belém, Brazil, in 2025, represents a historic opportunity for the country and, in particular, for the Public Prosecutor's Office, to put climate justice and the labor perspective on the agenda of global discussions. In this context, the MP's awareness of its role in climate action needs to be increasingly deepened, driving the construction of normative mechanisms that protect labor in times of environmental collapse and ensure a just and inclusive ecological transition. Brazil's new Nationally Determined Contribution (NDC), presented at COP29, already chooses climate justice as a political-normative horizon for 2035, reinforcing the relevance and urgency of ministerial action.

It is a small part of this work that is presented to the public in this material, with the purpose of showing and positioning the Brazilian Public Prosecutor's Office as a major agent of climate action in Brazil. It is hoped that, with this book, it will be possible to show the national and international community the great relevance of the work carried out and the future potential of this action.

The initiatives presented demonstrate, unequivocally, that the Brazilian Public Prosecutor's Office has consolidated a proactive, multisectoral, and replicable model of action, based on the premise that the mitigation of climate change and the conservation of biodiversity are inseparable from the promotion of socio-environmental equity. The MP not only inspects and prosecutes but also promotes reparation and induces public policies aligned with climate justice and sustainable development objectives.

LUCIANO FURTADO LOUBET

President of ABRAMPA

Prosecutor in Mato Grosso do Sul



PANELISTS AT THE 1ST PRE-COP EVENT

MACAPÁ AUGUST/2025

CAATINGA RESISTS PROJECT

Aldeleine Melhor Barbosa¹

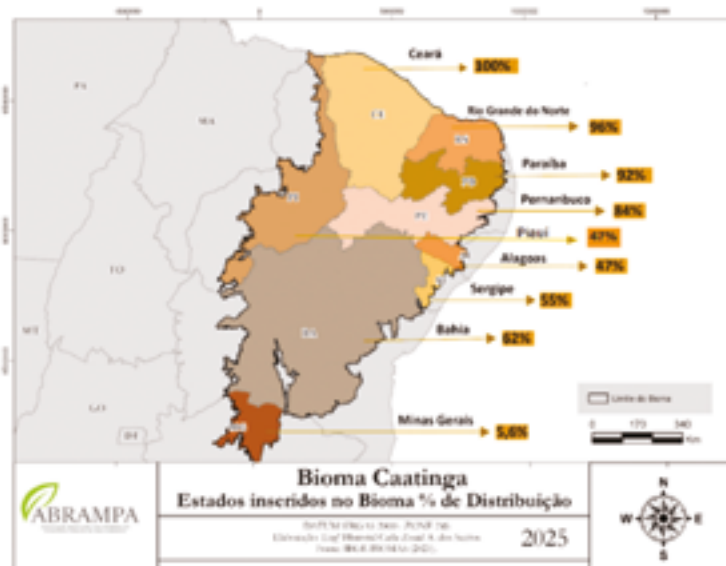
Alexandre Gaio²

1. INTRODUCTION

Importance of the Caatinga: the biome in data

The Caatinga is a biome found exclusively in Brazil, distributed across 10 states. It occupies approximately 11% of the national territory, covering an area of 844.453 square kilometers, and is predominantly situated in the Northeast region of the country. It encompasses the states of Alagoas, Bahia, Ceará, Pernambuco, Maranhão, Paraíba, Rio Grande do Norte, Piauí, and Sergipe, in addition of the northern part of Minas Gerais—the only state from the Southeast region (Figure 1).

Figure 1. Percentage of Caatinga occurrence within states.



Fonte: Divisão por Ecorregiões proposta por Velloso et al. (2002).

Imagens: Google imagens. Organização: os autores, 2025.

¹ Public Prosecutor at MPSE - Project Coordinator

² Public Prosecutor at MPPR - Director of Institutional Relations at AMBRAPA

Physiographically, the biome is divided into eight major ecoregions: “Complexo da Chapada Diamantina”, “Complexo de Campo Maior”, “Complexo Ibiapaba-Araripe”, “Depressão Sertaneja Setentrional”, “Depressão Sertaneja Meridional”, Dunes of São Francisco, Environmental Plateau and “Raso da Catarina”. This division highlights the significant environmental heterogeneity that makes the Caatinga a unique biome globally. Among these ecoregions, Chapada Diamantina exhibits one of the highest levels of endemism². The division into ecoregions serves as a very useful tool for environmental management and conservation efforts, as it effectively reflects the environmental heterogeneity of a given area³.

Its unique and highly biodiverse vegetation consists of several plant species adapted to water scarcity. These species contribute to soil protection, water conservation, and erosion prevention, acting as a natural barrier against desertification. The fauna is also quite biodiverse and adapted to the dry climate, including several endemic animals. Approximately 178 species of mammals, 591 species of birds, 177 species of reptiles, 79 species of amphibians, 241 species of fish, and 221 species of bees⁴ have been catalogued for this biome. 15% percent of these animals and 33% of the biome’s vegetation are exclusive (endemic) species, indicating that they do not occur anywhere else in the world.

In addition to the important biodiversity it shelters, the Caatinga biome has proven to be extremely efficient in sequestering large amounts of carbon dioxide from the atmosphere, functioning as true carbon sinks, even during dry seasons⁵, a period during which the biome’s vegetation sheds its green biomass to conserve water resources. Research conducted over nearly a decade has revealed that the biome is capable of removing an average of 527 grams of carbon per square meter from the atmosphere or 5.2 tonnes per hectare yearly. This efficiency places the Caatinga among the largest carbon sinks between dry forests in the world, according to a study led by the National Observatory of Water and Carbon Dynamics in the Caatinga Biome – NOWCDCB, which compared the Caatinga biome with 30 other dry locations around the world⁶.

Furthermore, the native vegetation of this biome sustains several aspects of the region’s economy, which are also vectors of environmental pressure, such as the use of firewood as the main energy source and the use of a range of non-timber products derived from its socio-biodiversity, which gives the region’s strong culture its unique character.

The region’s low Human Development Index reflects challenges often associated with drought, vulnerable physiographic conditions, poverty, and other forms of inequality present within this biome. However, contrary to common perception, numerous aspects highlight the uniqueness and invaluable significance of the Caatinga for environmental balance, the promotion of biodiversity, and the livelihood of local communities⁷.

3 BRASIL. **Ministério do Meio Ambiente e Mudança do Clima**. 2024. Plano de Ação para Prevenção e Controle do Desmatamento e das Queimadas na Caatinga – PPCaatinga. (Consulta). Disponível em: Governo Federal - Participa + Brasil - Plano de Ação para Prevenção e Controle do Desmatamento e das Queimadas na Caatinga – PPCaatinga.

4 BRASIL. Ministério do Meio Ambiente e Mudança do Clima. 2025. Dados sobre a Caatinga. Disponível em: <Caatinga>

5 MENDES, K.R. et al., 2020. Seasonal variation in net ecosystem CO₂ Exchange of a Brazilian seasonally dry tropical forest. *Nature*. (2020) 10:9454.

6 Observatório Nacional da Dinâmica da Água e do Carbono no Bioma Caatinga – OndaCBC. Embrapa. https://www.embrapa.br/busca-de-noticias/-/noticia/88549836/em-quase-uma-decada-anualmente-caatinga-retirou-da-atmosfera-52-t-de-carbono-por-hectare?p_auth=yhNLSJkx

7 BRASIL. Ministério do Meio Ambiente. Subsídios para a elaboração do plano de ação para a prevenção e controle do desmatamento na Caatinga. Brasília, 2011.

According to Aldrin Perez Marin, a researcher at the National Institute for the Semi-Arid Region (NISAR), the most significant socio-economic potentials lie in the use of native fruits, ornamental plants, and medicinal herbs, representing an important source of income for local communities .

The accelerated deforestation process is driven by multiple pressure factors on areas of native vegetation. Between 2022 and 2023 alone, deforestation increased by 43.4%. The main pressure vector corresponds to activities related to agriculture and livestock. However, in recent years, there has been a significant rise in deforestation associated with the establishment of renewable energy projects, an 24% increase between 2022 and 2023, resulting in the equivalent loss of more than 4,302 hectares⁸.

The platform also recorded a **34.7% increase in deforestation⁹ alerts detected in 2023 compared to 2022, totaling 18,835 alerts in 2023 versus 13,985 in 2022**. The deforestation rate detected was 23 hectares per hour, corresponding to an average of 552.6 ha of deforested area per day (MapBiomas, 2024).

In 2024, a slight decrease in the number of alerts was observed compared to 2023, with 17,835 alerts detected in 2024 versus 18,835 in 2023. This represented a 13.4% reduction in deforestation within this biome in 2024¹⁰.

Despite this progress observed in 2024, there is still significant deforestation pressure on this native vegetation, which warrants special attention, both regarding illegal (unauthorized) deforestation and the need for stricter oversight of the Authorization for the Suppression of Vegetation (ASV) being issued.

According to the Technical Note issued by ABRAMPA regarding the need to adjust procedures related to native vegetation suppression authorizations in the Cerrado, Caatinga, Amazon, Pantanal, and Pampa biomes, a significant portion of such native vegetation suppression has occurred outside the bounds of legality, without prior and adequate evaluation by the competent authorities, resulting in the instrument being misused and inadequately implemented¹¹.

Another strategy that also deserves attention for the protection of the biome is the identification and publicization of areas considered priorities for its conservation and restoration, the strengthening of the management of established protected areas, as well as the creation of new ones, especially those under strict protection. According to data from the National Register of Conservation Units (NRCU), less than 10% of the Caatinga biome is currently covered by Conservation Units, with approximately 2% under Strict Protection and 7% under Sustainable Use (NRCU, 2025). Consequently, it is evident that the existing Conservation Units in the Caatinga are insufficient to contribute to the global target of conserving and promoting the sustainable use of its biodiversity¹².

8 Embrapa. Mudanças Climáticas. https://www.embrapa.br/busca-de-noticias/-/noticia/88549836/em-quase-uma-decada-anualmente-caatinga-retirou-da-atmosfera-52-t-de-carbono-por-hectare?utm_source=chatgpt.com

9 Mapbiomas. Relatório Anual do Desmatamento no Brasil 2023. São Paulo, Brasil - MapBiomas, 2024 - 154 páginas <http://alerta.mapbiomas.org>

10 Mapbiomas. Relatório Anual do Desmatamento no Brasil 2023. São Paulo, Brasil - MapBiomas, 2024 - 154 páginas <http://alerta.mapbiomas.org>

11 ABRAMPA. ASSOCIAÇÃO BRASILEIRA DOS MEMBROS DO MINISTÉRIO PÚBLICO DE MEIO AMBIENTE. Nota Técnica da ABRAMPA: sobre a necessidade de adequação dos procedimentos relacionados às autorizações de supressão de vegetação nativa nos biomas Cerrado, Caatinga, Amazônia, Pantanal e Pampa. 2024.

12 BRASIL. Ministério do Meio Ambiente e Mudança do Clima. Cadastro Nacional de Unidades de Conservação – CNUC. Painel. 2025.

The preservation of the remaining areas of the Caatinga biome is indispensable, both for its role as a natural carbon sink and for its vital ecosystem services, especially in regions affected by water scarcity, as well as for its importance to the socioeconomic activities in the region that depend on the natural resources provided by this biome. The preservation of the Caatinga also constitutes a climate adaptation strategy and a measure to combat the water crisis and desertification in this territory.

The project also contributes to the achievement of the United Nations 2030 Agenda Sustainable Development Goals, specifically “SDG 13 – Take urgent action to combat climate change and its impacts”; and “SDG 15 – Protect, restore, and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss.”

2. MAIN OBJECTIVE OF THE PROJECT

The Caatinga Resists Project aims to gather, coordinate, and encourage efforts by the Public Prosecutor’s Offices of the states covered by the Caatinga biome, so that they act continuously in a planned, integrated, strategic, and harmonious manner, with the objective of maintaining, protecting, and restoring the sociobiodiversity of this biome.

2.1. SPECIFIC OBJECTIVES

- To promote more effective responses to the main illegal activities and damages resulting from unauthorized deforestation of native vegetation;
- Engagement with environmental public agencies, aiming to ensure transparency and the proper input of data into SINAFLO, as well as the accuracy of Vegetation Suppression Authorizations;
- Survey and mapping of the main remnants of native vegetation, identification of priority areas for restoration and conservation, and the adoption of legal strategies for avoided deforestation and recovery of strategic areas.

3. STAGES AND GOALS

3.1. OBJECTIVE 1: COMBATING UNAUTHORIZED DEFORESTATION

This corresponds to the technical survey of the main illegal activities and damages resulting from unauthorized deforestation of Caatinga vegetation in each of the Federation States encompassed by the aforementioned biome, which will be conducted based on deforestation alerts recorded by the Mapbiomas platform.

This technical survey will be based on deforestation alerts issued in the Mapbiomas System since 2019, as well as information from SICAR and other available systems, particularly regarding properties, owners, and the extent of native vegetation suppression within the Caatinga biome. Additionally, information concerning the absence of any authorization issued by environmental public agencies must be obtained.

Henceforth, each State Public Prosecutor's Office will coordinate with the respective environmental public agencies and environmental police forces to determine the number of properties to be included in the initial task force of the National Operation. This operation will be conducted in a hybrid format (in-person and/or remote) for the issuance of infraction notices, embargo orders, suspension of the respective Rural Environmental Registries (RER), and any other applicable administrative precautionary measures.

It is further proposed, within the scope of the Project Coordination, to implement the necessary measures for the consistent and uniform communication of the National Operation, as well as the preparation of suggested extrajudicial and judicial instruments, following a model similar to that adopted within the Atlantic Forest Standing Project (*Projeto Mata Atlântica em Pé*).

3.2. OBJECTIVE 2: TRANSPARENCY AND INTEGRITY OF ASVS AND SINAFLOR

It is intended to promote coordinated action with the Public Prosecutor's Offices and environmental public agencies, aiming at ensuring transparency and the proper input of data into SINAFLOR, as well as aligning the processes for Authorization for the Suppression of Vegetation with the legal and regulatory framework.

The National Project Coordination will promote engagement with the Public Prosecutor's Offices to encourage the possible adoption of the recommendations contained in the Joint Technical Note issued by ABRAMPA/CNMP¹³, regarding data entry and transparency within SINAFLOR or integrated systems. It will also promote the adoption of the recommendations outlined in the Technical Note issued by ABRAMPA concerning the need to align the requirements and procedures related to vegetation suppression¹⁴ authorizations.

In addition, it is foreseen that the Public Prosecutor's Offices will engage in dialogue with environmental public agencies, based on the aforementioned Technical Notes, in order to: 1) Recommend full transparency and proper data input into SINAFLOR (or any integrated system); 2) Obtain information on authorizations already granted by state and municipal environmental agencies; and 3) Recommend the necessary adjustments, without prejudice to the adoption of measures regarding authorizations issued in violation of the legal framework, with priority given to cases in which native vegetation has not yet been cleared.

13 NOTA TÉCNICA CONJUNTA n° 01/2022, CMA – COMISSÃO DO MEIO AMBIENTE. ABRAMPA - ASSOCIAÇÃO BRASILEIRA DOS MEMBROS DO MINISTÉRIO PÚBLICO DE MEIO AMBIENTE. CNPG - CONSELHO NACIONAL DE PROCURADORES-GERAIS DO MINISTÉRIO PÚBLICO DOS ESTADOS E DA UNIÃO de 29 de março de 2022. Nota técnica sobre a necessidade de assegurar a transparência dos dados ambientais de Estados e Municípios e do Sistema Nacional de Controle da Origem de Produtos Florestais – SINAFLOR

14 ABRAMPA. ASSOCIAÇÃO BRASILEIRA DOS MEMBROS DO MINISTÉRIO PÚBLICO DE MEIO AMBIENTE. Nota Técnica da ABRAMPA: sobre a necessidade de adequação dos procedimentos relacionados às autorizações de supressão de vegetação nativa nos biomas Cerrado, Caatinga, Amazônia, Pantanal e Pampa. 2024.

3.3. OBJECTIVE 3: MAPPING OF KEY REMNANTS AND PRIORITY AREAS FOR CONSERVATION AND RESTORATION, AND ADOPTION OF LEGAL STRATEGIES

Efforts will be made to map and georeference the largest and best-preserved remnants of native Caatinga vegetation, as well as priority areas for its restoration and conservation, ensuring their visibility through an online platform. This initiative will be carried out by a consultant contracted by ABRAMPA, with a specific focus on privately-owned properties registered in the RER that are not classified as agrarian reform settlements and that meet certain criteria regarding ecological importance, degree of conservation, and vulnerability:

- Mapping and classification of the largest remnants of native vegetation in the Caatinga biome that have remained relatively well preserved over the past 20 years. The degree of conservation of these remnants must also be assessed, and satellite imagery and geoprocessing methodologies may be employed for this purpose, provided they are supported by technical or scientific validation;
- Mapping and prioritization of the largest remnants of native vegetation in the Caatinga biome located within Priority Areas for Biodiversity Conservation, as designated by the Ministry of the Environment and Climate Change;
- Mapping and classification of the largest remnants of native vegetation in the Caatinga biome located within the buffer zones of Strictly Protected Conservation Units (at the federal, state, and municipal levels), within a radius of 3 kilometers from their boundaries, in accordance with CONAMA Resolution No. 428/2010;
- Mapping and classification of the largest remnants of native vegetation in the Caatinga biome located within watersheds identified and/or classified as having critical levels of water scarcity, according to data from the national database of the National Water and Sanitation Agency – NWSA;
- Mapping and classification of the largest remnants of native vegetation in the Caatinga biome located in regions most susceptible to desertification, according to the Atlas of Areas Susceptible to Desertification (AASD) in Brazil, published by the Ministry of the Environment, with special attention to desertification nuclei.

To achieve the objectives of this axis, ABRAMPA contracted a consultant specialized in geoprocessing to carry out the necessary surveys¹⁵, which should involve coordination between the Project Management and the Public Prosecutor's Offices of the States within the Caatinga biome, as well as the respective environmental public agencies.

15 ABRAMPA. ASSOCIAÇÃO BRASILEIRA DOS MEMBROS DO MINISTÉRIO PÚBLICO DE MEIO AMBIENTE. Contrato N. 006/2025. de prestação de serviços de consultoria com especialidade em geoprocessamento e sistemas de informação geográfica, assinado em 14 de março de 2025.

Once this survey and its organization on the online platform are complete, the Public Prosecutor's Offices will be provided with suggestions for potential legal strategies that can be employed in their efforts to preserve the biome, with direct impacts on climate change mitigation and adaptation. These strategies include, among others, the establishment of remnant banks for prioritizing the analysis and validation of the RER, allocation of environmental compensations, use of economic instruments for protection, and other actions.

In addition, the use of information systematized by the project initiative should guide the future actions of the Public Prosecutor's Office in its integrated work with other public institutions (Federal, State, and Municipal levels), particularly regarding recommendations for the protection of the most significant remnants, improved oversight of licensing processes and issuance of ASV, as well as recommendations for the restoration of areas identified with the most critical levels of vulnerability. This is without prejudice to the invocation of the application of Article 61-A, §17 of Law No. 12,651 concerning the designation of watersheds classified as critical.

CONSULTED REFERENCES

ABRAMPA. ASSOCIAÇÃO BRASILEIRA DOS MEMBROS DO MINISTÉRIO PÚBLICO DE MEIO AMBIENTE. **Nota Técnica da ABRAMPA:** sobre a necessidade de adequação dos procedimentos relacionados às autorizações de supressão de vegetação nativa nos biomas Cerrado, Caatinga, Amazônia, Pantanal e Pampa. 2024.

ASSIS, L. F. F. G.; FERREIRA, K. R.; VINHAS L.; MAURANO, L.; ALMEIDA, C.; CARVALHO, A.; RODRIGUES, J.; MACIEL A.; CAMARGO, C. **TerraBrasilis: A Spatial Data Analytics Infrastructure for Large-Scale Thematic Mapping.** ISPRS International Journal of Geo-Information. 8, 513, 2019. DOI: 10.3390/ijgi8110513

BRASIL. Ministério do Meio Ambiente e Mudança do Clima. 2024. **Plano de Ação para Prevenção e Controle do Desmatamento e das Queimadas na Caatinga – PPCaatinga.** (*Consulta*). Disponível em: Governo Federal - Participa + Brasil - Plano de Ação para Prevenção e Controle do Desmatamento e das Queimadas na Caatinga – PPCaatinga.

BRASIL. **Ministério do Meio Ambiente e Mudança do Clima.** 2025. Dados sobre a Caatinga. Disponível em: <Caatinga>

BRASIL. **Ministério do Meio Ambiente e Mudança do Clima.** Cadastro Nacional de Unidades de Conservação – CNUC. Painel. 2025.

RAD2023. **Relatório Anual do Desmatamento no Brasil 2023.** São Paulo, Brasil - MapBiomas, 2024 - 154 páginas <http://alerta.mapbiomas.org>

RAD2024. **Relatório Anual do Desmatamento no Brasil 2024.** São Paulo, Brasil - MapBiomas, 2025 - 209 páginas <http://alerta.mapbiomas.org>

VELLOSO, A. L, SAMPAIO, E.V.S.B.; PAREYN, F. (ed.). **Ecorregiões propostas para o bioma Caatinga.** The Nature Conservancy do Brasil.

CLIMATE JUSTICE IN THE AMAZON: THE ROLE OF THE AGRARIAN AND ENVIRONMENTAL PROSECUTOR'S OFFICE OF SOUTHEASTERN PARÁ IN DEFENDING THE RIGHTS OF TRADITIONAL PEOPLES AND COMMUNITIES

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INTRODUCTION

From a constitutional perspective and within the framework of international protection instruments, traditional peoples and communities are guaranteed cultural, territorial, and human rights. These rights safeguard the preservation of their ways of life, which are rooted in sustainable practices and a harmonious relationship with nature. Their traditional knowledge systems play an essential role in environmental conservation and ecological balance, reflecting the recognition of ethnic and cultural diversity as a foundation for territorial protection in Brazil.

Traditional peoples and communities play a strategic role in the conservation of biomes and biodiversity, contributing significantly to the global climate balance. Their traditional knowledge is crucial for formulating adaptation and mitigation strategies to address climate change, particularly given their direct and dependent relationship with natural resources, from which they derive their subsistence, identity, and culture. Directly affected by climate change, traditional peoples and communities see their territories, ways of life, and food security constantly under threat. They live the paradox of being among the most vulnerable to the impacts of the climate crisis, despite contributing the least to its causes.

Under the principle of Climate Justice, which places human rights and equity at the center of efforts to address the global crisis, it is acknowledged that the impacts of climate change are not felt equally by all. Accordingly, the territorial and cultural rights of these populations must be respected, alongside their meaningful participation in decisions related to socio-environmental rights, the right to historical reparation for social inequalities, and the provision of legal protection and political support for these communities, who are recognized as guardians of the environment. Without these elements, it is not possible to ensure a just ecological transition that leaves no one behind.

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Based on these premises, a series of initiatives has gained prominence internationally, highlighting a paradigm shift: the recognition of the environmental and climate value of Indigenous practices, traditionally marginalized. Assigning value to the regenerative potential of these ways of life brings the climate agenda closer to the Indigenous rights agenda, legitimizing the prioritization of these communities in forest restoration policies and climate crisis mitigation strategies.

This appreciation breaks with the colonial logic that has historically rendered Indigenous ways of life invisible. As Ailton Krenak (2019) argues, “postponing the end of the world” requires recognizing that Indigenous cosmologies do not separate nature from humanity, and that territory is a living part of the collective being. Likewise, Davi Kopenawa (2015) warns, in his testimony about the Yanomami, that destroying the forest is like tearing the sky—rupturing not only environmental balance but also the spiritual bonds that sustain life.

Paradoxically, the same interdependent relationship that positions Indigenous peoples as strategic allies in forest protection also makes them especially vulnerable. They are among the most affected by environmental degradation and the impacts of climate change, which threaten their physical, cultural, and territorial integrity. In this context, the debate on climate justice becomes particularly relevant, especially concerning traditional communities living in the Brazilian Amazon.

1. CLIMATE JUSTICE AND THE UNEQUAL IMPACTS OF ENVIRONMENTAL CHANGE

The impacts of the climate crisis are not distributed equally across social groups. While economically privileged sectors are able to finance adaptation strategies, such as relocating to less-affected areas or accessing water and energy Technologies, historically marginalized populations face the destruction of their very living environments, bearing the brunt of a crisis to which they have contributed very little.

This imbalance particularly and severely affects Indigenous peoples, Quilombola communities, and other traditional populations. These communities maintain a deep connection with their territories and depend directly on environmental integrity to access resources essential for their subsistence, the continuation of their ways of life, and the preservation of their cultural identity. For them, land holds a meaning that transcends the economic sphere, as the notion of territory encompasses symbolic and immaterial dimensions that differ from the civil law perspective of non-Indigenous society.

Despite the biocultural richness that sustains their agricultural practices, these communities face persistent food and nutritional insecurity. Such pressures weaken their relationship with the land and threaten the physical, cultural, and spiritual reproduction of their ways of life. Territorial conflicts with settlers often lead to violence, disease outbreaks, and the erosion of cultural practices, further exacerbating the scarcity of vital resources and intensifying land disputes. Environmental degradation, driven by mercury contamination, fires, biodiversity loss, and water scarcity, goes beyond physical damage. It disrupts social bonds, ancestral knowledge, and traditional forms of organization, all of which depend on the integrity of shared natural resources.

One of the greatest challenges faced by these communities is the legal recognition and demarcation of their lands. Many live in ancestral territories without formal titles, leaving them vulnerable to territorial disputes, expropriations, and invasions. The lack of sufficient areas for farming and hunting, aggravated by illegal activities, climate change, and delays in land regularization, places these communities in a state of extreme vulnerability.

The realization that the effects of environmental degradation disproportionately impact different social groups is the starting point for the concept of climate justice. Evolving from the framework of environmental justice, this perspective expands its focus by prioritizing socio-environmental inequalities exacerbated by the climate crisis, incorporating dimensions such as distributive equity, cultural recognition, and the meaningful participation of vulnerable communities, including Indigenous peoples and marginalized urban and rural populations, in the development and oversight of public policies.

Emerging in the United States in the early 1990s, in the context of reporting the historical responsibility of the oil industry for greenhouse gas emissions, the idea of climate justice gradually consolidated itself as an indispensable analytical category for understanding the relationship between ecological crisis and social inequality. In this sense, institutional responses to the climate emergency must address not only mitigation and adaptation measures but also strategies that directly confront the historical roots of socio-environmental vulnerabilities.

In the Brazilian context, this dimension is explicitly recognized in the new Nationally Determined Contribution (NDC), presented at COP29, which establishes climate justice as a political and normative horizon for 2035.

2. THE AID OF INDIGENOUS PEOPLES TO THE CLIMATE AGENDA

The IPCC Special Report on Carbon Fluxes in Terrestrial Ecosystems explicitly recognizes the fundamental role of Indigenous peoples in curbing environmental degradation, highlighting their contribution to forest conservation and climate regulation. This relationship is further supported by studies such as the Territories of Life report (ICCA, 2021), which underscores the central role of territories managed by local communities in protecting biodiversity and maintaining ecological cycles.

A study published in *Nature Sustainability* (2018) found that areas under Indigenous management often exhibit higher conservation outcomes than conventional protected areas. This effectiveness stems from practices rooted in cultural ties, traditional ecological knowledge, and the non-predatory use of natural resources. These territories contain some of the world's largest stocks of forest and soil carbon, whose preservation prevents the release of vast quantities of greenhouse gases. Estimates from the Woods Hole Research Center indicate that over 20% of the carbon in tropical forests is stored on Indigenous lands.

The environmental effectiveness of these territories is directly tied to management systems grounded in traditional knowledge passed down through generations, in which ecological balance is inherent to the productive logic itself. Agricultural practices adopted by traditional communities tend to be more aligned with natural cycles, promoting socio-biodiversity and supporting sustainable, resilient agri-food systems—unlike industrial agriculture, which relies heavily on genetically modified seeds and chemical pesticides.

Traditional knowledge represents one of humanity's oldest and most resilient forms of intellectual production. Transmitted orally across generations, it reflects continuous coexistence with nature's rhythms and comprises a complex repertoire of knowledge on resource management, species classification, pharmacology, food systems, agriculture, hunting, fishing, and ecosystem regulation. For traditional populations, the rational use of natural resources is essential for remaining in their territories and ensuring socio-cultural continuity.

In the case of Indigenous peoples, this knowledge is anchored in cosmologies that reject the division between nature and society. These are management systems based on reciprocity and environmental responsibility, often marginalized by the dominant Western epistemology, yet constituting genuine systems of ecological regulation. Such practices have proven highly effective in sustainable agriculture, adaptive water management, and the conservation of strategic ecosystems.

In the Amazon, this cultural richness takes on a unique expression: traditional agricultural techniques constitute an intangible heritage essential to cultural continuity, food security, and the socio-economic resilience of communities. From this perspective, Gersem Baniwa (2021) emphasizes that Indigenous knowledge is a legitimate and sophisticated epistemological system, whose practices not only contribute to sustainability but also challenge the "monoculture of knowledge" imposed by dominant development models. Incorporating these perspectives into the design of climate policies is, therefore, an imperative of epistemic justice.

Agroforestry Systems (AFS), for example, value biological diversity, preserve soil, and use local and often natural inputs rather than relying on chemical pesticides and fertilizers. This system helps restore biological connectivity between isolated preserved forest fragments, strengthens family farming, and provides local populations with a form of self-determination in accessing markets, which is fundamental for both cultural preservation and the sustainable development of Indigenous communities.

Traditional practices not only ensure family subsistence and productive autonomy, which are central aspects of sustainable development and cultural preservation of Indigenous communities, but also promote low-impact environmental production. Moreover, they contribute to biological connectivity between forest fragments, thereby reinforcing ecosystem integrity.

In the Brazilian legal framework, this relationship between traditional communities and environmental conservation is recognized by instruments such as Law No. 9,985/2000 (National System of Conservation Units Law), whose Article 20 underscores the essential role of these populations in nature protection, and Decree No. 4,339/2002 (National Biodiversity Policy), which in Article 2, XII, acknowledges the importance of Indigenous peoples, Quilombolas, and other local communities in the conservation and sustainable use of Brazil's biodiversity.

This importance extends beyond national borders. Preserving forest cover supports the regulation of the water cycle, cloud formation, and climate stability on continental and global scales. According to the United Nations Development Programme (UNDP), the goals of the Paris Agreement cannot be achieved without the full, informed, and respectful participation of Indigenous peoples. This means ensuring their territorial rights, direct access to climate finance, and meaningful inclusion in the formulation and monitoring of public policies.

Such conditions are not concessions but structural prerequisites for fair, effective, and sustainable climate policies. By maintaining territories that serve as carbon sinks and biodiversity reservoirs, Indigenous peoples and traditional communities provide an environmental service on a plan-

etary scale, one that is rarely recognized by state institutions and financial mechanisms. A study by the World Resources Institute confirms that strengthening territorial tenure for these communities generates measurable environmental benefits at lower costs than industrial carbon capture technologies.

Despite their significant contribution to climate change mitigation, exclusionary structures persist that keep these populations on the margins of decision making, in open violation of the principle of free, prior, and informed consent, which is guaranteed by international law and ratified in Brazilian legislation. It is therefore increasingly urgent for governments, multilateral organizations, and financial institutions to recognize through their regulations and budgets the central role of these populations in climate governance. Protecting their territorial and cultural rights is not only an ethical imperative but also a structural requirement for developing effective, resilient, and culturally relevant environmental policies.

III – The Role of the Public Prosecutor’s Office in the Climate Justice Paradigm

Despite their essential role in environmental conservation, Indigenous peoples and traditional communities remain excluded from the formulation of climate policies and the equitable distribution of resources. This exclusion persists even within environmental policy itself, which often overlooks local knowledge and traditional methods of managing common goods.

The 1988 Federal Constitution already anticipated the principles of environmental justice by enshrining the collective right to an ecologically balanced environment. However, climate justice requires further institutional progress. It demands public policies that address historical inequalities as a precondition for effective mitigation and adaptation strategies, promoting equity in decision-making and the active participation of all social groups.

This perspective calls for a reassessment of environmental governance models, with greater appreciation for traditional knowledge, legal protection of territories, and fair distribution of the benefits of the ecological transition. In this context, the Public Prosecutor’s Office (MP) plays a strategic role in monitoring the implementation of social and environmental policies, promoting the recognition of rights, and mediating conflicts involving traditional communities, the state, and the private sector.

Beyond ensuring legality, the MP has the duty to drive solutions that combine environmental protection with distributive justice, contributing to a fair and democratic ecological transition based on the protection of fundamental human rights, especially the rights of those most affected by the actions or omissions of public and private actors, in both cases of already existing damage and in prevention, reparation, and non-repetition.

Concrete examples of this transformative action can be found in initiatives of the Public Prosecutor’s Office of the State of Pará (MPPA), especially through the Specialized Prosecutor’s Offices of Marabá, which have been consolidating an innovative model of environmental and climate justice based on three pillars: active listening, territorial presence, and interinstitutional coordination.

Active listening to communities is the starting point for addressing socio-environmental inequalities. More than a formal procedure, it recognizes local knowledge as legitimate and essential for effective strategies, guiding participatory diagnoses and legal-administrative actions tailored to territorial dynamics. The MPPA’s territorial presence, especially in areas marked by deforestation, poverty, and land conflicts, strengthens bonds of trust with communities, allows continuous moni-

toring of structural demands, and facilitates intercultural mediation. This proximity-based work, supported by participatory methodologies, enables the Public Prosecutor's Office to play a key role in protecting rights and promoting socio-environmental justice in historically neglected territories.

Networking with public agencies, civil society, and local leaders breaks with fragmented models and enhances integrated actions in areas such as land regularization, agroecology, food security, environmental health, and cultural appreciation. In this context, the Raízes Sustentáveis ("Sustainable Roots") Program, promoted by the MPPA², stands out as an innovative institutional initiative supported by five pillars:

1. Diagnostics with qualified listening;
2. Networking with institutions and local collectives;
3. Ongoing follow-up;
4. Transforming good practices into public policies;
5. Sustainable productive inclusion, valuing agroecology and socio-biodiversity.

Among the subprojects linked to the program, the following stand out:

- "Food is a Right" (Comida é Direito): Implemented in the Sororó Indigenous Land, this initiative operationalizes the Indigenous Food Acquisition Program (PAA Indígena) as a strategy to combat hunger, strengthen traditional agriculture, and generate income. Based on participatory diagnosis and the legal regularization of producers' documentation, it ensures the lawful distribution of surplus to schools and vulnerable families, promotes economic autonomy, especially for Indigenous women, and revives traditional food and cultural practices. In less than a year, it served around 600 people, generated R\$ 1.366 million in economic activity, and established itself as a replicable, low-cost, high-impact model.
- "Revive" (Reviver): Developed in the same Indigenous Land in partnership with the Casa da Cultura de Marabá, this initiative responds to environmental degradation and declining extractive productivity by combining ecological restoration, sustainable extractivism, and cultural strengthening. Led by Indigenous communities, it trained young people in seed collection and forest management, reorganized Brazil nut production, and restored 180 hectares with native species such as Brazil nut (castanheira) and jenipapo, with the potential to sequester 712 tons of CO₂ annually. In addition to generating income and food, it reinforces cultural identity and community autonomy.

2 The project is carried out in the agrarian region of Marabá, in southeastern Pará, comprising 23 municipalities.

The strengthening of community economies goes beyond symbolic or cultural dimensions. It is a structural pillar of a just ecological transition. The program's recognition with the CNMP Environmental Excellence Seal (2024) reinforces its institutional relevance and demonstrates that the Public Prosecutor's Office can and should act as a driving force for social and environmental transformation in contexts historically marked by inequality and whose solutions carry global significance.

CONCLUSION

The achievement of climate justice requires overcoming exclusionary models of environmental governance by incorporating Indigenous peoples and traditional communities as rights-holders and strategic agents of the ecological transition. Their territories and knowledge are essential to mitigating the climate crisis, yet they remain undervalued in legal frameworks and financing mechanisms. The development of policies, programs, and projects that ignores the broad participation of these communities perpetuates the vulnerability of groups already exposed to the worst effects of the climate crisis, while also violating the territorial, cultural, and political rights guaranteed by the Federal Constitution.

The actions of the Public Prosecutor's Office, anchored in free, prior, and informed listening, territorial presence, and institutional coordination, strengthen fairer and more effective responses to the demands of these peoples. The example of the Sustainable Roots Program (Raízes Sustentáveis) demonstrates the viability of an approach based on community participation, cultural appreciation, and productive inclusion.

Ensuring climate justice requires more than recognizing these contributions. It demands the guarantee of territorial rights, equitable access to public policies, and fair distribution of environmental benefits. This is a constitutional commitment that the Public Prosecutor's Office must embrace as part of its mission to defend fundamental rights and the socio-environmental order, with local, regional, and global impacts.

PROTECTED LAND PROJECT: TECHNOLOGICAL INNOVATION BY THE PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF BAHIA (MPBA) IN PROTECTION AND SUSTAINABLE FOREST AND BIODIVERSITY MANAGEMENT

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Abstract: This article presents the Protected Land Project, a pioneering initiative by the Public Prosecutor's Office of the State of Bahia (MPBA) that revolutionizes the defense of Brazilian biomes through the integration of advanced technology, artificial intelligence, participation, and environmental governance. Developed within the context of thematic axis 2 of COP30 - sustainable forest and biodiversity management - the project establishes a replicable model for combating illegal deforestation, based on geotechnologies, process automation, and active transparency. The initiative demonstrates how the Public Prosecutor's Office can catalyze forest and biodiversity protection, contributing significantly to national and global climate goals while promoting socio-environmental justice and protecting vulnerable populations. The article describes the innovative methodology, achieved results, and replication potential of the experience for other Brazilian states and international contexts.

Keywords: Public Prosecutor's Office; climate governance; forests; biodiversity; geotechnologies; artificial intelligence; socio-environmental justice; COP30.

1. INTRODUCTION: THE CHALLENGE OF FOREST PROTECTION IN THE 21ST CENTURY

Brazil holds the planet's greatest biological diversity and plays a fundamental role in global climate balance. Our biomes harbor approximately 20% of all global biodiversity and are responsible for essential ecosystem services, from climate regulation to water security for millions of people. However, we face unprecedented pressure on our natural resources, with alarming deforestation rates that threaten not only local biodiversity but also global climate stability.

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In this critical scenario, the Brazilian Public Prosecutor's Office emerges as a protagonist in environmental defense, utilizing its constitutional prerogatives to develop innovative strategies for defending and protecting native vegetation. In this regard, the Protected Land Project, conceived and implemented by the Public Prosecutor's Office of the State of Bahia (MPBA), constitutes a component of this institutional mission, integrating data science, artificial intelligence, geotechnologies, participation, and active transparency in a unique environmental governance platform.

The initiative arises as a direct response to contemporary challenges in biodiversity protection, specifically illegal deforestation, in which the speed of environmental damage requires equally agile and precise institutional responses. More than a technological project, Protected Land materializes a new paradigm of prosecutorial action: based on scientific evidence and social participation, transparent in its processes, and effective in its results.

2. BAHIA'S ENVIRONMENTAL CONTEXT: URGENCY AND OPPORTUNITY

Bahia presents unique socio-environmental characteristics, home to significant portions of biomes critical to global biodiversity: the Cerrado, Caatinga, Atlantic Forest, and coastal and marine ecosystems. This biological diversity represents both an invaluable asset and a significant responsibility.

The data reveal the risk situation in which the biomes find themselves. According to the Map-Biomas Platform, between 2019 and 2025, Bahia recorded more than one million devastated hectares, with an alarming daily average of 796.2 hectares of deforestation in 2024. The Bahian Cerrado, in particular, faces intense pressures, being one of the country's most threatened biomes. This tropical savanna, known as the "cradle of waters" for harboring springs of important Brazilian hydrographic basins, has been losing its vegetation cover at an accelerated pace.

Similarly, the Caatinga, an exclusively Brazilian biome, also suffers from uncontrolled deforestation that eliminates and threatens endemic species and compromises the adaptive capacity of traditional communities to climate change. The Bahian Atlantic Forest, reduced to fragments, struggles for survival amid urban and agricultural pressure.

This reality has demanded an institutional response commensurate with the challenge. The traditional model of inspection and accountability, while necessary, has proven insufficient given the speed and scale of damage. Thus, innovation is necessary, and that is exactly what MPBA did with the Protected Land Project.

3. LEGAL FOUNDATIONS AND INSTITUTIONAL ROLE OF THE PUBLIC PROSECUTOR'S OFFICE

Protected Land is solidly grounded in the Brazilian and international legal framework for environmental protection. Indeed, the Federal Constitution of 1988, in its Article 225, establishes everyone's right to an ecologically balanced environment, attributing to the Public Power and the collectivity the duty to defend and preserve it. In this scenario, the Public Prosecutor's Office, in performing its constitutional role as a permanent institution essential to the jurisdictional function of the State, has among its fundamental missions the defense of legal order, the democratic regime, and unavailable social and individual interests.

Thus, the project aligns perfectly with the national legal system, especially with the Forest Code (Law No. 12,651/2012), which establishes general rules on native vegetation protection, and the National Policy on Climate Change (Law No. 12,187/2009), which aims to make economic-social development compatible with climate system protection. At the state level, the project integrates with Bahia State's Environmental and Biodiversity Protection Policy and the State Program for Payment of Environmental Services.

Internationally, Protected Land contributes to fulfilling Brazil's commitments under the Paris Agreement, particularly regarding greenhouse gas emission reductions and strengthening adaptive capacity. The project also aligns with the UN's Sustainable Development Goals (SDGs), especially SDG 13 (Climate Action), 15 (Life on Land), 16 (Peace, Justice and Strong Institutions), and 17 (Partnerships for the Goals).

By using advanced technologies to detect, validate, and hold accountable environmental violations, Protected Land gives practical effectiveness to constitutional rights, defense and protection of native vegetation and biodiversity, and the country's international commitments. Its differential lies in its capacity to translate these normative frameworks into concrete and measurable actions.

4. INNOVATIVE METHODOLOGY: GEOTECHNOLOGIES, DATA SCIENCE, ARTIFICIAL INTELLIGENCE AT THE SERVICE OF ENVIRONMENTAL JUSTICE

The heart of the Protected Land Project resides in its innovative methodology, which combines remote sensing, official data and information systems, process automation, and artificial intelligence to create a "digital chain of custody" for deforestation. This approach allows not only detecting vegetation suppression events in near real-time but also producing legally valid evidence in an automated manner.

4.1. REMOTE SENSING AND AUTOMATED DETECTION

The system uses deforestation alerts and high spatial resolution satellite images to continuously monitor Bahian biomes. Advanced image processing algorithms identify changes in vegetation cover, classifying them by type, extent, and geographic location. This technology allows detecting deforestation from nine square meters, ensuring that even small infractions are identified.

The system's precision is constantly improved through machine learning techniques that analyze historical patterns and refine detection algorithms. This results in a significant reduction of false positives and negatives, increasing the reliability of generated information.

4.2. SCIENTIFIC VALIDATION AND DIGITAL CHAIN OF CUSTODY FOR DEFORESTATION

Each detected deforestation event undergoes a rigorous validation process that includes temporal analysis, comparison with reference databases, geographic consistency verification, and consultation with public environmental information systems. The system maintains a detailed record of all processing stages, creating a digital chain of custody for deforestation that ensures information integrity and traceability.

This approach is fundamental for the legal validity of evidence produced. The system automatically documents data origin, algorithms used, analyses performed, and results obtained, creating a technical dossier that can be used in both administrative and judicial procedures.

4.3. PROCESS AUTOMATION AND TECHNICAL DOCUMENT GENERATION

One of Protected Land's most significant innovations is its capacity to automate the production of technical and legal documents. The system automatically generates thematic maps, technical reports, damage valuation and quantification reports, and drafts of conduct adjustment terms and public civil actions. This automation drastically reduces the time between damage detection and institutional response, from months to days or even hours.

The standardization of technical documents also ensures uniformity in the quality of evidence produced, regardless of the prosecutor or technician responsible for the case. This not only increases system efficiency but also strengthens legal security and procedure transparency.

4.4. PREDICTIVE ARTIFICIAL INTELLIGENCE

The project also incorporates predictive models that analyze environmental, socioeconomic, and land use variables to identify areas with higher probability of future deforestation and effects of environmental degradation resulting from deforestation. These models guide preventive actions, allowing the Public Prosecutor's Office to act before damage occurs, through recommendations or other precautionary measures.

Artificial intelligence also assists in prioritizing deforestation cases, considering criteria such as damage extent, ecological importance of the area, offender recidivism, and impact on traditional populations. This allows more efficient allocation of available human and material resources to seek reparation for identified environmental damages.

5. COLLABORATIVE GOVERNANCE AND ACTIVE TRANSPARENCY

The Protected Land Project is not just a technological solution but a collaborative governance model that integrates different actors and government levels. Central coordination is handled by the Environmental and Urban Planning Operational Support Center (CEAMA) of MPBA, which works in close coordination with Specialized Regional Environmental Prosecutor's Offices.

The project has established strategic partnerships with state environmental agencies such as the Institute of Environment and Water Resources (INEMA) and the Environment Secretary (SEMA). These partnerships ensure the exchange of environmental information, mainly those referring to rural environmental registries and vegetation suppression authorizations, as well as coordination of inspection actions and integration of official databases.

Additionally, collaboration with the MapBiomass project, a national and international reference in vegetation monitoring, ensures access to high-quality data and scientifically validated methodologies. This partnership also facilitates result comparison with other states and project insertion in national environmental monitoring networks.

One of Protected Land's pillars is active transparency, materialized in the Digital Panel available at www.terraprotegida.mpba.mp.br. This platform offers public and real-time access to information about deforestation alerts, Public Prosecutor's Office actions, and results of environmental damage reparation measures.

The panel presents data in an accessible and interactive way, including dynamic maps, temporal graphs, and performance indicators. This transparency not only strengthens social control but also increases pressure on violators and demonstrates institutional commitment to accountability to society.

6. RESULTS AND OBSERVED IMPACTS

Since its implementation in October 2024, the Protected Land Project has demonstrated significant results in different dimensions of environmental protection. These results reflect not only the technological efficiency of the system but also its capacity to transform institutional culture and environmental governance practices.

There has been an expansion in the number of investigations to combat illegal deforestation and repair environmental damages. More than one thousand civil inquiries are underway, and 130 conduct adjustment terms have been celebrated to date.

So far, commitments have been obtained for creating 87 Private Natural Heritage Reserves - RPPNs that will guarantee the maintenance of 3,100 hectares of native vegetation in the Caatinga and Cerrado biomes through conduct adjustment terms based on Protected Land data. These areas will be monitored by the same system that detected the original damages to ensure effective compliance with assumed obligations.

Additionally, R\$ 3,500,000.00 was allocated to the Fundamental Rights Defense Fund, created by MPBA to fund actions and projects aimed at defending fundamental rights.

7. SOCIO-ENVIRONMENTAL JUSTICE AND PROTECTION OF VULNERABLE POPULATIONS

The Protected Land Project recognizes that environmental protection cannot be dissociated from social justice. Traditional populations, quilombola communities, indigenous peoples, and family farmers maintain special relationships with territory, depending directly on ecosystem integrity for their subsistence and cultural reproduction.

The system incorporates specific information layers about traditional territories, conservation units, and areas of special social interest. This allows identifying cases involving vulnerable populations and applying differentiated action protocols, considering the cultural and socioeconomic specificities of each context.

When deforestation occurs in traditional territories or their surroundings, the project prioritizes intercultural dialogue and the search for negotiated solutions that reconcile environmental protection and territorial rights. Conflict mediation and promotion of sustainable productive alternatives are central strategies in these cases.

8. CONTRIBUTIONS TO THE GLOBAL CLIMATE AGENDA AND COP30

The Protected Land Project aligns directly with COP30 and Paris Agreement objectives, contributing measurably to global mitigation and climate adaptation goals. Its location in COP30's thematic axis 2 - sustainable forest and biodiversity management - reflects recognition that protecting natural ecosystems is fundamental to addressing the climate crisis.

8.1. EMISSION MITIGATION

Each hectare of deforestation prevented by the project represents tons of CO₂ that cease to be emitted to the atmosphere. Considering Bahian biome characteristics, it is estimated that preventing 1,000 hectares of Cerrado deforestation avoids the emission of approximately 47,000 tons of CO₂ equivalent.

The project also seeks to contribute to forest restoration, which represents additional carbon sinks. Areas mapped for restoration projects through Protected Land adjustment terms have the potential to sequester more than 300,000 tons of CO₂ over the next 20 years.

8.2. ECOSYSTEM-BASED ADAPTATION

Maintaining Bahian biome integrity contributes significantly to the region's adaptive capacity facing climate change. The Cerrado, for example, plays a crucial role in hydrological cycle regulation, maintaining rainfall patterns and water availability for multiple uses.

The Caatinga, adapted to semi-arid conditions, offers valuable lessons about climate resilience and sustainable management of scarce resources. Its conservation is essential for maintaining adaptive options for rural communities in Northeast Brazil.

8.3. BIODIVERSITY AND ECOSYSTEM SERVICES

Biodiversity protection promoted by the project goes beyond its intrinsic value, also encompassing ecosystem services essential for human well-being. Pollination, climate regulation, water purification, and pest control are just some of the benefits maintained by biome conservation.

The project directly contributes to the goals of the Kunming-Montreal Global Biodiversity Framework, particularly regarding conserving at least 30% of terrestrial ecosystems by 2030.

8.4. CLIMATE FINANCE AND INNOVATION

Protected Land demonstrates how investments in technology and governance can leverage climate finance resources. The model can attract resources from international funds interested in nature-based solutions and innovative monitoring, reporting, and verification (MRV) mechanisms.

The experience also offers subsidies for developing economic instruments such as payment for environmental services, REDD+, and voluntary carbon markets, providing precise data on avoided deforestation and forest restoration.

9. EXPANSION PERSPECTIVES AND REPLICABILITY

9.1. NATIONAL EXPANSION WITHIN THE PUBLIC PROSECUTOR SYSTEM

The Protected Land Project in Bahia paves the way for its expansion and replication in other contexts. The model was conceived from the beginning with a focus on scalability, using technologies and methodologies that can be adapted for different biomes, legal frameworks, and institutional arrangements.

Data and procedure standardization among different Public Prosecutor's Office units could create an unprecedented national environmental monitoring network, with the capacity to detect and respond to environmental violations on a continental scale. This integration would also facilitate addressing transboundary environmental crimes and articulating macro-regional conservation strategies.

9.2. INTERNATIONAL ADAPTATION

The Protected Land model has potential for adaptation in other Latin American countries and tropical regions, especially those facing similar challenges of deforestation and environmental degradation. South-South cooperation can facilitate technology and knowledge transfer, contributing to strengthening global environmental governance.

International organizations such as the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP), and the Latin American Network of Environmental Public Prosecutors (REDEMPA) have shown interest in supporting the dissemination of technology-based environmental governance good practices.

9.3. INTEGRATION WITH GLOBAL INITIATIVES

The project can integrate with international forest monitoring networks such as the Global Forest Observations Initiative (GFOI) and the Global Climate Observing System (GCOS). This integration would contribute to strengthening global monitoring systems and improving the quality of data used in international climate negotiations.

The experience can also inform the development of new international financial mechanisms, such as specific funds for institutional strengthening and environmental governance in developing countries.

10. CONCLUSION: A LEGACY FOR FUTURE GENERATIONS

The Protected Land Project represents more than a technological innovation or an institutional initiative that has already proven successful. It materializes a new vision of how the State can and should act in environmental protection, combining scientific rigor, administrative efficiency, and social commitment in a transformative synthesis for forests and biodiversity.

By demonstrating that it is possible to reconcile rigorous environmental protection with social justice, the project offers a concrete response to the false dilemmas that have historically divided environmental debate. The Bahian experience shows that nature conservation and sustainable human development are not conflicting objectives but complementary faces of the same civilizational project.

For COP30, Protected Land represents Brazil's contribution to a new climate governance paradigm: evidence-based, transparent in its processes, effective in its results, and inclusive in its conception. It is a model that recognizes science as the foundation of policy, technology as a tool of democracy, and social justice as a necessary condition for environmental sustainability.

The project also reaffirms the Public Prosecutor's Office's role as a strategic institution for confronting the climate crisis. Beyond a control or inspection body, the MP reveals itself as an agent of transformation, capable of catalyzing structural changes and promoting institutional innovations that benefit all of society.

Looking to the future, Protected Land establishes the foundations for a new generation of environmental policies in Brazil and the world. Policies that are not limited to reacting to damages but that anticipate problems, prevent conflicts, and build lasting solutions. Policies that recognize the interdependence between environmental health and social justice, between nature protection and human rights, between local action and global impact.

REFERENCES

BRASIL. Constituição da República Federativa do Brasil de 1988. Brasília: Senado Federal, 1988.

BRASIL. Lei nº 12.187, de 29 de dezembro de 2009. Institui a Política Nacional sobre Mudança do Clima (PNMC). Diário Oficial da União, Brasília, 29 dez. 2009.

BRASIL. Lei nº 12.651, de 25 de maio de 2012. Dispõe sobre a proteção da vegetação nativa. Diário Oficial da União, Brasília, 28 maio 2012.

BAHIA. Política Estadual de Meio Ambiente e de Proteção à Biodiversidade. Salvador: Governo do Estado da Bahia, 2006.

BAHIA. Política e ao Programa Estadual de Pagamento por Serviços Ambientais. Salvador: Governo do Estado da Bahia, 2015

CONSELHO NACIONAL DO MINISTÉRIO PÚBLICO (CNMP). Comissão do Meio Ambiente. Orientações para publicação especial COP30. Brasília: CNMP, 2025.

MAPBIOMAS. Relatório Anual do Desmatamento no Brasil (RAD 2024). São Paulo: MapBiomass, 2025.

MINISTÉRIO PÚBLICO DO ESTADO DA BAHIA (MPBA). Projeto Terra Protegida: sumário executivo. Salvador: CEAMA/MPBA, 2024.

ORGANIZAÇÃO DAS NAÇÕES UNIDAS. Acordo de Paris. Paris: UNFCCC, 2015.

ORGANIZAÇÃO DAS NAÇÕES UNIDAS. Marco Global de Biodiversidade de Kunming-Montreal. Montreal: CBD, 2022.

TERRA PROTEGIDA. Painel Digital de Transparência. Disponível em: www.terraprotegida.mpba.mp.br. Acesso em: 10 ago. 2025.

CLIMATE CHANGE AND ENVIRONMENTAL DEFENSE: THE INSTITUTIONAL ACTION OF THE PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF PIAUÍ (MPPI)

Áurea Emília Bezerra Madruga¹

The State of Piauí, with an estimated population of approximately 3.3 million inhabitants (IBGE/2024), presents an environmental mosaic of high ecological relevance, predominantly integrating the Cerrado biome with transition zones to the Caatinga and remaining portions of the Atlantic Forest. Within its territory, it also houses a unique natural heritage: the Delta of Parnaíba, the only open sea delta in the Americas, formed by an intricate set of islands, channels, and mangroves that perform essential functions in maintaining coastal ecosystems and protecting marine and terrestrial biodiversity. Added to this collection is the Serra da Capivara National Park, recognized worldwide for its archaeological significance, housing one of the planet's most important sets of rock paintings and considered the cradle of the American man, revealing records dating back tens of thousands of years. Beyond its invaluable scientific and historical value, the Park fascinates with the scenic beauty of its rock formations and unique landscapes, constituting a cultural and natural heritage of global relevance. This collection of ecosystems plays a strategic role in climate regulation, biodiversity conservation, and water resource preservation, ensuring environmental services that are indispensable to the quality of life of the population and sustaining economic activities that directly depend on environmental integrity.

However, despite this natural wealth and the potential for sustainable development, Piauí faces increasing pressures on its natural resources. Among the main challenges, the advancement of deforestation, difficulties in properly managing solid waste, and the recurrent and inadequate use of fire, both in rural areas and urban zones, stand out. These factors, when combined, can promote the reduction of socio-environmental resilience and threaten the continuity of ecosystem services — such as water regulation, protection against extreme weather events, and soil fertility maintenance — that sustain quality of life and environmental security in the State.

In this potentially adverse scenario, the role of the Public Prosecutor's Office of the State of Piauí (MPPI) becomes prominent in defending an ecologically balanced environment — a fundamental right enshrined in Article 225 of the Federal Constitution — directing efforts both for the prevention and repair of environmental damage and for the promotion of public policies aimed at mitigating and adapting to climate change.

1 Prosecutor of the Public Prosecutor's Office of Piauí

The MPPI structures its actions through various Public Prosecutor's Offices with specific responsibilities in the environmental sphere, which carry out activities of inspection, control, and accountability of public and private agents for harmful conduct towards environmental assets. This work is reinforced by the specialized technical support of the Operational Support Center for Environmental Defense (CAOMA), coordinated by Prosecutor Áurea Emília Bezerra Madruga, which provides legal guidance and strategic support to the Public Prosecutor's Offices, allowing greater efficiency and integration in ministerial actions.

In addition to typical prosecution and control activities, the MPPI also stands out in developing and implementing institutional projects that generate concrete impacts on environmental quality and promote the transition to a more sustainable and resilient development model. In exercising its constitutional function, it acts not only as a guardian of the law but also as a facilitator, integrating and calling upon other public and private institutions for a joint, coordinated action guided by a systemic vision. These initiatives encompass programs aimed at the proper management of solid waste and the prevention and combat of wildfires, as well as environmental education actions, involving communities, schools, public agencies, and productive sectors, in an approach that combines environmental protection, social participation, and compliance with legislation.

In this context of integration and interinstitutional cooperation, five structuring projects stand out for their potential to generate effective results in facing climate change: Project Zero Dumpsites: For a Cleaner Piauí, Alert MATOPIBA, Atlantic Forest Standing, Firebreak, and Eco Kids and Eco Teens.

1. PROJECT ZERO DUMPSITES: FOR A CLEANER PIAUÍ

The inadequate management of solid waste stands as one of the main causes of pollution and environmental degradation in Piauí, also acting as a vector of greenhouse gas emissions, especially methane (CH₄), released by the decomposition of organic matter in open-air landfills. Alert to this scenario, the MPPI, in partnership with the State Court of Accounts, the State Secretary of Environment and Water Resources (SEMARH), and the Labor Public Prosecutor's Office, has been implementing the Project Zero Dumpsites since 2021, aiming to promote the eradication of open-air dumps in Piauí and implement technical solutions for the environmentally adequate final disposal of waste.

The project adopts a strategy that combines technical planning, interinstitutional articulation, and extrajudicial action. The model includes the creation of regional sanitary landfills, such as those in Altos, Água Branca, and Buriti dos Lopes, which act as central hubs for receiving waste from neighboring municipalities through the establishment of transshipment stations. This regionalization provides logistical and economic gains, in addition to ensuring that the waste is disposed of in accordance with environmental legislation.

To date, 49 municipalities in Piauí, out of a total of 223, have already completed the definitive closure of their open-air dumps, adopting as the final destination for waste properly licensed sanitary landfills, in strict compliance with the environmental standards and regulations established by Brazilian legislation. This result, although partial, represents a significant advance in meeting the targets set for solid waste management, revealing that the transition to environmentally correct final disposal models is not only possible but also viable from a technical, administrative, and economic standpoint.

The challenge, however, remains significant, as the majority of municipalities in the State still maintain areas of inadequate disposal, often characterized by open-air dumping, lacking soil impermeabilization, drainage systems, and control of liquid and gas effluents, factors that cause serious environmental impacts and public health risks. This reality is in clear noncompliance with the National Solid Waste Policy (Law No. 12,305/2010) and the New Legal Framework for Basic Sanitation (Law No. 14,026/2020), laws that establish progressive targets for the eradication of open-air dumps and impose obligations for planning, monitoring, and integrated waste management.

Despite the challenging scenario, the institutional expectation — supported by public policies already being implemented, the strengthening of municipal structures, and interinstitutional cooperation with the Public Prosecutor's Office, environmental agencies, and regional consortia — is that, in a few years, all municipalities in Piauí will definitively close their open-air dumps, migrating to environmentally adequate and socially responsible solutions. This trend is reinforced by factors such as the increase in incentives for the formation of intermunicipal consortia, access to specific financing for the establishment of landfills and sorting units, and regulatory pressure stemming from legal deadlines and inspections.

The complete closure of open-air dumps in the State will mark a historic milestone for Piauí's environmental policy, with direct repercussions for the preservation of natural resources, the control of soil, water, and air pollution, the mitigation of climate impacts, and the improvement of the population's quality of life. This is an essential step towards the realization of the principles of integrated and sustainable solid waste management established in national legislation and towards the consolidation of a development model that reconciles economic growth, social justice, and environmental balance.

It is important to mention that the implementation of Project Zero Dumpsites also includes the socioeconomic valorization of recyclable material collectors, the establishment of selective collection, and the promotion of sorting and composting plants. Such actions reduce greenhouse gas emissions, extend the lifespan of landfills, and promote social inclusion, being, therefore, effective tools for mitigating environmental impacts and adapting to climate change.

2. PROJECT ALERT MATOPIBA

The Alert MATOPIBA Project, implemented within the scope of the Public Prosecutor's Office of the State of Piauí, has established itself as a structuring initiative aimed at strengthening the institutional capacity to respond to illegal deforestation in the Cerrado biome, with special attention to the southern region of the state — an area heavily impacted by the expansion of the agricultural frontier known as MATOPIBA (acronym for Maranhão, Tocantins, Piauí, and Bahia).

The MPPI's action in the project is based on technical diagnoses prepared within the initiative, which identified, among other aspects, the low effectiveness of environmental regularization of properties registered in the Rural Environmental Registry (CAR), gaps in integrated action with oversight agencies, and the need to standardize good institutional practices adopted by other State Public Prosecutor's Offices in combating vegetation suppression.

From these bases, the MPPI expanded its capacity to act through concrete actions, such as: (i) use of geospatial reports to detect critical areas with unauthorized deforestation; (ii) cross-referencing data with CAR records and environmental licenses to identify responsible parties; (iii) issuing

recommendations, initiating civil inquiries, and filing public civil actions requesting full reparation for damages; and (iv) developing regionally tailored action strategies sensitive to the land, socioeconom-ic, and environmental specificities of Piauí's territory.

In addition, the creation of a Transparency Platform is underway, which will compile and pub-licize the measures adopted by the MPPI and other participating Public Prosecutor's Offices in the project, increasing institutional visibility, promoting social control, and encouraging federative coop-eration and the exchange of good practices.

The project has direct results on the climate agenda by contributing to the conservation of ecosystem services associated with regional climatic balance, such as maintaining fertile soils, pro-protecting springs and aquifers, and safeguarding native vegetation cover. By curbing disorderly vege-tation suppression, the MPPI helps preserve the ecological foundation upon which local economies and the water security of thousands of families depend, thereby reinforcing the adaptation of terri-tories to the increasingly unstable environmental scenario.

3. OPERATION ATLANTIC FOREST STANDING

Originally conceived by the Public Prosecutor's Office of Paraná, the Operation Atlantic Forest Standing was incorporated into the action of MPPI as an institutional response to the environmen-tal degradation of the remnants of Atlantic Forest located in the capital and its surroundings, the extreme south, and the northern coastal portion of the state, especially in the municipalities of Luís Correia, Cajueiro da Praia, Parnaíba, and surroundings.

Although they represent a relatively restricted territorial range, these areas have high ecolog-ical value as they are situated in transition zones between the Cerrado, Caatinga, and Atlantic Forest biomes, functioning as biodiversity refuges, ecological corridors, and recharge zones. The advance of real estate speculation, unplanned occupation, and the expansion of the agricultural frontier has put these areas under strong pressure, resulting in irregular vegetation suppression, illegal subdivision of urban land, and degradation of Permanent Preservation Areas (APPs).

In the context of the operation, the MPPI acts in conjunction with agencies such as SEMARH, IBAMA, the Environmental Military Police Battalion, city halls, and federal institutions, promoting technical inspections, satellite data collection, identification of deforested areas, drafting of infrac-tion notices, and, above all, holding offenders accountable in administrative, civil, and, when appro-priate, criminal spheres. At the same time, adjustment terms have been signed with specific clauses aimed at forest restoration and reparation of environmental damage.

More than just an inspection effort, the Operation Atlantic Forest Standing strengthens the active presence of the Public Prosecutor's Office in environmentally sensitive regions of the state, consolidating its image as an institution that combines legality control, defense of natural heritage, and promotion of a rural and urban order compatible with the principles of sustainable development.

4. PROJECT FIREBREAK

The indiscriminate use of fire, whether in rural or urban areas, represents one of the most persistent and harmful threats to the environment and public health. This practice intensifies green-house gas emissions, exacerbates global warming, and causes severe and often irreversible harm to fauna, flora, and soil quality, in addition to creating direct risks to population safety. Aware of the

seriousness of the problem and its multidisciplinary dimension, the Public Prosecutor's Office of the State of Piauí (MPPI), through the Operational Support Center for Environmental Defense (CAOMA), has structured and coordinated, in partnership with IBAMA, the State Secretary for Environment and Water Resources (SEMARH), the Military Fire Brigade, the Environmental Patrol Battalion, EMATER, FETAG, and municipal agencies, the Firebreak Project.

This initiative translates into an integrated action that combines environmental education, effective oversight, and technical training. In urban areas, campaigns directed at property owners are promoted, emphasizing the prohibition of using fire for land clearing, in accordance with existing legislation and the harmful impacts of this practice. In rural areas, the focus is on guiding farmers regarding controlled burning — a procedure allowed by law but subject to environmental licensing and adherence to strict preventive measures to prevent uncontrolled fire spread.

The project also stands out for its strategically territorial character: through technical surveys of heat sources, communities and areas classified as critical points for wildfires are identified. In these locations, field meetings including lectures, distribution of educational materials, and formal commitments with community leaders and rural producers for the adoption of sustainable preventive practices take place.

By directly reducing the incidence of wildfires, the Firebreak Project not only prevents environmental disasters but also strengthens the ecological resilience of the State, protecting permanent preservation areas, minimizing soil degradation, preserving biodiversity, and avoiding significant CO₂ emissions. Thus, it consolidates itself as a strategic instrument of the MPPI in addressing climate change and promoting an environmentally balanced development model.

5. PROJECT ECO KIDS AND ECO TEENS

Effective combat against climate change is not limited to adopting clean technologies or tightening legislation; it requires a profound cultural transformation that can only be realized when new generations grow up aware and engaged in environmental causes. With this understanding, the MPPI implemented the Eco Kids Project — later expanded to include adolescents, with Eco Teens — aimed at the environmental education of elementary school students from public and private schools. These projects were originally conceived by the Public Prosecutor's Office of the State of Bahia and were incorporated and adapted to the reality of Piauí.

The central axis of the project is an environmental newspaper produced and narrated by the students themselves, who address topics such as recycling, water conservation, protection of fauna and flora, climate change, and sustainability practices. In Eco Kids, the content is tailored for children up to 12 years old, while Eco Teens reaches adolescents, introducing broader and more complex discussions about public policies, conscious consumption, and environmental citizenship.

The methodology, characterized by playful and participatory approaches, awakens the youth's protagonism, transforming students into multipliers of the environmental cause, capable of disseminating values and information not only within the school but also in their families and communities. By integrating environmental themes into the school routine, the project contributes to building a solid and lasting ecological consciousness, reinforcing the society's capacity to adapt and respond to the challenges posed by climate change.

Thus, both the Firebreak Project and Eco Kids/Eco Teens highlight the MPPI's commitment to interinstitutional articulation, social mobilization, and transformative environmental education, which are essential pillars for a more sustainable and resilient future in the State of Piauí.

6. GREEN LINE PROJECT

The Green Line Project is a permanent and innovative initiative, conceived and implemented since 2017 by the Operational Support Center for Environmental Protection (CAOMA). The Green Line consists of an electronic form, free of charge and with unrestricted access, available 24 hours a day on the official MPPI website. Its intuitive and user-friendly format allows anyone, in a simple way, to report environmental violations.

To enhance the effectiveness of the information provided, the form allows the submission of multimedia attachments — photographs, videos, and audio — which help substantiate the facts and define the extent of environmental damage. These pieces of evidence, combined with the data provided by whistleblowers, serve as initial elements for screening and for initiating administrative procedures and prosecutorial investigations, enabling a quicker and more targeted response from the competent Prosecutor's Offices. The project emerged as a concrete response to the need to modernize, democratize, and expedite citizens' access to institutional channels for environmental reporting and oversight, bringing the MPPI closer to society and strengthening social control over the preservation of natural resources and the cultural heritage of the capital of Piauí.

In this regard, the Green Line is not merely a reporting channel but a tool for environmental management and intelligence, integrating technology, social participation, and strategic prosecutorial action to protect Teresina's natural and cultural heritage. By promoting direct, swift, and continuous communication with the population, the project reinforces MPPI's role as a guardian of diffuse and collective rights, while also contributing to a healthier, more sustainable city that is aware of its environmental responsibilities.

FINAL CONSIDERATIONS

Facing climate change requires coordinated, continuous actions grounded in science, education, and social participation. Projects such as Project Zero Dumpsites, Firebreak, and Eco Kids/Eco Teens exemplify the capacity of the Public Prosecutor's Office of the State of Piauí to articulate integrated solutions that simultaneously act in mitigating environmental impacts, adapting to new climatic realities, and promoting environmental citizenship.

With these initiatives, the MPPI aligns itself with the set of public institutions that act directly in fulfilling Brazil's climate commitments made in international treaties. Furthermore, it reaffirms its institutional commitment to defending an ecologically balanced environment, effectively contributing to a sustainable future for all Piauí residents and leaving a legacy of responsibility, innovation, and hope for future generations.

“TIME TO CARE” PROJECT

Belize Câmara Correa¹

1. INTRODUCTION AND CONTEXT

Global climate change has increasingly contributed to the frequent and intense occurrence of extreme geological and hydrological events such as landslides and floods. This scenario, combined with local vulnerabilities—including a high number and extent of risk areas (slopes and flood-prone zones), housing deficits, uncontrolled occupation of environmentally protected areas, social inequality, and lack of basic services and adequate infrastructure—has made Brazilian territories progressively more susceptible to the impacts of disasters. Recurring harm to life, physical integrity, and people’s property, as well as environmental, urban, material, and economic losses, demonstrate the inadequacy or the need for improvement of existing public policies to more resiliently face the rainy seasons.

In the state of Pernambuco, the reality of socio-environmental disasters is particularly severe. The 2022 Winter Operation Report, prepared by the Executive Secretariat of Civil Defense of the State Government, revealed that the rains that year affected 90 municipalities, of which 79 declared a State of Emergency. By July 31, 2022, the state had recorded 132 deaths, making it the deadliest disaster since July 1970, affecting the Metropolitan Region of Recife (RMR), Zona da Mata, and Agreste. Additionally, the heavy rainfall recorded on May 28, 2022, resulted in 120,902 displaced individuals and 9,631 homeless. The total economic losses in the state reached R\$ 2.9 billion.

It is in this challenging context that the “Tempo de Cuidar” (Time to Care) Project arises—an initiative of the Public Prosecutor’s Office of Pernambuco (MPPE), whose primary objective is to coordinate prosecutorial actions aimed at inducing, improving, and implementing public policies capable of reducing the vulnerabilities of municipalities in Pernambuco, making them more resilient to the rainy seasons. Although initially focused on rain-related events (responsible for most deaths in Brazil and in Pernambuco), the project may eventually include other types of disasters, such as droughts, which are also recurrent in the state.

The target audience of this initiative is society in general, with special emphasis on residents of risk areas, who are disproportionately affected by socio-environmental disasters—highlighting what is known as “environmental racism.” By enhancing the oversight of public resource use and

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public policy implementation, the “Tempo de Cuidar” project seeks to improve the effectiveness of civil and criminal prosecution, consolidate integrated prosecutorial action, and foster inter-institutional coordination to ensure the cross-cutting protection of fundamental rights.

2. METHODOLOGY AND IMPLEMENTATION PROCESS

The implementation of the “Tempo de Cuidar” Project began in February 2023, marked by the launch of the first edition of GACE (Specialized Joint Action Group) “Rains,” requested and coordinated by the MPPE’s Environmental Defense Support Center (CAO Meio Ambiente). This group consisted of three public prosecutors, selected through objective criteria after qualification, and initially operated for five months.

Given the short time before the 2023 rainy season and the impossibility of GACE covering all 184 municipalities in Pernambuco with only three members, a selection was made based on technical and objective criteria. Fourteen municipalities were chosen, all of which had declared a State of Emergency confirmed by the State Government (State Decree No. 52.921/22) and recognized by the National Secretariat for Civil Protection and Defense (Ordinance No. 1.713/22). GACE’s operation in each municipality required prior formal consent from the local Public Prosecutor with jurisdiction over urban planning.

To speed up the process, the municipalities were distributed among the GACE members, who analyzed the procedures already in place at their respective prosecutor’s offices. The diagnostic phase—essential to understanding the problem—was multifaceted:

- **Social Listening:** A meeting was held on March 15, 2023, with social movements addressing the issue of rains, forming the GT Chuvas collective. This group produced the “Popular Dossier on the Impacts of the Rains in Recife and the Metropolitan Region,” entitled “An Announced Tragedy.” The dossier outlined necessary public measures, ranging from assistance to those affected in 2022, pre-winter actions, to building medium- and long-term resilience. Challenges identified included the lack of public information about risk areas, housing deficits, inadequate temporary shelters, limited access to financial aid, lack of transparency, outdated contingency plans, and the need for family registration and monitoring.
- **Diagnostics with Public Agencies:** Hearings were held with municipal civil defense agencies in the selected cities, including the three largest (Recife, Olinda, and Jaboatão), and with the State Executive Secretariat for Civil Defense, to assess the public policies in place for the rainy season response.
- **Dialogue with Technical Support Agencies:** Hearings were conducted with the Geological Service of Brazil (SGB/CPRM) on April 26, 2023—the main source for identifying risk areas in Pernambuco, despite mostly outdated maps (from 2012–2013). On May 16, 2023, a hearing was also held with technicians from the National Center for Monitoring and Alerts of Natural Disasters (CEMADEN).

- **Coordination with National Agencies:** On June 5, 2023, a joint hearing with the Federal Prosecutor's Office (MPF) and the National Secretariat for Civil Protection and Defense (SEDEC) clarified questions about the National Registry of Municipalities with Areas Susceptible to Major Landslides, Flash Floods, or Related Geological or Hydrological Processes.

Once the diagnostic phase was complete, actions to be required of the municipalities were defined. A draft Environmental Commitment Agreement (TCA) was prepared with obligations and deadlines, which was first shared with social movements to ensure that public demands were included. Of the 14 municipalities initially selected, one did not participate in GACE's specialized operations. Of the remaining 13, 10 fully signed the TCA. In the three that did not sign, draft Civil Public Actions (ACP) were proposed or made available for use by local prosecutors.

The obligations agreed upon in the TCAs, aligned with GACE's scope and the Public Prosecutor's duties in urban planning, include:

1. Restructuring the municipal Civil Defense agency to ensure sufficient human and material resources.
2. Registering in the National Registry of Municipalities with Areas Susceptible to Major Landslides, Flash Floods, or Related Geological or Hydrological Processes.
3. Updating the mapping of geological and hydrological disaster risk areas with georeferenced boundaries and sending the data to SEPDEC and CEMADEN. For smaller municipalities, funding was replaced by proof of request for state or federal support.
4. Including a link on the municipality's official website with the Contingency Plan and georeferenced risk area maps.
5. Annually preparing a Contingency Plan (PLACON) in accordance with Law No. 12.340/10 and national guidelines, with public participation at all stages and a prior public hearing.
6. Holding an annual public hearing to report on the effectiveness of the Contingency Plan.
7. Preferentially designating non-school buildings for temporary shelters.
8. Ensuring adequate hygiene and safety conditions in shelters, with health, social assistance, and security teams, and providing basic items (mattresses, sheets, hygiene kits, medicine, food, drinking water).
9. Maintaining a direct communication channel with the population for requesting, processing, tracking, and publicizing financial aid, with transparency about beneficiaries.
10. Conducting annual simulation exercises in all risk sectors mapped by CPRM to ensure the PLACON's effectiveness.

11. Creating Civil Protection and Defense Nuclei (NUPDECs) with sufficient representatives from civil society living in risk areas.

Upon GACE's conclusion, a final report was issued, and templates were made available to support prosecutors in both participating and non-participating municipalities. All materials, including reports, templates, and technical/legal documents, are available on the "Tempo de Cuidar" website, aiming to expand integrated action across all municipalities in Pernambuco.

3. INNOVATION OF THE PRACTICE

The main innovation of the "Tempo de Cuidar" Project lies in the redefinition of the Public Prosecutor's Office's role in civil protection and defense policy. Traditionally, the Public Prosecutor often acts as a mere crisis manager, intervening after the fact in an immediate and emergency-driven way to remedy harmful situations (e.g., shelter visits, donation drives). While relevant, this reactive role proves insufficient given the strategic institutional functions of the office, especially its role as a promoter and enabler of public policies.

The project's initial diagnostic confirmed this perspective: in the prosecutor's offices of the selected municipalities, prosecutorial action was largely limited to solving individual issues (property inspections, relocations, aid payments) or sporadic community demands (tarp placement, canal cleaning, retaining wall construction). There was no evident institutional stance aimed at ensuring the structuring of Civil Defense agencies, the implementation of planning tools, or the promotion of effective social participation.

In contrast, "Tempo de Cuidar" elevates the Public Prosecutor's role to that of "risk" management—not merely "crisis" management. The project aims to anticipate disasters by requiring legal and appropriate measures to equip municipalities for facing socio-environmental events across multiple aspects: prevention, mitigation, preparedness, response, and recovery. This proactive approach is essential because the Public Prosecutor's Office, as a political agent with constitutional duties of social transformation, cannot act solely after harm has occurred—it must focus primarily on prevention and preparedness to make municipalities less vulnerable and more resilient to disasters.

4. CONTRIBUTION TO THE IMPROVEMENT OF JUSTICE

The "Tempo de Cuidar" Project makes a significant contribution to the improvement of justice, particularly in addressing the deep socio-spatial inequalities that characterize the municipalities of Pernambuco and are exacerbated by extreme climate events. Low-income populations often live in risk areas—such as hillsides and flood zones—due to real estate market dynamics and the absence of adequate urban infrastructure. The public sector's historic inefficiency in addressing these issues results in systemic socio-environmental injustice.

The project strengthens the institutional action of the MPPE (Public Prosecutor's Office of Pernambuco), promoting a change in the behavior of public agents. The Public Prosecutor's Office assumes the role of a promoter of public policies focused on risk management—not merely on crisis management. Additionally, it acts as a mediator between social actors, aiming to induce the adoption of more assertive and effective measures for prevention, mitigation, preparedness, response, and recovery—both environmental and social.

This approach primarily seeks to promote social and environmental justice, ensuring that fundamental rights—such as the right to life, human dignity, and an ecologically balanced environment—are effectively protected for the most vulnerable populations.

The prioritization of consensual and negotiated pathways with municipalities, through the signing of Environmental Commitment Agreements (TCAs), demonstrates a focus on resolute and agile approaches, avoiding the delays and inefficiencies often associated with judicialization. If judicial means become necessary, the TCAs, as extrajudicial enforcement instruments, eliminate the need for debate over merit, thereby expediting legal proceedings.

5. SUCCESS FACTORS AND CHALLENGES FACED

The success of the “Tempo de Cuidar” Project can be attributed to several factors:

- **Focus on Affected Municipalities:** The initiative initially targeted the municipalities most impacted by rains and landslides in the year prior to the project’s launch, which may have facilitated local engagement.
- **Consensual Approach:** Of the 14 municipalities approached by GACE, 10 signed the Environmental Commitment Agreement (TCA) with MPPE. This consensual approach, based on legal, jurisprudential, doctrinal, and factual grounds, proved effective in securing the commitment of local managers and ensuring the implementation of essential tools and measures for disaster mitigation and preparedness, with agreed deadlines.
- **Dissemination of Support Materials:** The availability of templates for administrative and legal documents, along with technical notes on the project’s website, supports replicability and expansion to other municipalities vulnerable to critical events such as heavy rains, floods, and landslides.
- **Coordinated and Planned Action:** GACE’s methodology, enabling direct dialogue with involved agencies and a systemic view of Pernambuco’s situation, proved suitable for filling gaps in prosecutorial action. The intra- and inter-institutional cooperation with civil defense bodies, organized civil society, CEMADEN, and the National Secretariat for Civil Protection and Defense provided up-to-date information to guide the work of public prosecutors.

Despite its successes, the project faced—and continues to face—various implementation challenges:

- **Limited Municipal Institutional Capacity:** Most municipalities have recently appointed civil defense coordinators with precarious contracts (temporary positions) and little to no technical training, resulting in high turnover.

- **Lack of Structure and Planning:** Many locations lack: updated, detailed risk area mapping (relying on outdated CPRM maps); budget allocations for updating these maps; Municipal Risk Reduction Plans; appropriate or transparent Contingency Plans (some are “classified”); and official platforms for disclosing diagnoses and Civil Defense documents.
- **Low Social Participation:** Engagement with at-risk communities is often informal (e.g., via WhatsApp groups), with no formalized Civil Defense Councils or Nuclei. Public hearings, when held, are used merely to present finalized plans, without real public involvement.
- **Difficulty in Joining National Registries:** There is confusion or lack of understanding about the benefits of joining the National Registry of Municipalities with Areas Susceptible to Landslides. Other issues include a slow system and excessive bureaucracy for uploading documents.
- **Prioritization of Post-Disaster Actions:** Municipal administrations generally do not prioritize preventive measures, focusing instead on emergency actions (reports, inspections, canal cleaning) to the detriment of planning.
- **Budget Constraints:** The high cost of certain measures, such as georeferenced mapping updates, combined with municipalities’ financial difficulties, poses a challenge.
- **Staff and Leadership Turnover:** Changes in municipal administrations and local prosecutors can disrupt continuity, requiring renewed agreements with technical bodies and continuous support for new prosecutors.

6. RESULTS ACHIEVED

Monitoring of the clauses in the Environmental Commitment Agreements (TCAs) signed with the ten municipalities participating in GACE Chuvas has shown significant partial results as of June 19, 2024:

- **Shelter Procurement:** 100% of the committed municipalities carried out procurement procedures to ensure adequate conditions in temporary shelters, including hygiene, safety, and provision of essential items such as mattresses, sheets, hygiene kits, medicine, food, and drinking water.
- **Contingency Plans:** 80% of the committed municipalities prepared their Contingency Plans (PLACON), meeting the minimum legal requirements and observing the principle of public participation.
- **Georeferenced Mapping:** 70% of the committed municipalities carried out or updated the mapping of their geohydrological disaster risk areas with georeferenced boundaries.

- **Communication Channels:** 70% of the municipalities created and maintained direct communication channels with the population for requesting, processing, tracking, and publicizing financial aid, ensuring transparency regarding beneficiaries.
- **Non-School Shelters:** 90% of the municipalities indicated non-school buildings to serve as temporary shelters for affected populations, except in exceptional cases not foreseen in the PLACON.

Other obligations, such as registration in the National Registry of Municipalities with Areas Susceptible to Major Landslides and the creation of NUPDECs, are underway and have reached a 50% compliance rate.

The annual public hearings for PLACON accountability and the execution of simulation drills face greater implementation challenges, with current fulfillment rates at 10% and 30%, respectively.

The results achieved can be verified through forms completed by the municipalities, along with the analysis of digital documents related to the procurement procedures and contingency plans.

7. CONCLUSION

The “Tempo de Cuidar” Project, developed by the Public Prosecutor’s Office of Pernambuco (MPPE), represents a fundamental initiative to enhance the response capacity of municipalities in Pernambuco in the face of the increasing frequency and intensity of socio-environmental disasters driven by climate change. GACE’s initial diagnostic revealed that risk management is not a priority public policy at the municipal level, and that the Public Prosecutor’s oversight of the implementation of planning and risk management tools provided by law was, for the most part, insufficient. This gap stemmed partly from prosecutors’ lack of familiarity with the subject, a shortage of doctrinal resources, and the complexity of dividing responsibilities among civil defense agencies.

The Joint Specialized Action Group (GACE) model proved effective in addressing this gap, allowing direct dialogue and a systemic view of Pernambuco’s situation. It became evident that the lack of planning and preparedness for the rainy season significantly worsened the damage caused by seasonal rains in the state. On the other hand, many of the legally required actions do not demand large financial investments, but rather the engagement of Civil Defense agents and the involvement of other institutions.

Thus, “Tempo de Cuidar” reaffirms that the Public Prosecutor’s role in promoting preparatory public policies is essential to reducing risks and damages. It aims to overcome the prevailing culture of reactive responses over planning, the lack of prioritization of risk management policies, and the overall lack of knowledge on the topic. By promoting resoluteness, innovation, proactivity, transparency, and cooperation, the project not only seeks to mitigate the immediate impacts of disasters but also to build a more resilient and just future for Pernambuco’s communities—aligned with the multiple dimensions of sustainability: environmental, social, and economic. The initiative is replicable in other contexts and demonstrates the transformative potential of a strategic and anticipatory prosecutorial approach.

“PERNAMBUCO VERDE – ZERO DUMPSITES PROJECT: THE EFFECTS OF DECARBONIZATION AND THE PROTECTION OF VULNERABLE POPULATIONS THROUGH THE CLOSURE OF OPEN DUMPSITES.”

Christiane Roberta Gomes de Farias Santos¹

1. Introduction. 2. Project “*Pernambuco Verde: Zero Dumpsites*”. 3. Social and Environmental ICMS. 4. Fair energy transition and the effects of decarbonization. 5. Protection of vulnerable workers. 6. Conclusion.

1. INTRODUCTION

The present document aims to provide the basis for a presentation in Panel 2 – Fair Energy Transition, Waste and Climate-Related Impacts on the World of Work: Impacts of Decarbonization on Supply Chains and Protection of Workers Vulnerable to the Climate Crisis: to be held at the **Preparatory Event for COP-30 – “Building Pathways to COP-30: The Role of the Brazilian Public Prosecutor’s Office in Climate Sustainability”**, organized by the National Council of the Prosecutor’s Office, through its Environmental Affairs Commission.

Improper solid waste management remains a global challenge, with far-reaching social, economic and environmental implications. Open dumpsites, still found in various regions on Brazil, constitute a significant environmental liability, releasing greenhouse gases, contaminating soil and water, and directly affecting public health. Closing these dumpsites is not merely a matter of basic sanitation, but a crucial step toward a fair energy transition and the protection of workers vulnerable in the context of the climate crisis.

The **Pernambuco Verde: Zero Dumpsites Project** marks a milestone in Brazilian environmental policy. Launched by the Pernambuco State Public Prosecutor’s Office (MPPE) in 2020, the project achieved an unprecedented feat: **the closure of all open-air dumpsites in the state of Pernambuco by March 2023.**

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This achievement was made possible through an innovative institutional strategy, prioritizing consensual legal solutions: Non-Prosecution Agreements (NPAs) offered to municipal mayors. Instead of facing judicial proceedings, local leaders committed to the environmentally sound disposal of waste, the establishment of sanitary landfills, the expansion of selective collection systems, and the structuring of waste picker cooperatives.

This model of action demonstrates how aligning law enforcement, environmental protection, and public policy can eradicate longstanding environmental liabilities, generating positive impacts on public health, dignity of work and the climate. The project not only eliminates significant sources of methane emissions — one of the most potent greenhouse gases — but also ushers in a new phase of the fair energy transition in Brazil.

2. PROJECT “PERNAMBUCO VERDE: ZERO DUMPSITES”

In 2012, the Pernambuco State Public Prosecutor’s Office (MPPE), through its Environmental Protection Operations Support Center (CAO), launched the project “Lixo: Quem se lixa?” (“Waste: Who Cares?”), aimed at promoting compliance with state and national solid waste policies, with a focus on environmental protection and improving quality of life.

At that time, only 25 municipalities in Pernambuco were sending their solid waste to environmentally licensed sanitary landfills, while 160 municipalities continued to dispose of their waste in open-air dumpsites.

By 2019, despite the total of 129 Environmental Commitment Agreements² signed under the “Lixo: quem se lixa?”, only 44% of Pernambuco’s municipalities disposed of waste correctly, while 105 still used open dumpsites.

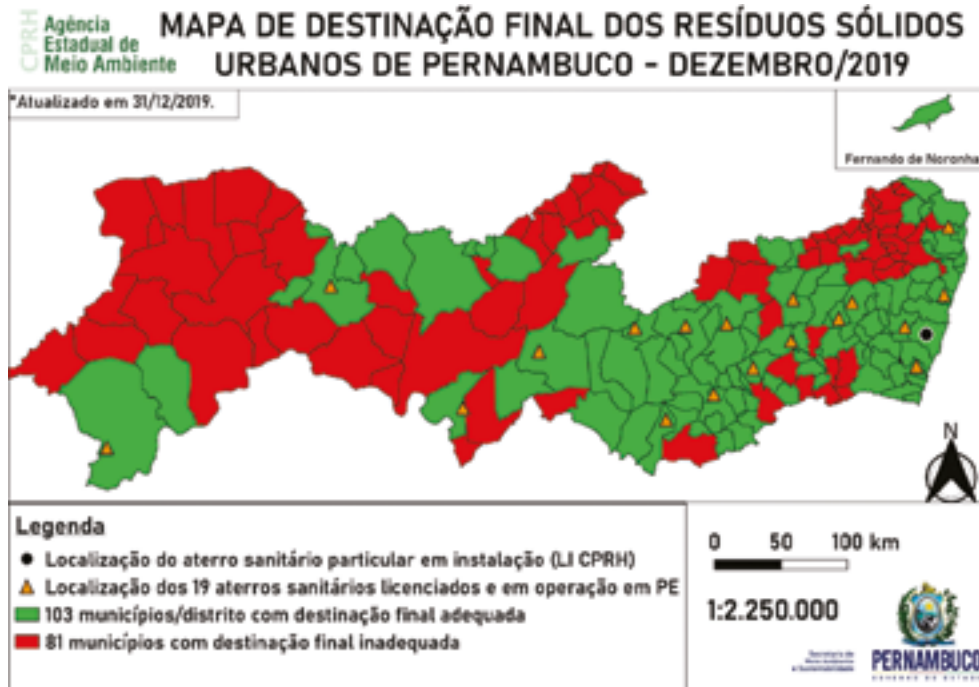
To accelerate closures, the MPPE launched the “Pernambuco Verde: Zero Dumpsites” Project with the State Secretariat for the Environment and Sustainability (SEMAS), the State Environmental Agency (CPRH), and the Pernambuco State Court of Accounts (TCE/PE). Mayors were offered Non-Prosecution Agreements (NPAs) requiring specific actions — closing dumpsites, sending waste to licensed landfills, supporting waste pickers, remediating degraded areas, and signing a Conduct Adjustment Agreement (TAC) or Civil NPA with local prosecutors.

Using data from the Public Prosecutor’s Office of Accounts and the TCE/PE, the MPPE identified 105 municipalities with active dumpsites, grouping them into six clusters, according to proximity to licensed landfills. NPAs require admission of the offenses indicated in the inspection reports, evidence presentation, environmental damage remediation, and socio-environmental obligations compliance. Full compliance leads to extinction of criminal liability; non-compliance triggers criminal prosecution.

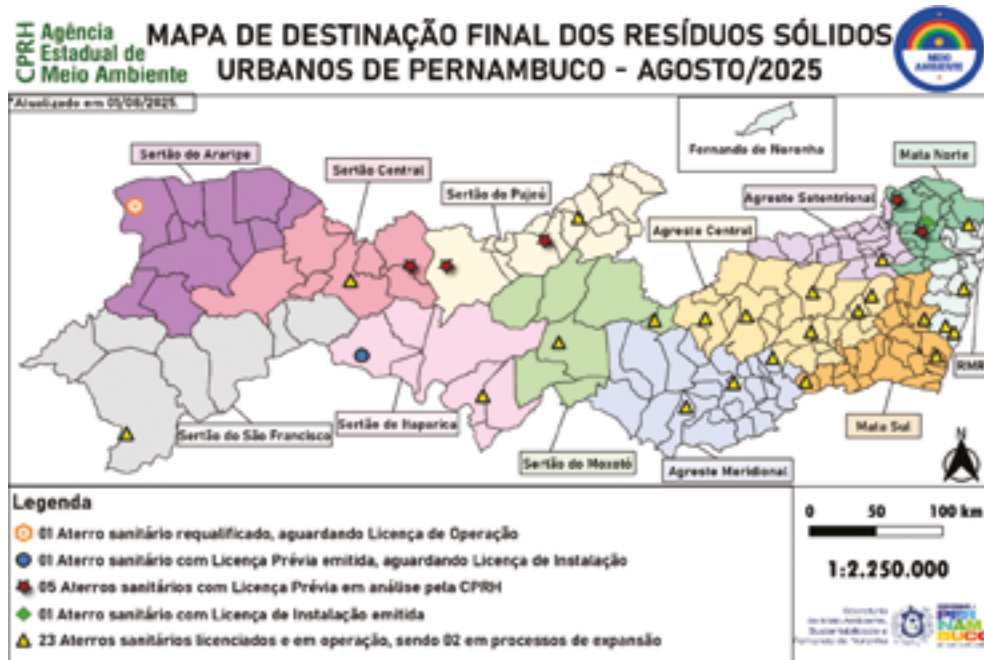
This strategy emphasizes consensual legal solutions, avoiding litigation, while warning that maintaining dumpsites violates both National and State Solid Waste Policies, constituting environmental crimes, and may be prosecuted before the Pernambuco State Court of Justice (TJPE) and also lose eligibility for federal funding. Agreements further require the implementation of a licensed and CPRH-supervised Degraded Area Recovery Plan (PRAD).

2 https://www.cnmp.mp.br/portal/images/CMA/residuos/70_TCA-ANPLIXaOZERO-MINUTA.doc

From 2020 to 2022, the Environmental Operations Support Center (CAO Meio Ambiente), in partnership with the Criminal Advisory Office of the Prosecutor General's Office, executed NPAs with the mayors of 75 municipalities, resulting — by March 2023 — in proper waste disposal in all 184 municipalities and the State District of Fernando de Noronha, according to data provided by CPRH and TCE/PE (attached maps).



As a result of this initiative, the state of Pernambuco progressed from a scenario in 2014, in which only 16% of its municipalities disposed of solid waste appropriately, to achieving 100% compliance by March 2023 — well above the national average of 51%. This was made possible through the operation of 23 sanitary landfills, 10 licensed waste sorting and transfer units in operation in the state, and an additional 5 facilities currently undergoing preliminary licensing procedures.



In parallel with the actions of the MPPE, it is worth noting that CPRH expedited the environmental licensing process for new sanitary landfills, enabling both public and private sectors to initiate various construction projects for such facilities throughout the state.

Similarly, SEMAS, as the environmental policy authority, took part in the efforts to implement the dumpsite closure strategy, guided by the State Plan for Addressing Climate Change and the State Decarbonization Plan (2022). The latter was developed through a greenhouse gas emissions inventory showing that solid waste accounts for 30% of all emissions in the state.

As a result of the efforts of the MPPE — through the **Pernambuco Verde: Zero Dumpsites Project** — and all its partners and collaborators, Pernambuco achieved the milestone of having **100% of its municipalities ensuring the proper final disposal of their municipal solid waste**.

3. SOCIAL AND ENVIRONMENTAL ICMS

In Pernambuco, one of the strategies to encourage the proper disposal of solid waste was the creation of the Socio-Environmental ICMS tax incentive, established by State Law No. 11,899/2001, initially aimed at encouraging municipalities to engage in environmental preservation and other public services. Pursuant to Article 11, IV, of Law No. 14,236/2010 (State Solid Waste Policy – PERS), these resources serve as an incentive for the implementation of the State Solid Waste Policy. Law No. 16,616/2019 redefined the distribution criteria, allocating 1% of the ICMS to municipalities that hold, at a minimum, a preliminary license issued by CPRH for solid waste treatment or final disposal systems, through composting units or sanitary landfills.

To qualify for the benefit, a municipality must prove the closure of its dumpsite—verified by CPRH inspection by December 31—and complete its registration, becoming eligible to receive the transfer two years later. According to data from the Pernambuco State Court of Accounts (TCE/PE)³, between January and December 2024, R\$ 121.1 million were transferred to 181 eligible municipalities (three of which send their waste to landfills in another state). As shown in the chart, 100% of Pernambuco’s municipalities began receiving the Socio-Environmental ICMS incentive, following the closure of their dumpsites.



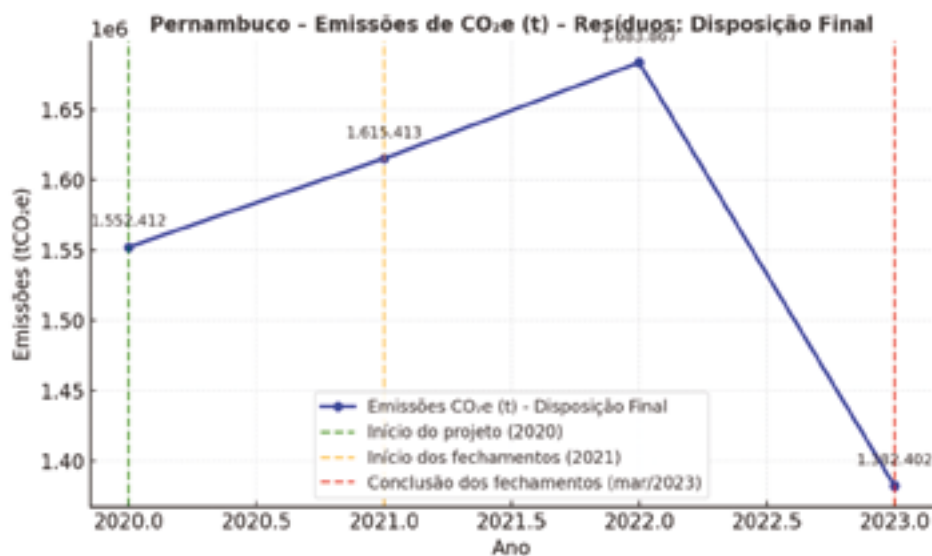
3 https://docs.google.com/spreadsheets/d/1jQM800xLYx5x94Y_wzCzKwz4k9MTawCK/edit?gid=1080535301#gid=1080535301

Currently, Bill No. 003072/2025 is pending in the Legislative Assembly of Pernambuco (ALEPE), seeking to increase the Socio-Environmental ICMS allocation from 1% to 2%, with the aim of fostering improved management of municipal solid waste in the State of Pernambuco.

4. FAIR ENERGY TRANSITION AND THE EFFECTS OF DECARBONIZATION

The **Pernambuco State Decarbonization Plan (PDPE)**⁴ sets out strategic actions to reduce greenhouse gas emissions, noting that, in 2018, the waste sector accounted for 29.2% of total emissions. Among the measures established are the requirement for licensed sanitary landfills equipped with biogas and biomethane capture and utilization systems; the installation of biodigesters to generate clean energy from organic waste — including in closed dumpsites; and the promotion of composting and the reduction of food waste. The plan also provides for the expansion of selective collection and recycling, ensuring the socio-economic inclusion of waste pickers and strengthening the circular economy.

These guidelines are directly aligned with initiatives such as the Pernambuco Verde – Zero Dumpsites Project, which, between 2020 and 2023, led to the closure of dumpsites and the transition to landfills with emission-control technology, as reflected in the results shown in the chart and the significant drop in emissions from 2023 onward.



The **chart**⁵ shows the transition of greenhouse gas emissions (CO₂e, in tonnes, GWP-AR5) from the final disposal of solid waste in Pernambuco between 2020 and 2023, highlighting the key stages of the **Project Pernambuco Verde – Zero Dumpsites**. In 2020, when the project was launched, emissions stood at **1.552.412 tCO₂e**. In the following year, 2021, even with the start of dumpsite closures, the figure rose to **1.615.413 tCO₂e**, and in 2022 reached a peak of **1.683.867 tCO₂e**. This

4 https://semas.pe.gov.br/wp-content/uploads/2022/03/2022_03_16_GIZ_plano_descarbonizacao_pernambuco-v6_reduzido.pdf

5 <https://plataforma.seeg.eco.br/>

increase, despite ongoing actions, is explained by the inertia of the decomposition of waste already disposed of — which continues to emit methane for years — and by the fact that many dumpsites were still in operation during that period.

A significant shift occurred in 2023, the year in which, by March, the closure of the 75 dumpsites mapped by the program was completed. That year, emissions dropped to 1,382,402 tCO₂e, representing a reduction of approximately 302 thousand tonnes compared to 2022, or about 18%. This sharp decline reflects the direct impact of eliminating inadequate disposal sites and transitioning to sanitary landfills equipped with biogas capture and flaring systems, combined with advances in sorting, composting, and recycling. The result reinforces how well-structured public policies can effectively mitigate methane emissions in the waste sector.

The State of Pernambuco has been consolidating its position as a national reference in energy recovery from waste, and this strategy plays a significant role in the emission reductions shown in the chart. Several sanitary landfills have invested in systems for the capture, purification, and energy use of biogas, contributing not only to greenhouse gas mitigation but also to diversifying the state's energy matrix:

- **CTR Igarassu (Ecopark):** Located in the Metropolitan Region of Recife, it receives approximately 2,000 tonnes of waste per day from nine municipalities. It has a power generation plant with a capacity of up to 4 MW and is in the process of installing a biogas purification facility to produce up to 45,760 Nm³/day of biomethane.⁶
- **CTR Jaboatão dos Guararapes:** Located in the Metropolitan Region of Recife, it receives approximately 2,000 tonnes of waste per day from nine municipalities, with a power generation capacity of up to 4 MW. It also is in the process of installing a biogas purification facility to produce up to 45,760 Nm³/day of biomethane.⁷
- **CTR Caruaru:** The first landfill in Brazil's Northeast region to host a biogas plant, in operation since 2021, producing 18,834 MWh/year and supplying around 1,100 consumer units, including contracts with the telecommunications operator Vivo.⁸
- **CTR Petrolina:** Biogas plant operating since 2019 with 1 MW capacity and annual output of 8,240 Mwh — enough to power about 4,300 households in the region.⁹

6 <https://ne9.com.br/igarassu-pe-recebera-usina-de-biometano/>

7 <https://brasilenergia.com.br/energia/orizon-investe-r-300-milhoes-para-produzir-biometano-em-jaboatao-dos-guararapes/>

8 <https://www.abegas.org.br/arquivos/80850>

9 <https://g1.globo.com/pe/petrolina-regiao/noticia/2019/12/26/usina-de-biogas-em-petrolina-gera-energia-eletrica-capaz-de-abastecer-4300-casas-por-ano.ghtml>

5. PROTECTION OF VULNERABLE WORKERS

Brazil generates over 80 million tonnes of municipal solid waste annually; more than 80% of this volume is potentially recyclable, yet only 2% is actually recovered. Around 40% is still sent to open dumpsites or controlled landfills, without adequate soil protection or leachate treatment, causing annual losses of around R\$ 14 billion (ABRELPE). Pernambuco produces 4.4 million tonnes of municipal solid waste per year and, as of June 2023, had 63 cooperatives and associations of waste pickers, on a total of 1,164 workers, according to the State Forum on Waste and Citizenship (Flic-PE). An estimated 8,000 people work informally, including in Recife alone 3,450 independent waste pickers registered in the Federal Government's Single Registry for Social Programs (CadÚnico), according to data from the Legislative Assembly of Pernambuco (ALEPE).¹⁰

In Pernambuco, waste picker cooperatives — including COOMSERC, COPEMAP, Recicla Vila Rica, the State Cooperative of Sairé, Brejo de Beberibe – Resgatando Vidas, and Ecovida Palha de Arroz — promote sustainable waste management and income generation.¹¹

Between 2024 and 2025, the Recicleiros Institute¹² entered into a partnership with BNDES, securing R\$ 9.5 million in non-reimbursable funding, matched by an equal contribution from the institute itself, totaling R\$ 19 million to expand infrastructure, equipment and training through the Recicleiros Cidades program, expected to create up to 545 inclusive jobs over the next five years. In April 2025, the Recicla+Pernambuco program was launched, in partnership with the institute, to expand selective waste collection, strengthen cooperatives, and integrate waste pickers into municipal waste management.

These actions and the replacement of open dumpsites with controlled systems and the production of clean energy are projected to avoid approximately 40 million tonnes of CO₂ emissions by 2050, create over 100,000 green jobs in recycling, renewable energy, reverse logistics and composting, and also strengthen productive inclusion by formalizing cooperatives and providing technical and financial support, boosting income and occupational safety.

6. CONCLUSÃO

In light of the foregoing, it is evident that the implementation of the pioneering *Pernambuco Verde: Zero Dumpsites* Project has achieved significant results in the State of Pernambuco, transforming a scenario in which, in 2014, only 16% of municipalities disposed of solid waste in compliance with environmental standards into one in which, by March 2023, 100% of municipalities were aligned with current environmental legislation—well above the national average of 51% (Source: ABRELPE/TCE-PE).

The *Pernambuco Verde: Zero Dumpsites* Project has been widely recognized for its success and relevance at the national level. In November 2022, the National Council of the Public Prosecutor's Office (CNMP) awarded it Top 3 in the Sustainability category of the CNMP 2022 Award.

10 <https://www.alepe.pe.gov.br/especial/?noticia=497352>

11 GOVERNO DE PERNAMBUCO. *Cooperativas cadastradas – Secretaria de Meio Ambiente e Sustentabilidade*. Recife, 2024. Disponível em: <https://semas.pe.gov.br>. Acesso em: 9 ago. 2025.

12 <https://jc.uol.com.br/pernambuco/2025/04/15/pernambuco-junto-ao-instituto-recicleiros-lanca-projeto-para-ampliar-a-coleta-seletiva-e-reciclagem.html>

In August 2024, the project once again stood out when it competed with 292 best practices from across the country in the 2024 Competitiveness Excellence Award, promoted by the Public Leadership Center (CLP). It was selected as one of the three best practices in Brazil, receiving the Competitiveness Award.

Later, in November 2024, the project earned yet another distinction: the “Environmental Excellence Seal – Recognition of Excellence in Environmental Actions of the Public Prosecutor’s Office,” granted by the CNMP’s Environmental Commission.

The *Pernambuco Verde: Zero Dumpsites* Project represents a replicable model for other states and countries facing the challenges of poor waste management. By combining innovative legal instruments from consensual law — such as the Non-Prosecution Agreement — with technical planning and social inclusion, the project not only brings an end to open dumpsites; it paves the way for a new, cleaner, fairer, and more resilient economy. Its legacy stands as proof that, with political will and institutional collaboration, it is possible to transform realities and protect both the planet and its most vulnerable people.

CLIMATE CHANGE AND ITS IMPACT ON WORK: THE ROLE OF THE BRAZILIAN FEDERAL LABOUR PROSECUTION SERVICE (MPT)

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Abstract: This paper aims to present the role of the Brazilian Federal Labour Prosecution Service (MPT) in addressing the impacts of climate change on work, with a focus on protecting the health and safety of workers. It highlights the promotion of mitigation, adaptation, and just transition measures through social-environmental dialogue, the harmonization of social and environmental rights, and environmental education.

Keywords: MPT; climate change; workers' health; work environment; adaptation; mitigation; just transition; social-environmental dialogue; environmental education.

INTRODUCTION

Climate change poses urgent and multidimensional challenges to the realm of work, directly impacting on the health, safety, and dignity of millions of workers. The Brazilian Federal Labour Prosecution Service (MPT), committed to its constitutional mission of defending social rights, has taken a leading role in building an institutional agenda that places work at the center of the climate debate.

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5 Federal Labour Prosecutor, member of the Study Group on Climate Change and its Impacts on the Work Environment of the MPT.

6 Federal Labour Prosecutor, member of the Study Group on Climate Change and its Impacts on the Work Environment of the MPT.

7 Federal Labour Prosecutor, member of the Study Group on Climate Change and its Impacts on the Work Environment of the MPT.

MPT's efforts demonstrate that no effective response to the climate crisis can overlook its effects on work relations and the centrality of working people. With this commitment, MPT organizes its actions strategically and comprehensively, based on the axes presented below.

MITIGATION

Mitigation is one of the main pillars of the climate change legal framework, alongside adaptation and a just transition. It consists of reducing the accumulation of greenhouse gases (GHG) in the Earth's atmosphere, whether through the implementation of sinks or by reducing emissions resulting from various human activities.

From a legal standpoint, Climate Change Law — with emphasis on the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement — initially guides the adoption of measures aimed at flattening the trajectory of GHG accumulation, and subsequently toward achieving negative emissions. According to the GHG Protocol, incorporated into the Paris Agreement, this shift must be observed in the three scopes of emissions attributable to business activities: direct emissions; indirect emissions resulting from energy consumption; and indirect emissions related to the value chains in which companies are embedded.

Each of these scopes involves, to a greater or lesser extent, human work. Worker participation, therefore, is an indispensable element for effective climate ambition. In this regard, Climate Change Law incorporates from Environmental Law the Principle of Participation, recognizing that preserving the climate system under conditions compatible with a life of dignity is a shared responsibility — including for workers, who hold the right-duty to engage in mitigation efforts, without prejudice to their dignity and fundamental rights.

The MPT, as guardian of the legal order related to human work, plays a strategic role in safeguarding this transindividual right-duty, aligned with the collective dimension of the protected climate interest. The implementation of this right-duty attracts other related rights, informed by the need to ensure justice in the transition to a low-carbon economy, thus shaping Climate Change Labour Law.

ADAPTATION

Climate change increases the risk of occupational diseases and accidents in the workplace by intensifying factors such as excessive heat, ultraviolet radiation, air pollution, and extreme weather events.

In this context, the MPT, in its institutional role of defending the legal order and the collective rights of workers, has been engaging companies, organizations, and service providers to encourage the adoption of climate adaptation measures, aimed at protecting occupational health. These measures seek to reduce adverse impacts and prepare workers to face the risks arising from the climate crisis.

Adaptation involves administrative measures (working hours control, thermal breaks, suspension of activities during extreme events), engineering and collective controls (air conditioning and ventilation of environments), and personal protection (PPE, sunscreen, drinking water), observing

the hierarchy of occupational hazard controls, in addition to training for managers and workers. To guide its actions, the MPT compiled these measures in the document “CODEMAT/GE Climate Change and Impacts on the Work Environment” (Guidelines CODEMAT/GE)⁸, which offers general adaptation guidelines applicable to various work settings—indoor and outdoor, industrial, administrative, among others—as well as two specific studies on protection from extreme heat and wildfire smoke.

The document endeavours to guide both the repressive and promotional efforts of MPT prosecutors and presents general climate adaptation measures for worker protection, applicable to various work settings, such as indoor and outdoor, industrial, factory, administrative, and office environments, among others.

As a result of this work, the aim is to ensure that both workers and organizations are better prepared to face the risks of illness and accidents related to the effects of climate change in the workplace.

Below are examples of climate adaptation measures provided for in the Guidelines, the implementation of which has been advanced by the MPT within organizations:

COLLECTIVE PROTECTION MEASURES:	PERSONAL PROTECTION MEASURES:
• Reorganize work shifts and schedules to avoid exposing workers during periods with more extreme weather conditions, or schedule heavier work during times with milder temperatures. • Promote thermal breaks. • Ensure ventilation and air conditioning in the work environment. • Provide guidance on occupational hazards, as well as symptoms and health problems resulting from climate factors. • Temporarily suspend activities in the event of an extreme weather event that poses a serious and imminent risk to health or life.	• Provide clothing appropriate for the nature of the activity, with lighter fabrics and colours that absorb less heat. • Provide chilled potable water in sufficient quantity and encourage consumption. • Provide adequate and sufficient PPE, such as a legionnaire’s hat, mask, and goggles, as well as other protective measures such as sunscreen appropriate for the sun exposure and in sufficient quantities.

SOCIAL-ENVIRONMENTAL DIALOGUE

Social-environmental dialogue is a strategic instrument for public action in addressing contemporary challenges in the realm of work. Within the scope of the MPT, it is a necessary approach to the coordinated protection of social and environmental rights, especially given the effects of climate change on workers’ health and safety.

The 1988 Brazilian Constitution enshrines a democratic state governed by the rule of law that is, at the same time, social and environmental. This conception guides public policies and institutional actions focused on human dignity in its community, ecological, and cultural dimensions. From this perspective, the MPT operates based on the premise that sustainable development and social justice are inseparable and require cooperation, transparency and social dialogue.

8 Available at: <https://mpt.mp.br/pgt/noticias/mpt-divulga-diretrizes-sobre-impactos-das-mudancas-climaticas-no-trabalho>.

The constitutional text reinforces this approach by adopting a cooperative form of federalism, particularly in the areas of health and the environment. Although work matters fall within the legislative jurisdiction of the Union, legislative authority in work matters lies with the Union, the protection of the work environment is a matter of shared responsibility, according to Articles 23 and 24 of the Constitution. Furthermore, Article 200, item VIII, includes workers' health among the responsibilities of the Unified Health System (SUS), expanding the scope for integrated action. Some State constitutions, such as that of São Paulo, provide even broader protection for workers' health.

This framework requires interpreters of the Constitution - including civil society - to take an active role in promoting fundamental rights, especially socio-environmental rights, through qualified listening and the creation of permanent spaces for participation.

The MPT's institutional experience demonstrates that social-environmental dialogue must be supported by accessible and contextualized information, adapted to diverse social, educational, and linguistic profiles, to ensure real understanding and effective participation. In this sense, the Escazú Agreement, the first environmental treaty in Latin America and the Caribbean, represents an important normative reference by ensuring access to information, public participation, and justice on environmental issues, in addition to providing specific measures to protect human rights defenders. These principles guide MPT's initiatives aimed at ensuring that workers and communities have full access to environmental information relevant to their health, safety, and well-being.

Information, especially when targeted at vulnerable groups, is not a mere institutional formality, but a condition for dialogue, listening, and the development of legitimate, effective, and lasting solutions.

In practice, the MPT incorporates social-environmental dialogue on several fronts: public hearings, educational campaigns, theme projects, and collaboration with the Unified Health System (SUS) and the justice system. The promotion of safe and healthy workplaces depends on the integration of environmental protection, public health, and worker rights. In matters related to the health and safety of workers affected by extreme events, the MPT has increased its presence based on qualified listening and the collective development of solutions.

As Peter Häberle⁹ once stated, we are all interpreters of the Constitution. From this perspective, the MPT embraces its constitutional mission with the awareness that protecting the work environment also means promoting public health, preserving life, and affirming human dignity in all its dimensions. Social-environmental dialogue is therefore an essential pillar to ensure that decent work is a possible and sustainable reality for all.

CLIMATE ACTION PLANS

Climate Action Plans must include specific measures to protect the work environment, as established by Brazilian Bill 14.904/2024, with the purpose of promoting decent work and fostering social-environmental dialogue, making workplaces more resilient, especially in sectors with higher pollution potential and social vulnerability.

9 HÄBERLE, Peter. **Hermenêutica Constitucional**. Porto Alegre: Sergio Antonio Fabris Editor, 1997. p. 13.

Resilience measures must be anticipatory, aimed at preventing or mitigating climate impacts, considering the differentiated exposure of vulnerable groups due to factors such as housing, the nature of the work performed, length of exposure, and other specific conditions.

Certain activities are potentially more vulnerable to climate change, including those performed in outdoor environments, such as agriculture, fishing, construction, waste collection and disease control, among others.

The MPT acts to ensure that the protection of workers is included in Climate Action Plans, promoting climate justice. These plans must consider the impacts of climate change on occupational health and safety, particularly in contingency plans for disaster response, which may lead to job losses, suspension and disruption of economic activities, loss of productive land, climate displacement, and other direct and indirect effects on workers.

Workers' health is particularly vulnerable, as climate events intensify illness processes that go beyond infectious diseases, affecting both those directly exposed and those involved in emergency response efforts. Furthermore, these events exacerbate existing risks in production processes, increasing the likelihood of harm.

In this context, it is essential to implement early warning systems for air and water quality, heat and cold waves, floods and other extreme events. Climate Action Plans must generate reliable, localized data on climate variables, enabling accurate assessment of their impacts on occupational health and safety. Licensing and permit procedures must require urban buildings to be resilient to climate change, following minimum thermal comfort guidelines.

It is also crucial to promote research focused on protecting workers' health and to immediately adopt measures that ensure work environments are adapted to the new climate reality.

Accordingly, within the framework of MPT's Green April campaign, which in 2025 carried the slogan "Sustainable Future in Work and Climate," recommendations were issued to public authorities and bodies, with the following directives:

1. To include in Climate Action Plans — as per Bill n. 14,904/2024 — specific measures to protect the work environment, with emphasis on social-environmental dialogue, cooperation, the promotion of decent work, education and training, including professional retraining and prioritisation of sectors recognized as major polluters.
2. To include in Contingency Plans the predicted impacts of climate change on workers, along with responses to disasters and risk management measures, in accordance with article 1, items VII, XII, and XIII of Bill n. 12,608/2012.
3. To incorporate into the advisory and monitoring actions of health institutions and agencies, in the context of preserving health in the face of climate change, specific measures aimed at protecting the health of the working population exposed to extreme climate conditions.
4. To implement and enforce early warning systems for air and water quality, heatwaves, cold spells, flooding risks, and other aggravated risks arising from climate events, ensuring rapid issuance and lifting of alerts, as well as communicating the consequences of the alerted hazards to the working population in both public and private sectors.

5. To produce reliable, localized and widespread indicators on climate system variables and their impacts on workers' health.
6. To require and enforce — during licensing or business permit procedures — that urban buildings where work is conducted comply with minimum thermal comfort guidelines for climate adaptation, including sizing, ventilation, lighting, ergonomics, privacy, and quality of building materials.

In this way, the MPT remains vigilant in ensuring that Climate Action Plans include effective measures for the protection of workers' health and safety.

JUST TRANSITION AND DECENT WORK

The International Labour Organization (ILO) defines decent work as productive and quality work carried out in conditions of freedom, equity, security, and human dignity¹⁰. At the same time, it establishes “Guidelines for a just transition to environmentally sustainable economies and societies for all”, which encompass policies in several key areas, such as industrial and sectoral policies, business policies, social protection, and active labour market policies¹¹. A just transition must be well managed and contribute to the goals of decent work for all, social inclusion, and poverty eradication^{12 13}.

The Inter-American Court of Human Rights (IACtHR), endorsing ILO's view, issued an Advisory Opinion on the climate emergency, in which it considers that the member states of the Organization of American States (OAS) must, among other measures, develop just transition policies with the participation of employers' and workers' organizations. These policies should include mechanisms for job reintegration and training aligned with the transition toward environmentally sustainable economies, as well as the establishment of social protection systems suited to the challenges of such transition¹⁴. Along the same lines, the Inter-American Commission on Human Rights (IACHR) had already outlined policies to be adopted by states in favour of a just transition¹⁵.

A recent BRICS declaration, in turn, acknowledges the importance of actively engaging key stakeholders to promote social dialogue and create decent work in the context of climate change and just transition, across all sectors, including the informal economy¹⁶.

10 INTERNATIONAL LABOUR ORGANIZATION. **Perfil do Trabalho Decente no Brasil**: um olhar sobre as Unidades da Federação durante a segunda metade da década de 2000. Brasília: OIT, 2012.

11 INTERNATIONAL LABOUR ORGANIZATION. **Guidelines for a just transition towards environmentally sustainable economies and societies for all**. Geneva: ILO, 2015. p. 6-17.

12 INTERNATIONAL LABOUR ORGANIZATION. **Guidelines for a just transition towards environmentally sustainable economies and societies for all**. p. 4.

13 Brazil seems to tread this path, as seen for instance in arts. 3rd, I, 5th and 8th of Bill n. 14,904/2024.

14 CORTE INTERAMERICANA DE DERECHOS HUMANOS. **Opinión Consultiva OC-32/25 de 29 de mayo de 2025 solicitada por la República de Chile y la República de Colombia** – Emergencia Climática y Derechos Humanos. San José: Corte IDH, 2025. p. 161. Available at: <https://jurisprudencia.corteidh.or.cr/es/vid/1084981967>. Access on: jul 16th, 2025.

15 COMISIÓN INTERAMERICANA DE DERECHOS HUMANOS. Resolución No. 3/2021 – Emergencia Climática: alcance de las obligaciones interamericanas en materia de derechos humanos (Adoptada por la CIDH el 31 de diciembre de 2021). Washington DC: CIDH, 2021. Available at: https://www.oas.org/es/cidh/decisiones/pdf/2021/resolucion_3-21_spa.pdf. Access on: jul 16th, 2025.

16 BRICS. **Declaração Conjunta da 17ª Cúpula do Brics**. Rio de Janeiro: BRICS, 2025. Available at: <https://brics.br/pt-br/documentos/documentos-da-presidencia-brasileira/250706-brics-declaracao-de-lideres-ptbr.pdf/@download/file>. Access on: jul 16th, 2025.

The MPT understands that a fair and truly sustainable ecological transition must guarantee decent work, and that companies cannot limit their role to mere rhetoric about renewable energies, as precarious and deteriorating working conditions and poverty feed into the climate crisis and further hinder social adaptation¹⁷.

It is essential to withstand informality, ensure safe and healthy green jobs¹⁸, and protect all forms of work - especially regarding the most vulnerable and low-income populations¹⁹ - through the implementation and appropriate revision of Climate Action Plans by public authorities at the federal, state, and municipal levels. These plans must emphasize, among other aspects, social-environmental dialogue and the promotion of decent work, including worker retraining and prioritisation in sectors recognized as major polluters²⁰.

In this sense, the MPT, in cooperation and dialogue with other relevant stakeholders, holds the duty and authority to defend the human rights of workers in the pursuit of a truly just transition, leaving no one behind. This includes contributing to the creation of adequate public policies, in accordance with constitutional provisions and relevant international treaties and instruments, as set forth in articles 1, 5 (paragraphs 1-4), and 127²¹ of the Brazilian Federal Constitution and in Complementary Bill n. 75/1993 .

ENVIRONMENTAL AND CLIMATE EDUCATION

Addressing climate change and its direct effects on the health, safety, and working conditions of millions of people requires integrated and preventive actions, among which environmental education holds a strategic position.

The MPT has advocated for environmental and climate education as an instrument of social transformation and environmental protection - including a labour perspective – in accordance with article 225 in conjunction with article 200, VIII and article 7, XXII of the Brazilian Constitution. Based on Bill n. 9,795/1999, which established the National Environmental Education Policy, the MPT recognizes that building a sustainable society requires the formation of informed citizens who understand the causes and consequences of the climate crisis and can act to promote environmental, social and labour justice.

Institutional action includes collaboration with the Ministry of Labour and Employment (MTE), ILO and educational institutions, as seen in the “Safety and Health in Schools” (SSE) project. This initiative brings the discussion of decent, safe, and healthy work, climate change and sustainability into

17 PEREIRA, José de Lima Ramos; ZIMMERMANN, Cirlene Luiza. Artigo portal Metrópoles. *In*: MINISTÉRIO PÚBLICO DO TRABALHO. **Guia Orientativo Abril Verde 2025**. Brasília: MPT, 2025. p. 9-10.

18 MINISTÉRIO PÚBLICO DO TRABALHO. Apresentação Audiência Pública Abril Verde 2025: mudanças climáticas e MAT. *In*: MINISTÉRIO PÚBLICO DO TRABALHO. **Guia Orientativo Abril Verde 2025**. Brasília: MPT, 2025. p. 98

19 MINISTÉRIO PÚBLICO DO TRABALHO. Diretriz CODEMAT/GE Mudanças Climáticas e impactos no MAT nº 01/2024. *In*: MINISTÉRIO PÚBLICO DO TRABALHO. **Guia Orientativo Abril Verde 2025**. Brasília: MPT, 2025. p. 24.

20 MINISTÉRIO PÚBLICO DO TRABALHO. Recomendação Abril Verde II: mudanças climáticas e MAT para autoridades públicas. *In*: MINISTÉRIO PÚBLICO DO TRABALHO. **Guia Orientativo Abril Verde 2025**. Brasília: MPT, 2025. p. 88.

21 BRAZIL. **Constituição da República Federativa do Brasil de 1988**. Brasília: Presidência da República, 1988. Available at: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Access on: jul. 16th, 2025.

the school environment through an interdisciplinary and transdisciplinary approach, raising awareness among children and adolescents about the relationships between production, consumption, environmental degradation, and working conditions.

The MPT also promotes the continuous training of educators, enabling them to critically address topics such as the environmental impacts of productive activities - including labor issues - the intensification of the climate crisis through technology, and its consequences on occupational health and safety. A concrete example of this initiative is the course “Introduction to Health, Environment, and Safety in Schools”, launched in 2024 in partnership with the Federal Institute of Espírito Santo (IFES), which integrates discussions on the environment, the sphere of work, and fundamental workers’ rights.

Furthermore, the MPT highlights the importance of adopting environmental education as a structuring axis in public education policies, promoting debate on climate justice, workers’ rights, responsible consumption, and the adaptation of work activities to new climate scenarios. The defense of a balanced environment - including in the workplace - represents the protection of a fundamental human right, essential to the dignity, health, and life of present and future generations.

Through these actions, the MPT strengthens a culture of risk prevention, contributes to environmental protection, and promotes a development model committed to the planet’s ecological limits and to dignified and safe working conditions, in the context of intensifying climate change.

CONCLUSION

MPT’s commitment to the prevention of work-related illnesses and accidents in the face of the impacts of climate change materializes through actions aimed at promoting the mitigation of its environmental effects, the adaptation of workplaces, the development of climate action plans with a focus on labour relations, the construction of a just and inclusive transition, and the advancement of environmental education.

In a scenario marked by uncertainty and growing risks, the MPT’s efforts seek to ensure that workers are not rendered invisible in public and private responses to the climate crisis. Building resilient, sustainable, safe, healthy and decent work environments is an inseparable part of protecting a balanced environment and promoting public health.

MECHANISMS FOR THE DEFENSE OF THE AMAZON: THE ACTIVITY OF THE PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF PARÁ IN THE FIGHT AGAINST DEFORESTATION.

José Godofredo Pires dos Santos¹

1. THE PREDATORY MODEL OF OCCUPATION OF THE AMAZON.

The North Region is occupied by a resident population of 17,349,619 inhabitants, inserted in the seven states that make up the political structure of the region, which is equivalent to 8.5% of the Brazilian population². However, if we disregard the criterion of the political division of the Brazilian Federation and consider the biome, from an environmental geographic perspective, we have to incorporate into this territory considerable areas of Maranhão and Mato Grosso, where the Amazon forest still predominates. As for traditional populations, 167,311 people declared themselves quilombolas and 753,780 declare themselves indigenous people.³

It is estimated that before the arrival of the Portuguese, about 3.5 million indigenous people inhabited Brazil, dispersed throughout the national territory, and the Amazon was densely populated by these peoples, with large population contingents located in the Amazon, with subsistence practices compatible with the forest and its biodiversity.⁴

Economic activity since the discovery has been limited to the occupation of the coast, both in the exploration of brazilwood as the first economic exploitation, but mainly by the cultivation of sugar cane, in view of the value of sugar as a relevant financial asset in the international market. Added to this economic “disinterest” in the Amazon is the lack of knowledge of the existence of gold and precious stones.

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2 IBGE, 2024.

3 Ditto.

4 According to the Socioenvironmental Institute (ISA), Brazil has 728 indigenous lands, specifically, 430 of these Indigenous Lands (TIs) are classified as part of the Legal Amazon, representing about 23% of the Amazon territory and approximately 98.25% of the extension of all TIs in Brazil.

It was only at the end of the nineteenth century and the beginning of the twentieth century that this occupation intensified, in the period identified as the “Rubber Cycle” (1879 to 1912). Such activity, however, even developing a complex economic system, including a high value in the international market, maintained compatibility with the standing forest, due to the very nature of the activity.

We can see that the process of economic exploitation of the Amazon changes dramatically throughout the twentieth century, especially in the 1970s and 80s, with the emergence of the main factor causing deforestation: the change in land use. These activities replace practices compatible with the preservation of biodiversity (rubber extraction, collection of Brazil nuts, artisanal fishing, etc.) with extensive cattle ranching, mining, and monocultures of grains and palms. The need to expand areas for new activities leads to the destructuring of the riverside way of life, the invasion of indigenous territories and, as a result, the struggle for land emerges, with practices of land “grabbing” and illegal occupation of conservation units.

The conversion of forest into pasture was the keynote of rampant deforestation, especially from the 1960s onwards, combined with the intensive timber trade (Leopoldo, Lima, and Sousa, 2022).

Currently, the escalation of deforestation is related to the interests of agribusiness in the Midwest Region and aims to enable the flow of grain production in that region. Thus, we have the paving of the BR 163 highway, the Ferrogrão Railway, the collapse of the Tocantins River waterway (Tocantins Waterway), among others.

2. DEFORESTATION AS THE MAIN VECTOR OF THE AMAZON ENVIRONMENTAL SYNDROME.

Deforestation is not really enough in itself. With it, several and complex interrelated economic, social and political factors are triggered: social disaggregation, siltation and the reduction of watercourses, the exhaustion of the soil as a result of leaching, the increase in the urban population in precarious conditions, tax evasion, the non-verticalization of the economy, land conflicts, among other factors and the weakening or even the annihilation of traditional populations. Therefore, the main driver of deforestation in the Amazon – with the resulting repercussions on biodiversity and water resources – is land use change. Namely, historically, the exploitation of the Amazon took place through extractive practices resulting from modalities compatible with the viability of the standing forest: fishing, fruit collection, commercialization of non-timber plant products, etc. This reality came to change with the fast, disorderly and predatory occupation sponsored by the Brazilian State from the second half of the twentieth century onwards. Significant academic and scientific production has been formulated discussing the impact of the economic activities of large financial capital in relation to the economic model and the process of occupation of the Amazon territory.⁵

5 FARIAS, André Luís de. Large projects in the Amazon: the political ecology of socio-environmental impacts and conflicts (org.) Guarujá-SP: Digital Scientific, 2023; FIALHO NASCIMENTO, Nádia S; CRUZ, Sandra Helena Ribeiro; COSTA, Solange Maria Gayoso da; Jurandir Santos de Novaes; SÁ, Maria Elvira R. Grandes projetos de desenvolvimento e lutas sociais na Amazônia Brasileira. In: VI International Conference on Public Policies, 2013, São Luís; HADDAD, Paulo and REZENDE, Fernando. Economic Instruments for the Sustainable Development of the Amazon. Brasília: Ministry of the Environment, 2002.

The appreciation of the land and the increase in cattle raising on an industrial scale, with the implementation of an intense marketing network and the installation of slaughterhouses, led to an interest in the acquisition of more land, as well as speculation on real estate for future sale, resulting in the occupation of lands previously inhabited by traditional populations: indigenous, quilombolas and especially small farmers who practiced subsistence agriculture, often without documentation of the occupied area or documentation on a precarious basis.⁶

3. THE EXPERIENCE OF THE PUBLIC MINISTRY OF PARÁ IN THE FIGHT AGAINST DEFORESTATION.

With a unique institutional profile in the world, compared to similar bodies and institutions, the Brazilian Public Prosecutor's Office goes beyond mere criminal prosecution and embarks on the defense of diffuse rights, among them the defense of an ecologically balanced environment.

In this step, the Public Prosecutor's Office of the State of Pará has been playing a relevant role in environmental defense, creating more effective action mechanisms, thus overcoming the more classic institutional tools, which are insufficient to combat deforestation and environmental degradation, including due to the modern profile of criminality: acting in different criminal and organized modalities.

Among the various factors that contribute to the increase in deforestation and environmental degradation, the serious land tenure issue stands out, with consequences in the irregular appropriation of public lands and lands of traditional peoples, a scenario that has historically converged into serious conflicts over land ownership.

As a way of acting in relation to the serious land issue, the Public Prosecutor's Office of Pará created the Agrarian Justice Prosecutor's Offices, divided into five ministerial enforcement bodies, covering – in a regionalized way – the entire territory of Pará.

The Agrarian Prosecutor's Office is part of the Commission to Combat Land Grabbing (institutional) with a firm action in favor of justice in the countryside and the end of violence historically practiced against traditional populations and small farmers. The specialty of the matter allows for a more qualified performance from a professional and technical point of view, in addition to enabling a fairer and more balanced view of land ownership and use.⁷

On the other hand, the Environmental Operational Support Center is a technical and environmental support body of the Public Prosecutor's Office of the State of Pará created with the objective of assisting the Prosecutor's Offices with environmental attribution in the exercise of their functions, either by providing technical support or in dialogue with other agencies related to the environmental theme. As for the contribution to the formulation of environmental public policies, the Public Prosecutor's Office of Pará is part of the institutional collegiate bodies linked to the matter, such as the

6 SANTOS, José Godofredo Pires. *Impact of Large Development Projects in the Amazon* in Martins, Andréia (coord) "Territory, People and Future Perspectives". Rio de Janeiro: FUNBIO

7 The Agrarian Prosecutor's Office of the 1st Region (northeast of Pará) has been playing a relevant and direct role in the serious conflict between oil palm agricultural companies and traditional populations (indigenous and quilombolas), in what is conventionally called the "Oil Palm War".

State Council for the Environment, the Interinstitutional Commission for Environmental Education, the Pará Forum on Climate Change, the State Forestry Commission, the State Council for Water Resources and the “Dams” Working Group.

In order to act in an aligned and convergent manner, with regard to the actions of Prosecutor’s Offices in environmentally sensitive areas, the Public Prosecutor’s Office of Pará created two Working Groups: the Xingú WG and the Tapajós WG. The first was due to the serious and disastrous environmental and social consequences caused by the construction of the Belo Monte Hydroelectric Power Plant, being integrated by the Prosecutor’s Offices of the Municipalities of Altamira, Anapú, Brasil Novo, Gurupá, Medicilândia, Pacajá, Placas, Porto de Moz, São Felix do Xingú, Senador José Porfírio, Uruará, Vitória do Xingú and Pacajá. The Tapajós WG, on the other hand, emerges from the need for joint action as a result of the vertiginous environmental degradation in the Tapajós River region, especially the paving of the BR-163 Highway, the construction of the Port of Miritituba, the pollution and degradation caused by mining and the unbridled advance of monoculture soybean plantations, creating rapid destruction of native forests. being formed by Prosecutor’s Offices from the municipalities of Santarém, Aveiro, Belterra, Itaituba, Jacareacanga, Juruti, Mojuí dos Campos, Novo Progresso, Rurópolis and Trairão.

Regarding the performance in sectorized themes, the Environmental Operational Support Center coordinates the Solid Waste Working Groups of the Metropolitan Region of Belém, GT Animal Defense, GT Dams.

Of singular importance and essential action, the Deforestation Working Group – Deforestation WG stands out. It concerns the priority area of action of the Public Prosecutor’s Office of the State of Pará, in view of the resurgence of deforestation in the Amazon in recent years, as a result of the dismantling of inspection mechanisms and the inaction of the Federal Government in combating such a practice that is harmful to the economy, society and a healthy environment. This WG includes the Prosecutor’s Offices based in the ten municipalities that have the highest deforestation rates in the State, and most of the municipalities are also commonly listed as the ten municipalities that nationally deforest the most. They are: Altamira, Itaituba, Novo Progresso, Novo Repartimento, Pacajá, Portel, Rurópolis, São Felix do Xingú, Senador José Porfírio and Uruará.

The Deforestation WG works by obtaining georeferenced data obtained directly from the “Terrabrisiis” platform, which presents official data, since the system belongs to the Ministry of Justice and is under the operational control of the Federal Police⁸. In the same sense, it receives and demands technical studies from the Institute of Man and the Environment of the Amazon – IMAZON, in both cases as a result of Cooperation Terms signed with the institutions. It also maintains a constant institutional dialogue with the National Institute for Space Research – INPE, including having already been trained members and servants of the Public Prosecutor’s Office of the State of Pará at the Institute.

8 The Brazil M.A.I.S. Program uses images from more than 180 satellites of the company Planet, which cover the entire Brazilian territory. These satellites provide daily high-resolution images, allowing for environmental monitoring and combating environmental crimes, such as deforestation and fires. The program also offers automatic alerts for various situations, such as deforestation, mining, and planting of illicit crops

It is also important to highlight the institutional concern of the Public Prosecutor's Office of the State of Pará with the harassment that traditional populations have been suffering from companies and intermediaries in relation to the carbon market.⁹

Providing technical, technological and operational support, the Public Prosecutor's Office of the State of Pará develops institutional partnerships with public agencies (Special Institute for Space Research, Federal University of Pará) and private non-business scientific institutions such as IMAZON, MAP-BIOMAS and the Brazilian Fund for Biodiversity – FUNBIO.

The Environmental Public Prosecutor's Office program to combat deforestation and fires, conceived and developed by the Environmental Operational Support Center – CAO, is a flow of action of the Prosecutor's Offices with environmental attribution, which begins with the receipt by the Environmental Cao of information referring to the occurrence of environmental crimes in the areas of deforestation and environmental degradation, as well as fires, from various institutions and through the most varied forms, namely: Infraction Notices drawn up by the State Secretariat for the Environment and Sustainability of Pará, IBAMA, IDEFLOR-BIO (state agency responsible for conservation units) or by partner scientific institutions, such as IMAZON. This information and satellite images give rise to a more accurate process of identification and georeferenced location of the area object of the information, with the identification of the characteristics of the territory, in the geographical scope (conservation units, Permanent Protection areas, hydrographic systems), political (identification of the federative unit, jurisdiction by federative unit, political limits, etc.) and related to the ownership/possession of the area, linked to the National and State SISCAR system, until the possible identification of the owner, squatter or detection agency of the area.

An action manual was created aimed especially at Prosecutors with environmental attribution to act against illegal deforestation and fires.

After the initiation by the Public Prosecutor's Offices of instruments proper to the Public Prosecutor's Office for the investigation of the unlawful acts (News of Fact, Preparatory Procedure, Civil Inquiry) or culminating in the filing of Judicial Actions (Criminal Complaint and Public Civil Action), if applicable, the clauses of the possible conviction or the agreement entered into with the Ministerial Execution Body are monitored through an Administrative Procedure, and the technical instruction necessary to obtain evidence or technical bases for the formulation of an agreement are part of the support offered by the Environmental DOG.

The Public Prosecutor's Office of the State of Pará recognizes the need to prioritize action in the area of environmental protection, as well as seeks to make efforts to provide technical and operational support to the Ministerial Enforcement Bodies with attribution to act in the matter. The proposal for the creation of the Special Action Group on the Environment will boost this activity, with a technological structure and training of the human resources involved in order to face environmental crimes in Pará territory in an organized way and in unified action.

9 The Public Prosecutor's Office of the State of Pará, with the collaboration of the Federal Public Prosecutor's Office, issued a Technical Note in relation to the Carbon Market and the exposure that traditional populations have been suffering in order to authorize the negotiation of their rights by companies and agents, with a clear exploratory bias.

TRADITIONAL PEOPLES AND THE PREFERENCE FOR COMMUNITY-BASED TOURISM IN CONSERVATION UNITS

Leandro Mitidieri¹

INTRODUCTION

What is commonly called the “granting of conservation units,” always with the laudable aim of promoting tourism, has largely ignored the rights of traditional peoples living in those territories.

Since the creation of Yellowstone National Park in 1872, through the definition of national parks at the Third World Congress of National Parks in 1962 in Bali, Indonesia, concern for traditional peoples only emerged in 1985, with a February 1985 issue of the magazine of the non-governmental organization Cultural Survival, dedicated to the defense of traditional peoples, titled “Parks and People.” It argued that these areas could contain traditional ways of life, criticizing the expulsion of traditional peoples from protected areas and asserting that they could benefit from the sale of products or income generated by tourism.

The Supreme Federal Court of Brazil, in ADI 7008, ruled that lands traditionally occupied by Indigenous communities, remnants of quilombolas, and other traditional communities cannot be subject to concessions for ecotourism and logging under state law. However, even when dealing with conservation units and “concessions of conservation units,” the issue must be examined with due consideration.

RULES ON PRIVATE EXPLORATION IN CONSERVATION UNITS

In 2017, ICMBio drafted a proposal for a provisional measure to accelerate the modernization of conservation unit management with greater legal certainty, aiming to resolve legal issues that would impede more assertive and comprehensive action by the agencies and entities responsible for implementing this policy.

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According to Technical Note No. 6/2017/PFE, the expectation was to bring public use of conservation units closer to their full potential, with significant environmental and economic benefits for the country. This is based on the alleged tourism potential of these areas, which is allegedly underutilized.

Data presented by ICMBio showed that, in 2016, approximately 8,300,000 visitors were recorded in federal conservation units, of which more than half, approximately 4.4 million, were concentrated in Tijuca National Park and Iguaçu National Park alone, two of the federal conservation units that already have more robust infrastructure for public use, the result of partnerships with the private sector. Of the then 327 federal conservation units, only 14 charged admission fees.

There is no doubt that tourism or public visitation in conservation units is supported and even encouraged by our legal system (art. 225, §1, VI, of the Constitution and art. 4, XII, of Law 9,985/2000 - SNUC, to give a few examples). The law that created ICMBio establishes as one of its responsibilities “to promote and implement, in conjunction with other agencies and entities involved, recreational, public use, and ecotourism programs in conservation units, where these activities are permitted” (Article 1, V, of Law 11.516/2007).

ICMBio itself admits its failure to implement recreational, public use and ecotourism programs in conservation units on its own, citing bureaucratic constraints and a lack of human and budgetary resources as justification.

To circumvent this situation, the agency seeks partnerships with the private sector through the use concession system. However, ICMBio understands that granting the private sector the right to exploit public use in conservation units requires specific legislation that provides legal certainty and regulates their specificities. It is clear that the idea would be to go beyond the limits of mere concessions, elevating the possibilities for public use in conservation units to a new level. While the interests of biodiversity conservation and environmental education cannot be overlooked, there is a notable pursuit of so-called “sustainable economic development, in a symbiotic relationship from which everyone benefits.”

This specific legislation for private sector activities in conservation units regarding so-called “public use” would clearly define the required bidding process, rather than the imprecise application of Laws 8.987/95 and 8.666/93. It would address the term and contractual extension of these concessions, inspired by Law 13.334/2016, which created the Investment Partnership Program (PPI). It would regulate the “public use contract,” with its specificities, as well as, for example, the provision for the contractor to cover the costs of actions and services to support the conservation, protection, and management of the conservation unit, as well as the provision of a predefined number of free services to the Chico Mendes Institute.

Provisional Measure 809 was enacted on December 1, 2017, and later converted into Law 13.668/2018 of May 28, 2018. Thus, Law 11.516/2007, which created ICMBio, was amended to include the following:

“Art. 14-C. Services, areas, or facilities of federal conservation units may be granted for the exploration of visitation activities focused on environmental education, preservation and conservation of the environment, ecological tourism, environmental interpretation, and recreation in contact with nature, preceded or not by the execution of infrastructure works, through a bidding process governed by Law No. 8.987 of February 13, 1995.

§ 1. The bidding notice may provide for the contractor to cover the costs of actions and services to support the conservation, protection, and management of the conservation unit, in addition to the provision of a number a pre-defined amount of free services to the Chico Mendes Institute and additional charges, provided that the costs arising from the charges specified in the notice are considered in the studies prepared to assess the economic viability of the intended public use model.

§ 2. The free services defined in the notice must be used to promote universal access to conservation units, encourage environmental education, and integrate local populations into the conservation unit.

§ 3. The public call for proposals will be waived for the execution of partnerships, pursuant to Law No. 13,019 of July 31, 2014, with associations representing traditional populations benefiting from conservation units for the exploration of activities related to public use, the distribution of the resources obtained from which will be defined in the partnership instrument.

§ 4. The authorization document issued by the managing body of the conservation unit for the installation and operation of the activities referred to in the caput of this article waives, with the consent of Ibama, other licenses and authorizations related to environmental control carried out by other entities. agencies that are part of the National Environmental System (Sisnama), except when the environmental impacts resulting from these activities are considered significant or exceed the territorial limits of the buffer zone.”

From the aforementioned legislation, it is clear that:

1. all concessions are “aimed at environmental education, environmental preservation and conservation, ecological tourism, environmental interpretation, and recreation in contact with nature,” with environmental interests taking precedence over economic ones. The concession must, naturally, be compatible with the unit’s purposes, as embodied, for example, in the management plan;
2. priority was given to the establishment of partnerships, under Law 13.019/2014, with associations representing traditional populations benefiting from conservation units for the exploration of activities related to public use, which is in line with existing public-community partnerships (prior, free, and informed consultation with traditional communities in all cases of concessions or partnerships is discussed below).

A notice that was published based on this new model was Competition No. 1, dated September 26, 2018, for “Concession of support services for visitation, ecological tourism, environmental interpretation and recreation in contact with nature in the Pau Brasil National Park (BA), including the following mandatory services: entrance fees; internal transportation, vehicle parking at the Headquarters and in Jaqueira; snack bars at the Headquarters and in Jaqueira; convenience store at the Headquarters; cyclist’s area; visitor center, camping area, zip line and suspended walkways, with the burden on the concessionaire to adapt the necessary physical structures, in accordance with the requirements contained in this notice and its annexes, to be remunerated through the exploitation

of said services and by Additional Revenue” (http://www.icmbio.gov.br/portal/images/stories/edital/edital_concorrencia_01_2018_concessao_de_servicos_parna_pau_brasil.pdf). It should be noted that the new legislation also addressed complex issues such as the possibility of hiring a financial institution to manage environmental compensation resources and the expansion of the possibilities for hiring personnel for a fixed period.

In February 2021, during the Bolsonaro administration, the “Adopt a Park” program was launched, with the idea of “attracting resources to fund the conservation and maintenance of federal conservation units throughout the country.” Subsequently, Decrees 10,673, of April 13, 2021, and 10,958, of February 7, 2022, “qualified” concession projects from a list of conservation units in the Federal Government’s Partnership and Investment Program (PPI) as strategic projects of national priority, under Law No. 13,334, of September 13, 2016, as clarified by the Ministry of the Environment at the time. Once qualified, studies and modeling of the concession projects would be developed. Following a challenge from the Brazilian Anthropology Association, the Federal Public Prosecutor’s Office questioned the program about potential harm related to the overlapping of conservation units granted to private enterprise on lands traditionally occupied by traditional communities, quilombolas, and indigenous peoples.

The Ministry of the Environment’s response explained that the analysis of all environmental and social aspects, including potential conflicts with traditional peoples and communities, should be postponed until after this so-called “qualification,” and properly identified and managed to determine the best possible solution to mitigate the impact of the projects on these occupied territories.

The matter was then forwarded to each Federal Prosecutor’s Office with jurisdiction over the conservation units included in the program for monitoring and appropriate action.

CONSTITUTIONAL ISSUE: SUPREMACY OF ENVIRONMENTAL INTERESTS AND THE RIGHTS OF TRADITIONAL COMMUNITIES

The call for solutions through outsourcing and privatization is recurrent. It is highly unlikely that the lack of implementation of conservation units in the country can be resolved through concessions. Practice itself already shows that the private sector’s eyes are not focused on all conservation units, but on the true “jewels” of national tourism. Thus, of the 8,300,000 visitors to federal conservation units in 2016, more than half were concentrated in Tijuca National Park and Iguaçu National Park. And this isn’t just because these conservation units have partnerships with the private sector. The fact that they have long been renowned tourist destinations also plays a role, which, in fact, explains why they have sparked private interest.

The appropriateness of specific regulation of concessions in conservation units or the implementation of this policy by ICMBio would be within administrative discretion. Other issues related to the implementation of this policy, however, should be addressed, such as the supremacy of environmental interests and the rights of traditional communities.

Regarding the supremacy of environmental interests—which stems from the fundamental right to an ecologically balanced environment, enshrined in Article 225 of the Constitution—the legislative changes leave no doubt. All concessions are “aimed at environmental education, environmental preservation and conservation, eco-tourism, environmental interpretation, and recreation in contact with nature.”

It is important to emphasize that the compatibility of the concession with the unit's purposes, in order to benefit them, must be duly and formally analyzed. In this regard, any concession is inconceivable before the unit's management plan has been developed.

Regarding the rights of traditional communities, it is not enough for the legislation to prioritize the establishment of partnerships, under Law 13.019/2014, with associations representing traditional peoples benefiting from conservation units for the exploration of activities related to public use. Public-community partnerships deserve attention, but there are rights that must be respected, both for traditional peoples benefiting from conservation units and for any other impacted traditional community.

In the case of traditional peoples benefiting from conservation units who participate in the unit's management council, these issues must be addressed there. However, in general, there must be prior, free, and informed consultation with traditional communities in all cases of concessions or partnerships.

While recommended, prior consultation does not necessarily need to be provided for in any infra-constitutional legislation regarding concessions in conservation units. Because it is based on an international human rights treaty, internalized in Brazil, it cannot be revoked or repealed at the infra-constitutional level:

"Article 6

1. In applying the provisions of this Convention, governments shall:

a) Consult the peoples concerned, through appropriate procedures and, in particular, through their representative institutions, whenever legislative or administrative measures are contemplated that may directly affect them."

(Convention 169 of the International Labor Organization, internalized by Decree 5051 of April 19, 2004)

"This supralegal nature of the treaty, duly ratified and internalized in the Brazilian legal system—although not subject to the legislative process stipulated by Article 5, §3, of the 1988 Federal Constitution—was reaffirmed by the enactment of Binding Precedent 25, according to which "the civil imprisonment of an unfaithful depositary is unlawful, regardless of the form of deposit." This summary entry consolidated this Court's understanding that Article 7, item 7, of the ACHR had entered the national legal system with status. supra-legal, inferior to the 1988 Federal Constitution, but superior to domestic law, which would no longer produce any effect on anything that conflicted with its provision prohibiting the civil imprisonment of unfaithful custodians. International treaties and conventions with human rights content, once ratified and internalized, while directly creating rights for individuals, operate to suppress the effects of other infraconstitutional state acts that contradict their full implementation."

(ADI 5,240, vote by rapporteur Min. Luiz Fux, P, j. 20-08-2015, DJE 18 of 02-01-2016)

Note that, in the event of overlapping conservation units with Indigenous or Quilombola lands, specific regulations apply, and all matters must be addressed under the aegis of joint management.

STATE OF SÃO PAULO LAW 16,260/16

State Law 16,260/2016 authorized the São Paulo State Treasury to “grant the exploitation of services or the use, in whole or in part, of areas within state property, as specified, and establish other related provisions.” The aforementioned law expressly provides for concessions in conservation units:

“Article 3 - The concessions referred to in Article 1 of this law are subject to their remunerative nature and public interest. In the case of Nature Conservation Units, governed by Federal Law No. 9,985 of July 18, 2000, members of the National System of Nature Conservation Units (SNUC), concessions are also subject to meeting the following minimum requirements:

I - existence of an approved Management Plan;

II - compatibility of the activities subject to economic exploitation with the objectives of the Conservation Unit, as set forth in the Management Plan;

III - approval of the concession and the bidding notice by the Conservation Unit’s Managing Body;

IV - hearing of the Advisory Board of the Information and Management System for Protected Areas and Areas of Environmental Interest of the State of São Paulo - SIGAP, established by Decree No. 60,302, of March 27, 2014, and the Unit’s Advisory Council, or, where applicable, approval by the Deliberative Council;

V - sole and exclusive exploration of areas for public use, experimentation, or sustainable management, provided they are provided for in the Management Plan;

VI - compatibility of activities subject to economic exploration with the protection objectives of the area to be granted;

VII - consultation with the State Environmental Council (CONSEMA), with prior public hearing;

VIII - bidding, in the competitive bidding process.”

The law provides for the supremacy of environmental interests, requiring the concession to be compatible with the unit’s objectives and the existence of a management plan. Furthermore, it provides for a consultation with the unit’s council. However, it neglects the prior, free, and informed consultation of potentially impacted traditional communities.

In this regard, it is also noteworthy that there was no proper consultation when drafting the law. Bill 249/13 received aggregating amendments and was significantly modified. It continued to be processed under an urgent procedure, being approved on June 7, 2016, without consulting the affected communities about the changes.

The provision for “provision of a performance guarantee by the concessionaire, in an amount equivalent to 5% (five percent) of the contract value” (art. 3, § 1, 5) also does not appear to favor the establishment of partnerships with associations representing traditional populations benefiting from conservation units, in contradiction to the concept of public-community partnerships.

In May 2023, as already mentioned, the Supreme Federal Court (STF) decided to exclude lands traditionally occupied by Indigenous communities, remnants of quilombolas, and other traditional communities from the scope of this São Paulo law, which authorized the exploitation of state real estate.

CONCLUSION

It is concluded that in cases of “conservation unit concessions,” the primacy of environmental interests must be verified, and the compatibility of the concession with the unit’s objectives must be duly and formally analyzed. Any concession prior to the development of the unit’s management plan is inconceivable.

Respect for the rights of traditional communities must be ensured not only through the privilege of public-community partnerships, but also through prior, free, and informed consultation with the traditional populations potentially impacted in all cases of concessions or partnerships. In cases where a conservation unit overlaps with Indigenous or Quilombola lands, specific regulations apply, and all issues must be addressed under the auspices of joint management.

However, the most anomalous issue regarding “conservation unit concessions” is that the objective of promoting tourism overlooks the rights of the traditional peoples living in those territorial spaces. In the bold concession projects currently underway in the country, the possibilities for developing community-based tourism should be examined, in line with environmental concerns and respecting the rights of these traditional peoples and communities.

These conclusions in no way reaffirm the already common proposals for including communities in the activities of entrepreneurs who become beneficiaries of concessions in conservation units. Community-based tourism does not mean making Indigenous people, quilombolas, or riverside dwellers employees (attendants, guides, drivers, etc.) of the tourism company. Community-based tourism should represent the community’s role as a protagonist in the activity, as is already the case in several non-concessioned conservation units.

PERFORMANCE OF THE MPMS ON THE THEME OF SOLID WASTE AND ITS CONTRIBUTION TO THE MITIGATION OF CLIMATE CHANGE

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Abstract: the present study aims to demonstrate the performance of the Public Prosecutor's Office of Mato Grosso do Sul and its contribution to the reduction of climate change in relation to the theme of solid waste, specifically with regard to the extinction of dumps and proper disposal of tailings and the implementation of reverse logistics of packaging in general in the State, also aiming to demonstrate how this relates to the possibility of reducing greenhouse gases (GHG) in the context of the regulated Brazilian carbon market. Inefficient waste management, in addition to violating the National Solid Waste Policy (Law No. 12,305/2010), constitutes an obstacle to the mitigation of climate emissions, considering that dumps operate as diffuse sources of methane — a gas with global warming potential dozens of times greater than CO₂. At the same time, the low implementation of reverse logistics systems, especially in the packaging sector in general, prevents the reinsertion of materials into the production chain, encourages improper disposal, and aggravates the environmental and climate impacts of this waste. In this sense, it was found that the proactivity and constant dedication of this ministerial body has been indispensable for the implementation of the National Solid Waste Policy, for the regulation of the matter through State Decree No. 15,340/2019 and for the reduction of factors associated with solid waste that cause global warming.

Keywords: Public Prosecutor's Office, Solid Waste, Climate Change.

INTRODUCTION

The intensification of climate change represents one of the greatest contemporary threats to ecological, economic and social stability on a global scale. The increasing concentration of greenhouse gases (GHG) in the atmosphere, especially carbon dioxide (CO₂) and methane (CH₄), has been driven by unsustainable production and consumption patterns, as well as inadequate management of municipal solid waste.

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In this context, the climate impact generated by the persistence of open-air dumps and the absence of effective reverse logistics of packaging stands out, both structural problems that compromise the environmental commitments assumed by Brazil and contribute significantly to uncontrolled GHG emissions.

In this scenario, the role of the State Public Prosecutor's Office is strategic and indispensable, not limited to the repression of illegal conduct, but also encompassing the induction of structuring solutions, such as the definitive closure of dumps, the implementation of reverse logistics, and the valorization of waste as instruments of decarbonization and environmental justice.

In this way, it aims to highlight the role of the Public Prosecutor's Office of Mato Grosso do Sul in promoting integrated actions that address the structural causes of the climate crisis, relating the results achieved with possibilities associated with the regulated carbon market in Brazil for the reduction of greenhouse gases (GHG) and their consequent climate damage.

1. DUMPS IN MATO GROSSO DO SUL

According to the Intergovernmental Panel on Climate Change (IPCC, 2021), the main cause of climate change is the increase in the planet's average temperature — the so-called global warming — caused mainly by the release of greenhouse gases (GHG) into the atmosphere. These gases have the ability to absorb infrared radiation, contributing to heat retention.

Dumps, as places where waste is disposed of directly on the ground, without any type of treatment, waterproofing, gas control, leachate or access restriction; represent a major environmental problem, since they cause losses such as health risks, soil and groundwater pollution and, mainly, the emission of greenhouse gases due to the decomposition of the materials located there (Loubet et al., 2021).

The IPCC (2006) identified that the main gases resulting from the disposal of municipal solid waste are methane (CH₄) and biogenic carbon dioxide (CO₂), and the global warming potential of methane is between 28 and 34 times greater than carbon dioxide (IPCC, 2021).

The National Solid Waste Policy, instituted by Federal Law No. 12.305/2010, designates as tailings solid waste that has exhausted all possibilities of treatment and recovery by available and economically viable technological processes; recognizing that they are only responsible for the appropriate final disposal, consisting of the orderly distribution of these in landfills, which must comply with specific operational rules in order to avoid damage or risks to public health and safety and to minimize adverse environmental impacts (art. 3, XV and VIII).

This Policy expressly prohibits some forms of improper disposal of solid waste or tailings, one of them being the release in natura in the open pit (with the exception of mining waste), thus referring to the characteristic of dumps (art. 47, II).

In Mato Grosso do Sul, the Sanitary Code (State Law No. 1,293/1992) also prohibits the disposal of garbage or waste in the open (art. 77, a), also determining that the use of the soil for the final destination of these materials will only be possible through sanitary landfills or other techniques approved by the Health and Environment agencies (art. 80).

In addition, the existence of dumps constitutes an environmental crime of qualified pollution, by the disposal of waste or debris in disagreement with the requirements established in laws or regulations, according to article 54, paragraph 2, V of the Environmental Crimes Law (Federal Law No. 9,605/1998).

In this context, the Public Prosecutor's Office, aiming to achieve its constitutional mission of environmental protection (art. 129, III, CF), has acted in search of the eradication of dumps. Especially in Mato Grosso do Sul, the State Public Prosecutor's Office, through joint efforts with the Court of Auditors and the Environment Institute of Mato Grosso do Sul (IMASUL), instituted the "Solid Waste Project – Legal Provision", with the objective of reducing the disposal of solid waste in illegal dumps in the 79 municipalities of the state (Loubet et al., 2021).

According to Loubet et al. (2021), the aforementioned project sought to implement the National Solid Waste Policy through collective (by region) and individual (by municipality) agreements, possible due to the preparation of diagnoses and cost analysis with services related to the theme, with a survey of the legal situation of each location.

Due to the costs of sanitary landfills, the best strategy was identified as the adoption of larger landfills that would serve several cities, thus investing in the transshipment of waste from several municipalities to others that had landfills. With this strategy, a significant reduction in the number of municipalities with illegal dumps in Mato Grosso do Sul was achieved in a period of five years, considering that in 2015 there were 63 (80%) of the state's municipalities with dumps and, in 2020, this number reduced to 16 (20%) (it should be noted that currently this number has already been reduced to only 5%).

To verify the potential advantage of this strategy, the increase in emissions due to the transshipment trips of the tailings by the trucks used was considered, consisting of CO₂ as a result of fuel burning. In the comparison between CO₂ and CH₄ emissions from dumps and landfills, it was observed that landfills emit more carbon dioxide, while dumps release significantly more methane (Loubet et al., 2021).

The study by Loubet et al. (2021) showed that converting dumps to landfills resulted in a 74% reduction in CH₄ emissions, although it caused a 41% increase in CO₂ emissions. Even so, it was found that this transition is environmentally advantageous with regard to atmospheric pollution, considering that methane has an impact potential on average 30 times higher than that of carbon dioxide, as exposed.

Thus, it is evident not only the success of this project in extinguishing dumps and significantly reducing GHG emissions into the atmosphere, but also the dedication of the Public Prosecutor's Office to achieve such objectives, in full achievement of its constitutionally delimited purposes.

However, in addition to the elimination of dumps for the proper final disposal of waste, the environmentally appropriate disposal of solid waste is also a necessary measure to control global warming; since the reuse, recycling and recovery of materials avoids the extraction of new raw materials and the use of energy-intensive industrial processes for the production of materials, for example (Ferreira; Castagnara, 2015). Thus, it is imperative to address how the Public Prosecutor's Office of Mato Grosso do Sul has acted in favor of the reverse logistics of packaging in general.

2. REVERSE LOGISTICS: PERSPECTIVES AND ACTIONS

The National Solid Waste Policy (PNRS), instituted by Federal Law No. 12,305/2010 and initially regulated by Federal Decree No. 7,404/2010, which was later revoked and replaced by Federal Decree No. 10,936/2022, establishes guidelines for the integrated management of solid waste, defining the duties of the agents involved and presenting principles, objectives, and instruments — including economic ones — applicable to the policy.

The aforementioned Law conceptualizes reverse logistics in its article 3, XII, by defining it as:

[..] An instrument of economic and social development characterized by a set of actions, procedures and means aimed at enabling the collection and return of solid waste to the business sector, for reuse, in its cycle or in other production cycles, or other environmentally appropriate final destination.

In its article 33, it establishes that manufacturers, importers, distributors and traders are responsible for structuring and implementing reverse logistics systems, through the return of products after use by the consumer, independently of the public services of urban cleaning and solid waste management. This obligation applies, especially, to pesticides, batteries, tires, lubricating oils and their packaging, fluorescent, sodium vapor, mercury and mixed light lamps, as well as electrical and electronic products and their components.

However, the first paragraph of the aforementioned article provides that, according to regulations, sectoral agreements or terms of commitment, the obligation to implement reverse logistics systems may also be extended to products sold in plastic, metal or glass packaging, as well as to other products and packaging, taking into account, as a priority, the degree and extent of the impacts on public health and the environment.

Based on this possibility, and considering that the theme was practically non-existent in the state, the Public Prosecutor's Office of Mato Grosso do Sul began to act in search of the implementation of such provisions.

Initially, through the establishment of Civil Inquiry No. 06.2016.00000122-8 by the 26th Prosecutor's Office in order to investigate possible damages resulting from the non-implementation of reverse logistics of packaging in Mato Grosso do Sul, seven Cooperation Terms were formalized, consisting of agreements containing several obligations, aimed at ensuring that the productive sectors could start reverse logistics projects in the state and that at least some initiatives were implemented, since there was no national or state program that regulated the system.

These Terms were signed with ABIVIDRO, ABRAFATI and ABEAÇO, ABRAS, Comper Supermarkets, Aurora Alimentos Central Cooperative, Abicalçados and Eureciclo Institute. The purpose of the agreements signed included provision for support for cooperatives, environmental education and even the obligation to purchase materials, as in the case of glass (Bernardes; Loubet; Caramori, 2022).

Nevertheless, despite the efforts of the Public Prosecutor's Office and the various attempts at negotiation, a large part of the productive sector initially chose not to sign agreements. In view of this, it became necessary to open procedures and file lawsuits aimed at demanding the implementation of reverse logistics of packaging in general in Mato Grosso do Sul.

To support these actions, a study was carried out to assess the environmental damage considering separately each type of material (aluminum, steel, paper/cardboard, plastic and glass) and covering all state municipalities, which took into account the benefits of recycling that were no longer being realized due to the omission of the companies; as well as the damage to the treasury and to the collectors of recyclable materials, since, without the implementation of reverse logistics, both were assuming an obligation that was not theirs and without the remuneration that was due to them in this case, generating illicit enrichment for the companies (Bernardes; Loubet; Caramori, 2022).

Based on this, 136 public civil actions were filed in 60 municipalities, involving 72 defendants, among which are the main associations and unions of the industrial sectors, large companies in the market and some local companies.

It is verified that the performance of the Public Prosecutor's Office in the extinction of dumps and, in parallel, in the implementation of reverse logistics in the state, provided an adequate and favorable environment for the regulation of the matter and establishment of guidelines for the implementation of reverse logistics of packaging in Mato Grosso do Sul, through Decree No. 15,340/2019. Such regulation made it possible to enter into agreements in all these actions mentioned above, thus avoiding an even greater burden for the Judiciary (Bernardes; Loubet; Caramori, 2022).

The main advances in the state's packaging recovery results resulted from the following aspects present in the regulation:

Table 1. Differential aspects in Decree No. 15,340/2019

Aspect	Description
Acceptance of Managing Entity (EG) without the need for major requirements	It is enough that it is a legal entity, which is responsible for the information provided and indicates which other companies are represented by it. As a rule, there is no need to sign any commitment or term with the environmental agency, except in specific cases such as structuring systems.
Self-declaratory system	The reverse logistics systems carried out by the Managing Entities (EG) are self-declaratory, which means that the information is registered by them and reported to the environmental agency for later inspection; without the requirement of a plan to be approved by it, since the state would not be able to analyze it on a case-by-case basis.
Results-based system	The results must be expressed in tons of recovered packaging, with a comparison between the volume of packaging sent to the state and that actually collected for recycling, proven through the presentation of invoices; so that the company proves that the post-consumption material has returned to the recycling industry, that is, it proves the removal of the material.
Separation by material	The results must be presented by group of materials (paper/cardboard, glass, plastic and metal), ensuring the recycling of the material produced after its consumption, in order to foster the chain of materials that were not used by recycling in Mato Grosso do Sul, considering that some are easier to sell than others.
Coexistence of several reverse logistics systems	The coexistence of several models of reverse logistics of packaging in general was possible because the system is focused on results, since it allowed the various existing programs to adapt to Sisrev/MS; such as structuring systems for cooperatives, waste pickers' associations, systems with collections in PEVs, etc.

Aspect	Description
Prioritization of recyclable material collectors	In order to comply with reverse logistics, priority is given to partnerships with cooperatives and associations of waste pickers as logistics operators, so that, currently in the state, there is no formally instituted cooperative and association of waste pickers that are not being assisted by reverse logistics systems for packaging in general. This meets the social issue and the PNRS itself.
Sisrev/MS – Reverse Logistics System of Mato Grosso do Sul	Creation of a computerized system for receiving information and verifying invoices, which enabled agility for the evaluation and inspection of compliance with the reverse logistics of packaging in general.
Participation of the State Secretariat of Finance - SEFAZ	Considering that the state of Mato Grosso do Sul is little industrialized, and that the products sold in general packaging in their overwhelming majority come from other units of the federation, an agreement was made with SEFAZ to receive information from this agency about all companies that sell products in Mato Grosso do Sul in a given base year, allowing the inspection of reverse logistics carried out beyond the scope of environmental licensing and, thus, ensuring isonomy for its compliance.

Source: elaboration by the authors, based on Bernardes, Loubet and Caramori (2022).

It is verified that the system created by State Decree No. 15,340/2019 brought unique advances to Mato Grosso do Sul, ensuring the adhesion of 5,476 companies to the reverse logistics system after its implementation, according to a survey carried out in the “Solid Waste Project: Legal Provision 2021” (Bernardes; Loubet; Caramori, 2022).

Likewise, after the Decree, already in its first cycle in the base year of 2019, 24,796.50 tons of post-consumption packaging were recovered, all duly proven by invoices issued by logistics operators located in Mato Grosso do Sul; which represents a reach of 76.2% of the defined recovery goal, corresponding to 22% of packaging in general (Bernardes; Loubet; Caramori, 2022).

Thus, the success of the performance of the Public Prosecutor’s Office of Mato Grosso do Sul is observed, in seeking the implementation of reverse logistics in the state even before the state regulation, giving impetus to the creation of Decree No. 15,340/2019 and foundations for its implementation.

It is known, therefore, that the increase in recycling – as in this case, with the implementation of reverse logistics – leads to significant reductions in emissions, due to energy savings in the production process, a fact that can even be measured by methodologies internationally accepted by the UNFCC (United Nations agency for climate change).³

3. BRAZILIAN CARBON MARKET: USE OF SOLID WASTE IN GHG REDUCTION

Federal Law No. 15,042/2024 instituted the regulated carbon market in Brazil, based on the urgency of establishing effective restrictions on the emissions of polluting gases into the atmosphere, with the objective of mitigating the effects of climate change on a global scale. This rule created the

3 <https://cdm.unfccc.int/methodologies/DB/LOWIXM9S6DVO7DGBX21DPVLE8N3VB9> (AMS-III. AJ.: Recovery and recycling of materials from solid wastes --- Version 9.0)

Brazilian Greenhouse Gas Emissions Trading System (SBCE), which is responsible for establishing maximum limits for emissions, in addition to defining rules for the negotiation of offset credits, among other attributions (Loubet; Catellan, 2025).

According to Loubet and Catellan (2025), the aforementioned Law stipulated, within the scope of the SBCE, the creation of two types of assets as offset instruments: the Brazilian Emissions Quota (CBE) and the Certificate of Verified Emission Reduction or Removal (CRVE). In accordance with arts. 29 and 30 of the aforementioned rule, operators responsible for facilities or sources that annually emit more than 10,000 tCO₂e (ten thousand tons of carbon dioxide equivalent) are subject to SBCE regulation, and specific obligations are imposed on those that exceed 25,000 tCO₂e (twenty-five thousand tons of carbon dioxide equivalent), including the submission of a monitoring plan, emissions reports and, as the case may be, periodic reconciliation report.

In the face of such regulation, it becomes evident that the most emissions-intensive sectors, such as energy, industry, agriculture, transport, and waste (IEMA, 2024) will need to implement mitigation strategies to reduce their financial exposure to the acquisition of CBEs and maintain legal compliance with the established limits.

In this scenario, the use of solid waste as an instrument of decarbonization is presented not only as legally possible, but also as environmentally appropriate and economically rational; especially considering that, as seen, the waste sector is traditionally an emitter of methane (CH₄), a gas with high global warming potential.

The valorization of waste through recycling, composting, co-processing, biogas generation and other forms of reuse (article 3, VII of Federal Law No. 12,305/2010) allows the direct reduction of emissions and the replacement of inputs and fossil fuels, contributing to the sustainability of production processes. Such practices may even generate CRVEs, as provided for in Law No. 15,042/2024, and these certificates can be traded in the regulated market as a form of emissions offsetting.

The integration between climate policy and solid waste management is, therefore, consistent with the current regulatory system, especially in light of the principles of prevention, precaution, polluter pays and sustainable development, all enshrined in Brazilian environmental legislation (Law No. 6,938/1981 and Law No. 12,305/2010).

In addition, the adoption of practices that integrate waste management with climate commitments reinforces the effectiveness of the SBCE and prevents it from being restricted to the merely commercial logic of buying and selling quotas, ensuring that the regulated carbon market promotes real and measurable environmental gains, as desired by the legislator.

The Public Prosecutor's Office's performance, in this context, involves promoting the integration between climate policy and waste management, as well as through the monitoring and control of projects that generate CRVEs, in order to verify the legality and transparency of the projects that request the issuance of this certificate and to supervise the traceability and measurement of emission reductions or removals.

It should be noted that the generation of CRVEs may also be a new source of income for recyclable material collectors, since a large part of national recycling receives an important contribution from these agents in the collection, separation, sorting and shipment of these materials to the recycling industry.

CONCLUSION

The Public Prosecutor's Office of Mato Grosso do Sul has had an intensive role in the fight against climate change. Initially, through the "Solid Waste Project – Legal Provision", it promoted the deactivation of several dumps and the adhesion of 80% of the state's municipalities to sanitary landfills, thus implementing the provisions of the National Solid Waste Policy.

Likewise, it contributed to the adhesion of companies to the reverse logistics of packaging in general and provided an adequate environment and basis for the regulation of the matter in the state through Decree n. 15,340/2019, which allowed the recovery of almost 25 thousand tons of post-consumer packaging considering the base year of 2019.

Considering the importance of reverse logistics for the reduction of solid waste produced through its proper disposal, as well as the polluting potential of this waste in the atmosphere, in view of the regulation of the Brazilian carbon market by Federal Law No. 15,042/2024, it is understood that the use of solid waste by the main Brazilian sectors that will be subject to regulation will be necessary to reduce their emissions; not only to control the incidence of GHG in the atmosphere, but also as a way to reduce the financial consequences arising from the need to offset emissions through the acquisition of quotas, and this strategy may also help in the socioeconomic inclusion of recyclable material collectors.

The performance of the State Public Prosecutor's Office continues to be fundamental in its role as an integrator, inspector and inducer of climate public policies, ensuring that the regulated carbon market is implemented in an effective, fair and environmentally robust manner.

REFERENCES

BERNARDES, Fernando Silva; LOUBET, Luciano Furtado; CARAMORI, Thaís Barbosa de Azambuja. The experience of Mato Grosso do Sul in the implementation of reverse logistics of packaging in general – success story in the Solid Waste Project: legal provision. **Legal Journal of the Public Prosecutor's Office of the State of Paraná**, Curitiba, a. 9, n. 16, p. 127-158, jan./jun. 2022. Available at: https://www.cnmp.mp.br/portal/images/CMA/residuos/25_Artigo-LogisticaReversa-publicadoversaofinal.pdf. Accessed on: 02 jul. 2025.

BRAZIL. **Law No. 12,305, of August 2, 2010**. Establishes the National Solid Waste Policy; amends Law No. 9,605, of February 12, 1998. Federal Official Gazette: section 1, Brasília, DF, 3 ago. 2010. Available at: https://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/lei/l12305.htm. Accessed on: 2 jul. 2025.

BRAZIL. **Law No. 9,605, of February 12, 1998**. Provides for criminal and administrative sanctions derived from conducts and activities harmful to the environment, and provides for other provisions. Federal Official Gazette: section 1, Brasília, DF, 13 Feb. 1998.

FERREIRA, Charles Albert Moisés; CASTAGNARA, Luci. Importance of reverse logistics to achieve environmental sustainability. **Maiêutica – Ciências Biológicas**, Indaial, v. 3, n. 1, p. 7–16, 7 out. 2015. Available at: https://publicacao.uniasselvi.com.br/index.php/BID_EaD/article/view/1363. Accessed on: 4 jul. 2025.

IEMA - Institute of Energy and Environment. **Understand greenhouse gas emissions in the energy and industrial process sectors in Brazil in 2023**. Energy and Environment, 13 nov. 2024. Available at: <https://energiaeambiente.org.br/entenda-as-emissoes-de-gases-de-efeito-estufa-nos-setores-de-energia-e-de-processos-industriais-no-brasil-em-2023-20241113>. Accessed on: 4 jul. 2025.

IPCC – INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE. **2006 IPCC Guidelines for National Greenhouse Gas Inventories: Volume 5 – Waste**. Prepared by the National Greenhouse Gas Inventories Programme. IGES, Hayama, Japan, 2006. Available at: <https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol5.html>. Accessed on: 2 jul. 2025.

IPCC – INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE. **Climate change 2021: the basis of physical science**. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. [S.l.]: IPCC, 2021. Available at: <https://www.ipcc.ch/report/ar6/wg1/>. Accessed on: June 26, 2025.

LOUBET, Luciano Furtado; CATELLAN, Letícia. From the best available techniques to the allocation of CBEs in the regulated carbon market. **Legal Consultant (ConJur)**, 16 mar. 2025. Available at: <https://www.conjur.com.br/2025-mar-16/das-melhores-tecnicas-disponiveis-a-alocacao-das-cbes-no-mercado-regulado-de-carbono/>. Accessed on: 2 jul. 2025.

LOBET, Luciano Furtado; GIURIZZATTO, Lívia Barbosa; PINTO, João Onofre Pereira; BERNARDES, Fernando Silva. Extinction of dumps in Mato Grosso do Sul: the role of the Public Prosecutor's Office in mitigating climate change – a case study. In: GAIO, Alexandre (Org.). **The National Policy on Climate Change in action: the performance of the Public Prosecutor's Office**. 1. ed. Belo Horizonte: Abrampa, 2021.

THE RIGHT TO AGRICULTURE AND CLIMATE JUSTICE

Luís Fernando Cabral Barreto Júnior

1. INTRODUCTION

This brief article aims to analyze the harmonization of the individual fundamental right to agriculture with the collective and diffuse right to a stable climate, from the perspective of the legal concept of Climate Justice.

Focusing on an ecocentric paradigm and drawing from the concept of critical epistemology, we will address the intrinsic relationship between the right to adequate food — including food security — and the recognition of the right to agriculture as a fundamental right. We will then examine the phenomenon of the “climatization” of fundamental rights, based on notable judicial precedents, and finally present a legal concept of Climate Justice. Lastly, we will argue that Climate Justice imposes a legal obligation to decarbonize large-scale agriculture, and that sustainable family farming and extractivism require special protection in light of the effects of climate change.

2. AGRICULTURE AS A FUNDAMENTAL RIGHT

Agriculture is intertwined with the very origins of civilization. It is well known that the discovery of agriculture was an essential step toward human settlement and the formation of stable communities within a given territory.

The development of humanity is marked by the civilizational advances brought about by agricultural activity. A notable example worth recalling is that of the Egyptian civilization, which mastered wheat cultivation and domesticated tilapia thousands of years ago.

The fulfillment of human needs for adequate food leaves no doubt about the direct relationship between the practice of agricultural activity and the right to life. As an example, we can identify in Article 5, item XXVI, of the Constitution of the Republic, the protection of this activity from the perspectives of rural family property used for agriculture.

In the current Constitution of the Republic, we also find an entire chapter devoted to agricultural policy, including parameters for recognizing the social function of property, among which Article 186 lists its “rational and adequate” use.

Not infrequently, this right is negatively affected by environmental pollution, the use of pesticides, and other forms of environmental damage caused by human actions. A recent example of the serious violations this right can suffer is cited in the judgment of the Inter-American Court of Human Rights in the case *Oroya v. Peru*.

A development of this right is found in the right to adequate food and food security, protected by Federal Law No. 11,346/2006, whose Article 4, items I and II, establishes the direct relationship between environmentally sustainable traditional and family farming and food security.

Thus, it must be acknowledged that the environmentally sustainable practice of agriculture constitutes a fundamental right to be protected.

However, the practice of agriculture for profit, when it overrides human rights and environmental protection, results in an abuse of rights that must be restrained and corrected.

Historically, it should be noted that the development of large-scale agricultural activity has already brought about inconsistencies and incompatibilities with the “rational and adequate” use that would later be introduced in the 1988 Constitution.

One historical example of how the economic development of an agricultural activity can result in significant environmental damage is found in the origins of coffee production in southeastern Brazil. Although introduced to Brazil by Francisco de Melo Palheta in the state of Pará, coffee experienced great expansion in the southeast, particularly in São Paulo. While it generated considerable wealth, it also caused significant destruction of the Atlantic Forest, with environmental consequences that ultimately affected the coffee¹ culture itself.

As Jean Dorst reminds us in the classic work *Before Nature Dies*, the actions carried out by Neolithic humans differ from those of humans in the 21st century due to the significantly greater degree of impact they can cause.

It is certain that much of agriculture developed through the clearing of forests, releasing carbon stocks that have contributed and continue to contribute to the increase in the concentration of greenhouse gases, thereby driving global warming and contributing to climate change. Science recognizes that climate change also results from anthropogenic factors.

At the same time, food scarcity situations have a close relationship with natural climate variations that have always occurred. Large migrations are linked to extreme droughts and floods, which compromise access to food. When we recall the prophecy of seven years of plenty followed by seven years of famine, we can infer that it was a prediction of extreme climatic effects caused, at that time, solely by natural causes.

The projected rise in temperatures in the coming years, along with human contributions to this trend, poses both a legal and economic challenge.

This leads us to the need to recognize that family farming is the closest to sustainability but also the most vulnerable to the impacts of climate change. At the same time, large-scale agriculture must undergo decarbonization to align, at least minimally, with the standards of agriculture compatible with the challenge of mitigating the effects of climate change.

The vulnerability of extractivist and traditional cultures, which use heirloom seeds and agroforestry methods, needs to be minimized through the decarbonization of large-scale agriculture as a strategy of Climate Justice.

Lastly, we cannot overlook that Brazil’s main contribution to global temperature rise lies in wildfires and deforestation.

3. THE CLIMATE CRISIS AND THE CLIMATIZATION OF FUNDAMENTAL RIGHTS

Found in the jurisprudence of the French constitutional and administrative courts (*L’Affaire du Siècle*) and the German courts (*Neubauer v. Germany*), the “climatization of fundamental rights”³ consists of interpreting fundamental rights as a means to ensure protection against climate disruptions.

In other words, the defense of fundamental guarantees does not oppose environmental preservation. On the contrary, the protection of fundamental rights must be reconciled with environmental and climate preservation, only allowing the sacrifice of the environment and climate when the very survival of a fundamental right is threatened.

The sacrifice of nature and, consequently, the preservation of a stable climate should only occur exceptionally, in the name of protecting fundamental rights. Applying this reasoning to the right to agriculture, it is entirely reasonable and proportional to impose limitations and obligations on the exercise of agricultural activity that lead to a reduction in carbon emissions.

Among these measures, we can cite the obligation to restore degraded soils before clearing new areas; the prohibition of new deforestation for those with outstanding forest restoration obligations; and the prioritization of such restoration through planting. It is also essential to impose technological mechanisms that apply the principle of Best Available Technology to all phases of agricultural activity, especially in the logistics of crop transportation, with the decarbonization of its transport modes.

In addition to these measures directed at private properties, the prohibition can also be extended to the States and the Union against altering the boundaries of strictly protected conservation units that would result in new deforestation, as well as against reducing the legal reserve through ecological-economic zoning. All these measures would constitute new requirements involving significant changes in agricultural activity to make it compatible with climate mitigation and adaptation efforts.

However, given the inevitable temperature rise and its severe consequences such as droughts, floods, and biodiversity loss, such measures cannot be demanded of the entire agricultural production chain. Except for new deforestation, traditional, family, and extractivist agricultural activities should be exempt from these limitations.

Alongside its constitutionally recognized vulnerability, the differentiated treatment stems from the application of the concept of Climate Justice.

4. CLIMATE JUSTICE AND AGRICULTURE: PROTECTING THE VULNERABLE

It is reported that, when signing the Climate Convention, then-American President Barack Obama stated that if all those provisions were fulfilled, when the results came to fruition, the beneficiaries would likely neither remember nor know the names of those who signed the convention—but that this would be the noblest part of that moment. As is characteristic of Environmental Law, Climate Justice is an intergenerational issue.

Analyses of the climate and projections about its future behavior cover a minimum period of 30 (thirty)4 years of study. Therefore, all the projections currently under debate are based on analyses that began at least 30 (thirty) or 40 (forty) years ago. Thus, public policies and technical or legal standards cannot disregard that their applicability must occur over long-time horizons.

Scientific research on the climate indicates that even if humanity were to achieve carbon neutrality now, concentrations would decrease very slowly, with approximately 15% to 40% of the CO₂ present in the atmosphere remaining for about 1,000 (one thousand)5 years. Consequently, sea levels would continue to rise as well.

Given this premise of the impossibility of controlling temperature rise and the need for adaptation and mitigation measures, we face a crucial legal challenge: how to identify and protect the most vulnerable populations and ecosystems.

The response proposed in this essay begins with an analysis of the concept of Climate Justice. In this sense, we start by recalling that the populations that have emitted and continue to emit the least greenhouse gases will be the most affected by the consequences of rising temperatures. Often, these are already vulnerable populations in terms of the right to adequate housing, access to land, and food security.

Identifying the ecosystems least resilient to rising atmospheric temperatures is a task requiring urgent scientific research, but it also demands a differentiated legal approach. Undoubtedly, ecosystems with greater biodiversity are, by nature, more vulnerable.

The concept of Climate Justice is not included in the clauses of the Paris Agreement. It appears only in paragraph 14 of its preamble. This concept emerged from movements led by Bolivia precisely to address this challenge: to ensure fair treatment for those who are most affected, even without having made significant (or any) contributions to global warming.

From this movement arose the Bali Principles6, created in part to refine the application of the principle of common but differentiated responsibilities. Among these 27 principles, we highlight those recognizing that industrialized countries have appropriated a significant portion of the Earth's CO₂ absorption capacity, and that solutions to climate change must not externalize their costs onto the environment or vulnerable communities.

Legal scholarship on the subject recognizes that Climate Justice is a polymorphic concept and, as such, must adapt to the different challenges in which overcoming inequalities arises.7

Within this paradigm, we define Climate Justice as an institutional legal approach that presupposes the adoption of preventive and reparative legal measures addressing the effects of climate change, aimed at reducing the inequality of these effects on the most vulnerable ecosystems and populations. This approach is grounded in an ecocentric view of environmental protection and is carried out through legislative or judicial processes—whether consensual or adversarial—that are transparent and participatory.

In other words, Climate Justice consists of the specific way of shaping applicable law according to this ecocentric, transparent, and participatory principle, focused on reducing or eliminating the imbalance between the most vulnerable and the most resilient parties.

It is a clear choice aligned with critical epistemology, through which legal scholars refuse to *“produce knowledge that may result in harm to society or exacerbate social injustices.”*

As a form of Recognition Justice and Distributive Justice, based on the assumption that the climatization of the fundamental right to agriculture converges toward its own sustainable maintenance, we propose a progressive imposition of limitations on property rights aimed at achieving carbon emission neutrality.

Thus, agricultural activities that do not fit the concept of low carbon emissions—particularly large-scale agriculture—are required to do more than simply maintain the legal reserve and permanent preservation areas. Such properties, playing an active and progressive role of private assets in favor of environmental preservation, must adopt decarbonization targets.

Such targets must range from eliminating deforestation through the restoration of agricultural soils⁹ to the adoption of planting technologies and production logistics using low-carbon transportation methods, in accordance with the Best Available Technology principle.

In addition to these measures, the traceability of agricultural products is required, which, through transparency, allows verification that the products do not originate from properties where human rights violations or abusive use of pesticides have occurred.

As a compensatory measure, family farming properties or holdings, as well as extractivist activities and all others that adopt the “standing forest” concept, deserve prioritized state support throughout all phases of their economic activity. This support should not preclude their participation in negotiations involving carbon credits that affect them.

The receipt of carbon credits by traditional communities of all kinds must not result in their exclusion from agricultural activities, especially to maintain other activities that continue to accelerate global warming through their emission.

Only with this differentiated treatment between agricultural activities, applied promptly, can we mitigate the consequences of climate change on vulnerable ecosystems and populations, ensuring Climate Justice for those who have neither caused nor contribute to global warming.

5. FINAL CONSIDERATIONS

Reiterating what we have outlined in this brief essay, we propose the incorporation into the institutional policies of the Public Prosecutor’s Office

1. Establishment of debates on Climate Justice within the Public Prosecutor’s Office and the Judiciary, including through their higher education institutions;
2. Establishment of communication and exchange mechanisms between the Public Prosecutor’s Office, regulatory agencies, and governments to ensure compliance with regulations such as EU Regulation No. 1115/2023;
3. 3 Ensure environmental transparency of all large-scale agricultural activities, covering all types of product;
4. Recommend that the States and the Union prohibit altering the boundaries of strictly protected conservation units that lead to new deforestation, as well as reducing the legal reserve through ecological-economic zoning;

5. Direct climate damage reparations to traditional communities engaged in family farming and extractivism as a mechanism of Reparative and Recognition Climate Justice;

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FIREFIGHTING AND NETWORKING: THE ROLE OF THE PUBLIC PROSECUTOR'S OFFICE, THROUGH GAEMA, IN THE COORDINATION OF THE TASK FORCE AND OPERATION EARLY IN RONDÔNIA, IN THE YEAR 2024

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1. INTRODUCTION

Fires are one of the main factors of environmental degradation in the Amazon, affecting ecological integrity, air quality, biodiversity, and human well-being. In Rondônia, they are associated with illegal deforestation, the disorderly expansion of agriculture and the fragility of inspection mechanisms. This critical scenario demands articulated and effective institutional responses, which act in a preventive, resolute, and repressive manner.

Furthermore, its consequences go beyond the environmental field, also impacting the social and economic spheres. The smoke generated compromises public health, affecting mainly children, the elderly and traditional populations. In addition, the loss of vegetation cover and the fragmentation of ecosystems compromise environmental services that are essential for climate balance and food security. In view of this situation, the action of the State, through its institutions of control, inspection and justice, becomes indispensable.

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The Public Prosecutor's Office, on constitutional grounds, has the duty to protect diffuse and collective rights, including the right to an ecologically balanced environment. In this perspective, in the "*Parquet*" of Rondônia, the Special Action Group for the Environment, Housing, Urbanism, Historical, Cultural and Artistic Heritage (GAEMA) was created, a specialized auxiliary body, composed of Prosecutors with priority action in environmental issues, which plays a strategic role by providing a more technical, regionalized and articulated action, especially in situations of environmental crisis. The experience of Rondônia in 2024, with Gaema's strong performance in confronting fires, is an emblematic example of this institutional function.

In view of the worsening environmental crisis in Rondônia, the Public Prosecutor's Office, through Gaema, coordinated the creation of an interinstitutional task force to coordinate actions between state and federal environmental agencies, security forces, and technical support entities. As a result, Operation Temporã was launched, aimed at directly combating environmental crimes related to fires. This article aims to demonstrate the effective performance of the specialized body of the Public Prosecutor's Office of Rondônia in 2024, highlighting its institutional leadership and its contribution to more effective environmental public policies.

2. OVERVIEW OF FIRES IN RONDÔNIA

2.1. HISTORICAL DATA AND PROJECTIONS

The dynamics of fires in Rondônia over the last decade reveal a persistent pattern of use of fire as an instrument of management and territorial expansion, especially in agricultural frontier areas, buffer zones of Conservation Units, and regions under pressure for land regularization (MANGUEIRA,

2021). The practice, often associated with illegal deforestation and land grabbing of public lands, has strong seasonality, with peaks during periods of drought (CABRAL JUNIOR, CYRNE and TURATTI, 2024). Monitoring reports from the National Institute for Space Research (INPE) and the

The Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA) indicate that, despite the annual variations influenced by climatic and operational factors, hot spots tend to be concentrated in the period between June and October, as observed in studies on the prevention and control of forest fires (SILVA, 1998).⁸ The geographical distribution follows the internalization of agricultural activities and deforestation.

According to Silva and Michalski (2020), there is a gradual displacement of critical areas, with advance into regions that were previously little affected, including protected areas and territories of traditional peoples and communities. This reinforces the hypothesis of organized strategies of land occupation and conversion, associated with environmental degradation for economic and land purposes.

Projections based on historical analyses and deforestation alert systems indicate that, without structuring measures, the tendency is for fires to remain or increase (BRASIL, 2013). In this context, technologies such as remote sensing, cross-referencing of geospatial data, and integration of public databases are essential for the diagnosis and anticipation of critical scenarios, allowing for more effective responses.

Geospatial analyses carried out by systems such as DETER, PRODES, and MapBiomas Fogo reveal a worrying overlap between areas with a high incidence of fires and environmentally sensitive zones, such as Conservation Units, Permanent Preservation Areas, and Indigenous Lands (MAPBIOMAS, 2025), which generates land conflicts and the advancement of economic interests over protected areas.

In addition, the absence of integrated public policies aimed at forest protection, territorial planning and strengthening of inspection tends to aggravate the problem.

Thus, the need for preventive and articulated action between inspection, control and accountability institutions becomes evident, highlighting the role of the Public Prosecutor's Office of the State of Rondônia as an articulator of integrated strategies to combat fires and environmental crimes.

2.2. STRUCTURAL CAUSES

The persistence of fires in Rondônia is anchored in structural factors that go beyond the mere inefficiency of environmental enforcement. This is a phenomenon linked to a development model historically based on the extensive appropriation of land and the conversion of forests into productive areas, in a context marked by inequalities in access to land and the absence of effective land governance (MANGUEIRA, 2021). Weaknesses in the processes of regularization of rural properties, combined with the state's slowness in the demarcation, protection and management of public and protected areas, foster legal uncertainty and favor illegal occupations and the use of fire as a mechanism for territorial affirmation.

8 https://dataserver-coids.inpe.br/queimadas/queimadas/Publicacoes-Impact/material3os/1998_Silva_ManualPrevencaoIncendiosFlorestais_IBAMA_DE3os.pdf

The lack of structuring public policies aimed at sustainable production models also contributes to the perpetuation of predatory practices. The scarcity of economic incentives for conservation, the recovery of degraded areas and the rational use of natural resources limits the transition to forms of production compatible with the maintenance of the standing forest (CISNEROS et al., 2021; MDPI, 2022; CAMBRIDGE, 2023). This combination of factors means that the burning of vegetation is still seen as an economically viable solution, in the absence of technical alternatives, effective rural assistance or efficient environmental development instruments.

In addition, the institutional weakening of environmental agencies and the discontinuity of public policies compromise territorial management and control (VIOLA; FRANCHINI, 2018). The disarticulation between the federative entities, the overlapping of competences and the low operational capacity weaken the exercise of environmental police power (OLIVEIRA; SANTOS, 2020). This weakness compromises the State's presence in critical areas and favors the operation of organized illegal networks, with high logistical capacity and local influence (ICCT, 2022). Overcoming these structural causes requires integrated, preventive, and transformative strategies that go beyond emergency and punctual measures (BARRETO; BROOK; PEREIRA, 2021).

Another relevant factor to be considered is the economic logic that dissociates the environmental costs from the immediate gains with the opening of new areas (OLIVEIRA; SANTOS, 2020). Inspection, when it exists, is punctual and reactive, which makes the use of fire a low-risk and high-efficiency strategy (BARRETO; BROOK; PEREIRA, 2021). In addition, the absence of effective accountability and the slowness in the application of sanctions reinforce the feeling of impunity.

Finally, the deficit of integration between environmental, land and rural development policies compromises prevention. Addressing the structural causes of fires requires a federative pact that prioritizes environmental protection as a central axis and promotes coordinated and permanent state action (VIOLA; FRANCHINI, 2018).

2.3. SOCIAL AND ENVIRONMENTAL CONSEQUENCES

Another point to be considered is that the fires in Rondônia generate significant impacts on public health, especially in urban and rural areas close to the outbreaks. The emission of air pollutants, such as particulate matter and carbon monoxide, deteriorates air quality and increases cases of respiratory diseases, hospitalizations, and medical care, especially among children, the elderly, and vulnerable populations (ANDRADE, 2025).⁹ These effects intensify in the dry season, when the smoke remains in the atmosphere for a longer time.

From an ecological point of view, the use of fire leads to the loss of biodiversity, degradation of habitats and damage to fundamental processes such as the hydrological cycle and soil fertility. The burning of vegetation compromises the regeneration of ecosystems, causes forest fragmentation and threatens endemic species. It also contributes to the emission of greenhouse gases, aggravating global warming and the effects of climate change (DOUGLAS, 2023).¹⁰

9 <https://downloads.editoracientifica.com.br/articles/250319041.pdf>

10 file:///C:/Users/53307/Downloads/PRODUTO_DescontroleFogo.pdf

The consequences are even more severe in protected areas, Conservation Units, Indigenous Lands and territories of traditional populations, affecting food security and socio-cultural practices. The damage reveals the diffuse and intersectional nature of the fires, requiring articulated, preventive, and sensitive institutional responses to territorial specificities and collective rights (PORTO, PACHECO, and LEROY, 2023).¹¹

3. HISTORY OF THE ENVIRONMENTAL PERFORMANCE OF THE PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF RONDÔNIA THROUGH GAEMA

The Special Action Group on the Environment (GAEMA)¹² of the Public Prosecutor's Office of the State of Rondônia was created in response to this growing complexity of socio-environmental issues in the State. Since then, it has sought to strengthen the strategic and resolute performance of the MPRO on issues such as the protection of conservation units, the inspection of illegal deforestation, sustainable land regularization and the prevention of large-scale environmental damage.

Initially, Gaema focused efforts on combating deforestation, monitoring environmental licensing, and judicializing severe socio-environmental impacts, such as invasion of protected areas and disorderly agricultural expansion. The joint action with prosecutors and environmental agencies resulted in court decisions favorable to sociobiodiversity.

Over time, the group expanded its activities, incorporating topics such as solid waste management, protection of springs, among other actions in the environmental context. It began to adopt integrated approaches, promoting articulation with state secretariats, environmental councils, civil society and research institutions. Among the actions of the specialized agency, actions such as the following stand out: accountability for illegal occupations in Conservation Units, inspections with SEDAM and federal agencies in critical areas; Lawsuits for the eviction of the Guajará-Mirim State Park¹³; lawsuits for the eviction of the Samuel Ecological Station¹⁴; lawsuits and TACs on solid waste and dumps¹⁵; criminal actions such as Operation Anomia and Persistere¹⁶.

This trajectory has consolidated the Public Prosecutor's Office as an articulator of environmental public policies, uniting judicial, extrajudicial and institutional action, with a focus on prevention, recovery of degraded areas and appreciation of environmental conservation.

11 <https://books.scielo.org/id/468vp/pdf/porto-9788575415764.pdf>

12 Resolution No. 9/2022/CPJ and Resolution No. 21/2022/CPJ

13 <https://g1.globo.com/ro/rondonia/noticia/2023/08/24/desocupacao-do-parque-guajara-mirim-mapinguari-10-prisons-flagrant-24-million-fines.ghml>

14 <https://g1.globo.com/ro/rondonia/noticia/2023/09/15/justica-determina-desocupacao-da-estacao-ecologica-de-samuel-em-ro.ghml>

15 <https://g1.globo.com/ro/rondonia/noticia/2023/09/14/ministerio-publico-cobra-a-desativacao-de-open-sky-dumps-in-cities-of-rondonia.ghml>

16 <https://g1.globo.com/ro/rondonia/noticia/2023/11/23/suspeito-de-ocupar-ilegalmente-parque-estadual-guajara-mirim-volta-invadir-a-unidade-de-preservacao.ghml>

4. CREATION OF THE INTERINSTITUTIONAL TASK FORCE AND OPERATION TEMPORÃ (2024)¹⁷: PLANNING AND EXECUTION

The year 2024 was marked as the year in which one of the most severe environmental crises in Brazil's recent history occurred, with record fires recorded in several biomes, especially in the Amazon and the Cerrado (ALENDAR et al., 2024). The prolonged drought, aggravated by the effects of the El Niño phenomenon, added to the fragility of environmental enforcement and the uncontrolled advance of predatory agricultural practices, resulted in an intense fire season, causing alarming impacts on public health, biodiversity, and the climate (TOLEDO et al., 2024).

Images of skies covered by smoke, cities with critical air quality indexes, and affected indigenous and riverine populations dominated the national news¹⁸. Data from the National Institute for Space Research (INPE) indicate that, in 2024, hot spots reached the highest levels in 14 years in the state of Rondônia.

Figure 1. Fire outbreaks in Rondônia (2024).



Source: BDQueimadas Program (2024).

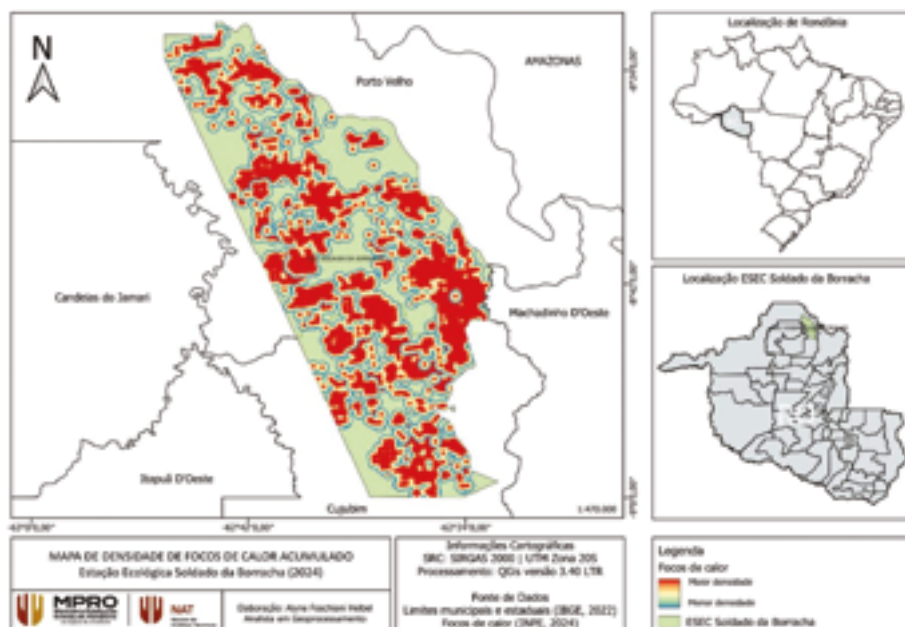
The Amazon, already pressured by illegal deforestation, has seen vast areas of forest converted to ash, often after vegetation suppression (ALENDAR et al., 2024). In Rondônia, the scenario was particularly serious. Municipalities such as Porto Velho, Cujubim, Machadinho d'Oeste and Nova

¹⁷ <https://www.cnnbrasil.com.br/nacional/rondonia-sofre-com-com-queimadas-da-regiao-amazonica-e-State-Prosecutor'sOffice-Triggers-Operation-See-Videos/>

¹⁸ <https://g1.globo.com/ro/rondonia/noticia/2024/08/14/encoberta-por-fumaca-porto-velho-segue-com-the-worst-air-quality-of-the-country.ghtml>

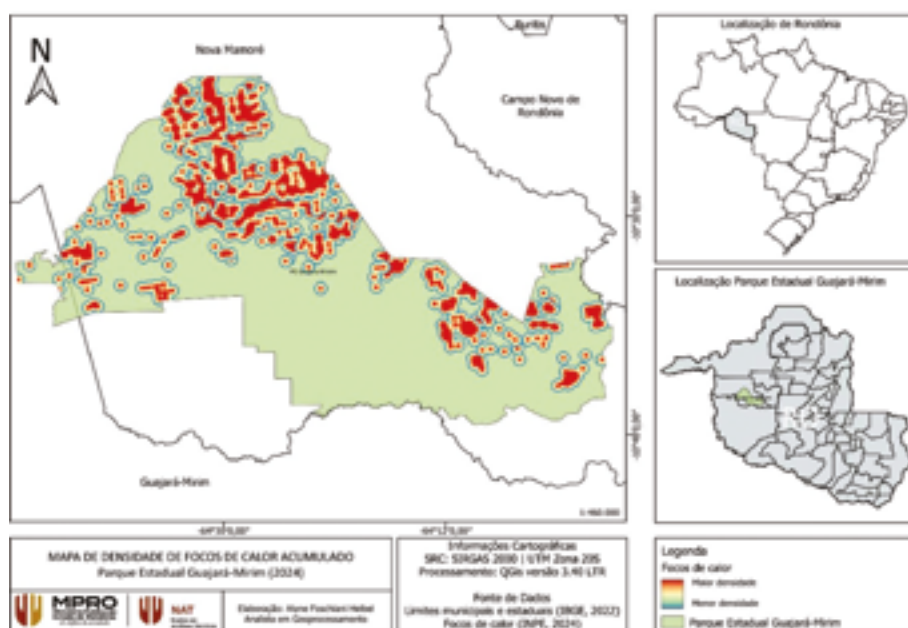
Mamoré concentrated thousands of active fires. Protected areas, such as conservation units and indigenous lands, were hit hard. The increase in the illegal use of fire to clear pastures and open productive areas occurred even during periods of legal prohibition, evidencing the limitation of state control and response structures.

Figure 2. Hot spots in the municipalities of Porto Velho, Cujubim and Machadinho d'Oeste in 2024.



Source: Center for Technical Analysis – Public Prosecutor’s Office of the State of Rondônia (2025).

Figure 3. Hot spots in the municipality of Nova Mamoré in 2024.



Source: Center for Technical Analysis – Public Prosecutor’s Office of the State of Rondônia (2025).

In this context of climate and environmental emergency, the Public Prosecutor's Office of Rondônia led the creation of the Interinstitutional Task Force to Combat Fires in 2024. The initiative sought to articulate an integrated, efficient and permanent institutional response, mobilizing various public agencies for shared strategies of monitoring, repression and prevention.

The Task Force had representatives from GAEMA, SEDAM, the Fire Department, the Environmental Police Battalion, Civil Defense, in addition to the occasional support of federal agencies such as IBAMA and ICMBio, and the Federal Public Prosecutor's Office. The focus was to combat environmental crimes quickly and effectively, and to implement preventive solutions to contain fires in the most sensitive areas of the State¹⁹.

Among its main milestones are Operations **Temporã I and II**, coordinated by the Public Prosecutor's Office of the State of Rondônia, through Gaema, with support from the Task Force. Launched at the height of the dry season, they aimed to dismantle criminal chains linked to the use of fire, carry out field inspections and hold perpetrators of illegal fires accountable. The operation was based on cross-referencing satellite data, complaints and environmental intelligence systems.

Figure 4. Official art of Operation Temporã, coordinated by MPRO through GAEMA, in partnership with state and federal agencies.



Source: Source: Public Prosecutor's Office of the State of Rondônia (2024).

During Temporã, dozens of rural properties, public areas and settlements were inspected. Infraction notices were applied, equipment used for deforestation and burning was seized²⁰. The Public Prosecutor's Office has instituted procedures for civil and criminal liability of offenders, requested inquiries from the Civil Police and recommended structuring measures to environmental agencies.

19 <https://www.rondoniagora.com/geral/forca-tarefa-e-criada-para-combater-incendios-florestais-em-Rondonia>

20 <https://rondonia.ro.gov.br/fiscalizacao-e-responsabilizacao-por-crimes-ambientais-sao-intensificadas-in-Rondonia/>

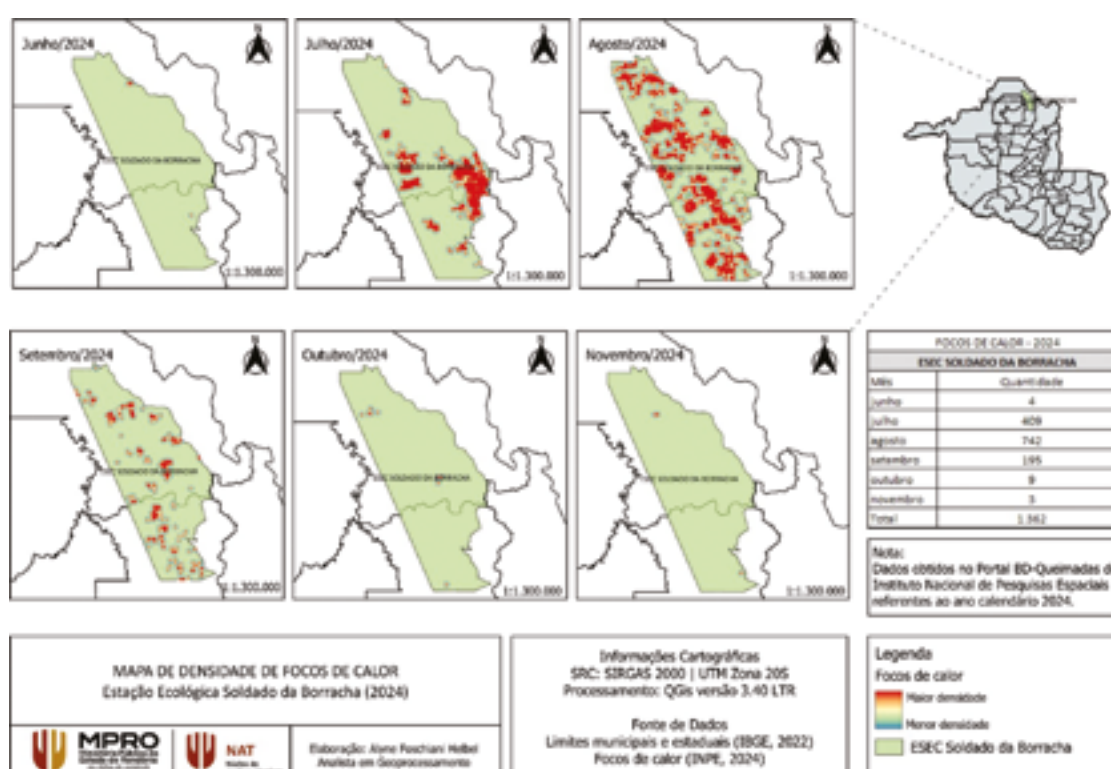
The operations were also educational, with actions to raise awareness about the risks and legal prohibitions of the use of fire, standing out for their speed, inter-institutional synergy and direct impact on the reduction of outbreaks in critical areas.

It should be noted that the creation of the Task Force and Operation Temporã marked a change in the State's approach to environmental crimes related to fires, with emphasis on the proactive, strategic and articulated action of its members, based on intelligence and territorial presence, resulting in effective accountability of those involved. The protagonism of the Public Prosecutor's Office, via GAEMA, was fundamental to transform environmental protection from a discourse into concrete actions, preserving the natural heritage of Rondônia.

5. FINDINGS

Early Operations I and II, conducted in 2024 in the state of Rondônia, produced direct effects on the dynamics of fires in critical areas. Coordinated interinstitutional action allowed effective interventions in protected territories, marked by growing anthropogenic pressure. Conservation Units located in environmental conflict zones showed a significant reduction in hot spots after the outbreak of the actions.

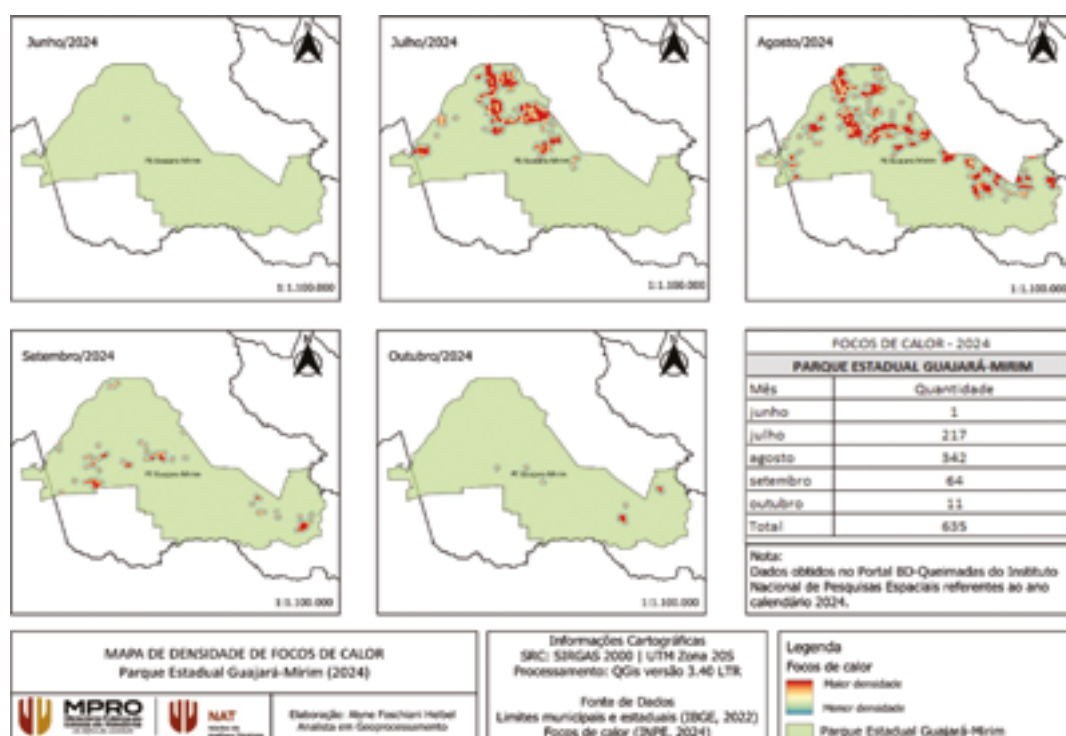
Figure 5. Heat source density map - Soldado da Borracha Ecological Station (2024).



Source: Center for Technical Analysis – Public Prosecutor's Office of the State of Rondônia (2025).

At the Soldado da Borracha Ecological Station, between the months of July and August, the hot spots exceeded 1,100 records, with critical density in almost the entire length of the unit. After the intervention of the operations, a drastic reduction was observed: in November, there were only three occurrences left. The comparative mapping clearly demonstrates the effectiveness of the repressive and territorial control measures implemented in the area.

Figure 6. Heat source density map – Guajará-Mirim State Park (2024).



Source: Center for Technical Analysis – Public Prosecutor’s Office of the State of Rondônia (2025).

A similar scenario occurred in the Guajará-Mirim State Park. In August, 342 hot spots were recorded. With the intensification of institutional actions in the territory, the number dropped to 11 in October, showing a drop of more than 95% in just two months. The data illustrate the impact of the State’s presence in regions that had been systematically degraded by illegal fires.

The significant reduction in outbreaks did not occur spontaneously, but was the result of technical planning, use of geospatial intelligence and coordinated execution of inspections, seizures and accountability. The strategy adopted prioritized territories with a high degree of recurrence of environmental crimes and a history of land conflicts, revealing the importance of integrated data analysis to direct efforts.

The success of Operations Early I and II in the Conservation Units of Rondônia shows that the fight against fires depends on direct, face-to-face and articulated actions between public entities. The accumulated experience serves as a reference for other states in the Legal Amazon, demonstrating that ministerial action, when combined with geotechnology tools and institutional articulation, is capable of reversing scenarios of environmental degradation in the short term.

6. CONCLUSION

The serious environmental crisis experienced in Rondônia in 2024 has exposed the limits of the traditional model for confronting fires, requiring faster, more coordinated, and structured institutional responses. In this scenario, the action of the Public Prosecutor's Office of the State of Rondônia, through GAEMA, proved to be not only necessary, but decisive. The creation of the Interinstitutional Task Force and the execution of Operation Temporã evidenced the capacity of the Public Prosecutor's Office to articulate different agencies around a common objective: to contain environmental destruction, hold offenders accountable and induce structural transformations in public policies for environmental protection.

The success of the actions undertaken in 2024 is directly linked to the problem-solving and strategic performance of *"Parquet"*, which knew how to combine technical knowledge, institutional presence and political articulation. The use of geospatial data, the identification of critical areas, the rapid response to hot spots, and the legal accountability of the agents causing damage demonstrated that it is possible to strengthen state action with intelligence and integration.

More than an emergency response to the fire season, the experience of the Task Force and Operation Temporã reveals a promising path for ministerial networking. The strengthening of specialized structures such as GAEMA, the valorization of inter-institutional action and evidence-based planning are essential elements to contain the expansion of fires, ensure the protection of sensitive territories and promote a development model compatible with environmental conservation.

Therefore, the case of Rondônia in 2024 is an example of good institutional practices in the fight against environmental crimes, demonstrating that the Public Prosecutor's Office, when acting in a strategic, coordinated, and technically qualified manner, can be a central actor in the defense of the Amazon and the diffuse and collective rights that depend on it.

7. REFERENCES

ANDRADE FILHO, Valdir Soares de. Fires in the Brazilian Amazon: emission of pollutants and effects on human health. In: Circular Economy: principles and practices for sustainability. São Paulo: Editora Científica, 30 mar. 2025. Chapter 9, p. 139–160. DOI 10.37885/250319041. Available at: <https://www.editoracientifica.com.br/artigos/queimadas-na-amazonia-brasileira-emissao-de-pollutants-and-effects-on-human-health>. Accessed on: 10 jul. 2025.

BARRETO, Paulo; RIBEIRO, Júlia; PEREIRA, Rafael. How to combat deforestation in the Amazon in a structuring way. Belém: Imazon, 2021. Available at: <https://imazon.org.br/publicacoes/como-combater-o-desmatamento-na-amazonia-de-forma-structuring/>. Accessed on: 11 jul. 2025.

BRAZIL. Constitution of the Federative Republic of Brazil of 1988. Brasília: Senado Federal, 1988.

BRAZIL. Complementary Law No. 75, of May 20, 1993. Provides for the organization, attributions and statute of the Federal Public Prosecutor's Office.

CAMBRIDGE CROWN. **Comparing market instruments for forest conservation in Brazil using farm-level census data.** *Environment and Development Economics*, 2023.

CISNEROS, E.; BÖRNER, J.; PAGIOLA, S.; WUNDER, S. **Impacts of conservation incentives in protected areas: The case of Bolsa Floresta, Brazil.** *Journal of Environmental Economics and Management*, v. 111, 2021.

DOUGLAS, Weslen. Uncontrolled fire. Ouro Preto: Federal University of Ouro Preto, 2023. 48 p. Available at: file:///C:/Users/53307/Downloads/PRODUTO_DescontroleFogo.pdf. Accessed on: 10 jul. 2025.

GAEMA/MPRO. Internal performance reports 2024. Porto Velho: Public Prosecutor's Office of the State of Rondônia, 2024.

ICCT – **International Council on Clean Transportation. Environmental crime in the Amazon Basin: actors, logistics, and governance gaps.** Washington: ICCT, 2022. Available at: <https://theicct.org/publication/environmental-crime-amazon-basin/>. Accessed on: 11 jul. 2025.

NATIONAL INSTITUTE FOR SPACE RESEARCH (INPE). Monitoring Burnings and Forest Fires – BDQueimadas. Available at: <http://queimadas.dgi.inpe.br>. Accessed on: jul. 2025.

SOCIO-ENVIRONMENTAL INSTITUTE (ISA). Fires and Traditional Territories in the Amazon. São Paulo, 2023.

MANGUEIRA, Rita de Souza. Fires in the Amazon 2020: a study on the causes and long-term consequences. 2021. 48 f. Final Paper (Specialization in Science and Mathematics Teaching) – Federal Institute of Education, Science and Technology of Paraíba, Campus Itaporanga, Itaporanga, 11 mar. 2021. Available at: <https://repositorio.ifpb.edu.br/bitstream/177683/1923/1/QUEIMADAS%20NA%20AMAZ%C3%94NIA%202020%20UM%20STUDY%20ABOUT%20AS%20CAUSES%20E%20CONSEQUENCIAS%20EM%20LONGO%20PRAZO.pdf>. Accessed on: 11 jul. 2025.

MAPBIOMAS. MapBiomas Fogo: monitoring of fires in Brazil. Available at: <https://mapbiomas.org/serie-historica-queimadas>. Accessed on: 11 jul. 2025.

MAPBIOMAS. Annual Reports on the Use of Fire in Brazil. Available at: <https://mapbiomas.org>. Accessed on: jul. 2025.

MDPI. **Payment for Environmental Services and the Financial Viability of Agroforestry Systems: An Integrated Analysis of Socio Environmental Projects in the Descoberto Basin— Federal District.** Forests, 2022.

OLIVEIRA, João Paulo; SANTOS, Mariana M. The disarticulation of environmental policy Brazilian: federalism, conflicts and risks. *Journal of Public Administration*, v. 54, n. 1, p. 135-154, 2020. OVIEDO, Antonio Francisco Perrone; DOBLAS, Juan N. Forests need people. São Paulo: Instituto Socioambiental, 2022. 22 p. Available at: <https://acervo.socioambiental.org/sites/default/files/documents/m1d00064.pdf>. Accessed on: 10 jul. 2025.

PEREIRA, H. A. et al. Environmental management and firefighting in the Brazilian Amazon: institutional challenges and intersectoral strategies. *Cadernos de Sustentabilidade*, v. 10, n. 1, p. 102–125, 2022.

PORTO, Marcelo Firpo; PACHECO, Tânia; LEROY, Jean Pierre (eds.). Environmental injustice and health in Brazil: the Conflict Map. Rio de Janeiro: Editora Fiocruz, 2013. 306 p. eISBN 9788575415764. DOI: 10.7476/9788575415764. Available at: <https://books.scielo.org/id/468vp/pdf/porto-9788575415764.pdf>. Accessed on: 10 jul. 2025.

PRODES/DETER – INPE. Monitoring of Deforestation in the Legal Amazon by Satellite. Available at: <http://terrabrasilis.dpi.inpe.br>. Accessed on: jul. 2025.

RONDONIA. State Complementary Law No. 93, of November 3, 1993. Provides for the organization of the Public Prosecutor's Office of the State of Rondônia. Science of the Total Environment, v. 954, p. 176612, 2024. Available at: <https://doi.org/10.1016/j.scitotenv.2024.176612>. Accessed on: 10 jul. 2025.

SILVA, Ricardo Gilson da Costa; MICHALSKI, Amanda. On the way to the North: cartography of the territorial impacts of agribusiness in Rondônia (western Amazon). Confins, n. 45, 2020. Available at: <https://doi.org/10.4000/confins.28017>. Accessed on: 11 jul. 2025.

SILVA, E. C. Manual de prevenção de fogo florestas. Brasília: IBAMA, 1998. Available at: https://data-server-coids.inpe.br/queimadas/queimadas/Publicacoes-Impact/material3o/1998_Silva_Manual-PrevencaoIncendiosFlorestais_IBAMA_DE3os.pdf. Accessed on: July 11. of 2025.

SILVA, F. M.; COSTA, R. B. Fires in the Amazon: causes, consequences and paths to prevention. Law and Environment Journal, v. 18, n. 2, p. 45–70, 2023.

TOLEDO, Naomi; MOULATLET, Gabriel M.; GAONA, Gabriel V.; VALENCIA, Bryan C.; HIRATA, Ricardo; CONICELLI, Bruno. **Dynamics of meteorological and hydrological drought: The impact of groundwater and El Niño events on forest fires in the Amazon.**

VIOLA, Eduardo; FRANCHINI, Matheus. Climate Policy and Institutions in Brazil: advances and setbacks (2005–2017). Brazilian Journal of International Politics, v. 61, n. 2, 2018.

CONTRIBUTION OF THE PUBLIC PROSECUTOR'S OFFICE TO A JUST AND INCLUSIVE ENERGY TRANSITION

Rachel Medeiros Germano¹

Abstract: This article highlights the importance of renewable energies in the context of climate change while also addressing the socio-environmental impacts that have been observed. The impacts are described, and solutions are presented to avoid, mitigate, and repair or compensate for them. Finally, it discusses the role of the Public Prosecutor's Office in contributing to a just energy transition, through both proactive and repressive actions.

ENERGY TRANSITION IN BRAZIL: CONTEXT

The energy transition in Brazil is a matter of paramount importance and transversal complexity for the nation's future. Brazil is a leader in this process, being the first in the Americas, the third in the G20, and the only BRICS nation without fossil fuels as the predominant source in its electrical matrix. The transition to renewable energies such as wind and solar represents a promising path for the decarbonization of the economy in a context of climate emergency. However, it is not without challenges. Although the energy source is clean, its impacts are multifaceted, requiring a concerted effort by the State, the productive sector, and society to overcome them. To this end, a dialogue that incorporates empirical and traditional knowledge, in addition to strictly scientific knowledge, is essential.

According to the Argentine activist Pablo Bertinat, the energy transition is, in essence, a social, economic, political, and environmental problem that concerns the very organization of society. For countries in the global South, the greatest challenge lies in social inequality and environmental racism, which generate profound concerns regarding environmental and climate injustice. The mitigation of greenhouse gases at a global level is not always accompanied by adaptation at a local level, which can render affected communities more vulnerable and less resilient, in a context of “energy addition”—the concurrent development of new energy sources without phasing out existing ones.

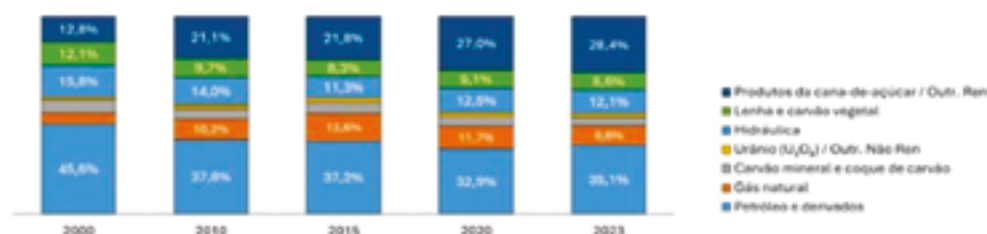
This phenomenon occurs because, in Brazil, the pursuit of new renewable energies has not curtailed oil exploration. Thus, as demonstrated by the data from EPE - Empresa de Pesquisa Energética, a phenomenon of energy source addition, rather than a complete transition, is observed.

1 Public Prosecutor of MPRN

Evolução da Oferta Interna de Energia (OIE) por fonte

Pelo lado das fontes não renováveis, o petróleo e seus derivados seguem como as maiores fontes. O gás natural sofreu aumento de participação de 5,4% em 2000 para 9,6% em 2023, devido à sua utilização em termelétricas de base e extensão da malha dutoviária, o que possibilitou seu uso tanto nas indústrias como nas edificações residenciais, comerciais e públicas.

Figura 3: Oferta Interna de Energia (OIE) por fonte em anos selecionados
Fonte: EPE (2024a)



As fontes renováveis cresceram em ritmo mais acelerado devido à expansão do setor sucroalcooleiro e a forte penetração de outras renováveis, como as fontes eólica, solar, licor preto e biodiesel. A energia eólica apresentou participações crescentes na matriz energética, chegando a 2,6% da Oferta Interna de Energia em 2023. Já o licor preto, diretamente associada à indústria de celulose, contribuiu com 3,4% da OIE em 2023. O biodiesel tem sido favorecido pela política de adição deste combustível no diesel fóssil. Em 2023, o percentual de adição (em volume) foi arbitrado em 12% a partir do mês de abril daquele ano. O volume médio anual de adição do biocombustível atingiu 11,54% na composição do óleo diesel total em 2023.

PRINCIPAL SOCIO-ENVIRONMENTAL CHALLENGES AND THE ROLE OF THE PUBLIC PROSECUTOR'S OFFICE

Among the most critical social impacts, the following are identified:

- **Land conflicts and abusive contracts:** The onshore experience in Brazil has revealed the imposition of standardized, adhesion-based contracts that preclude the participation of vulnerable parties, such as members of traditional communities and agrarian reform settlements. These contracts often lack essential information, such as basic fixed income, payment periodicity, and the total area committed. Secrecy clauses, which prohibit the disclosure of negotiations, contravene the principle of good faith and impede adequate technical and legal assistance. These long-term contracts with automatic renewal result in the de facto dispossession of land, binding heirs and effectively severing their control over the property.
- **Socioeconomic and health damages:** The implementation of solar and wind farms has generated socioeconomic harm to residents, affecting activities such as agriculture, livestock, fishing, and extractivism, and disrupting productive chains. Rural producers suffer from soil damage and the obstruction of passages. Furthermore, the installation of these projects can lead to an increase in the cost of living and offer only temporary jobs. In wind energy projects, specifically, noise, vibrations, lights, and dust are direct health impacts, with reports of mental health impacts, including insomnia, anxiety, stress, and depression. Community leisure and well-being are also negatively affected.

- **Lack of Free, Prior, and Informed Consent (FPIC):** ILO Convention No. 169 recognizes the right to FPIC for indigenous peoples and traditional communities. However, initiatives by the Executive Branches to conduct these consultations are nascent, and the Public Prosecutor's Office warns that consultations should not be conducted by the developer itself. Independent technical-legal assistance and transparent information for the population are crucial.
- **Conflict with food security:** The installation of renewable energy projects in the Caatinga, a major food-producing region, can compete with family farming, thus impacting food security.

Despite the renewable nature of the sources, the installation of these projects can lead to significant environmental impacts:

- **Deforestation and Loss of Vegetation Cover:** Solar and wind energy projects can result in the deforestation of thousands of hectares, as detected in the MapBiomas Annual Deforestation Report (RAD) for the Caatinga biome.
- **Soil Erosion and Waterbody Siltation:** Deforestation and the removal of native vegetation lead to the abrupt runoff of rainwater, causing erosion on slopes and riparian forests, and siltation of water bodies. The ineffectiveness of containment barriers and the absence of soil conservation practices worsen these processes, often affecting Permanent Preservation Areas (PPAs).
- **Impacts on Water Resources:** Sediment runoff can alter the quality of watercourses, increasing turbidity and the presence of solids, making the water unsuitable for human and animal use. There have been reports of water shortages and insufficient tubular wells installed by companies.
- **Loss of Biodiversity and Fauna Mortality:** Mortality of winged fauna occurs. The alteration of local ecosystem dynamics, including the displacement and flight of fauna, has also been observed. There is a risk of extinction of populations of endangered species.
- **Disfiguration of the Landscape and Cultural Heritage:** Projects can cause the disfigurement of mountain ranges. The geological, geomorphological, and archaeological richness of certain areas, with the occurrence of rock graphics and caves, is also impacted, in addition to the landscape impact on the Coastal Zone.
- **Cumulative and Synergistic Impacts:** There is a gap in the discussion of the cumulative and synergistic impacts of multiple projects operating or being implemented in the same area, which can lead to the worsening of environmental degradation.

- **Inadequacy of Policies and Enforcement:** There are gaps in the policies designed to avoid, mitigate, and repair impacts. Monitoring studies and degraded area recovery plans (PRAD) are often considered insufficient. Environmental agencies sometimes grant licenses even while recognizing the importance of the areas for the environment and other social and economic uses.

These impacts have generated intense social mobilization, leading to the creation of the “Dialogue Table of the Presidency of the Republic on Renewable Energy: rights and impacts.” In Rio Grande do Norte, the Movement of Those Affected by Renewables (MAR) highlights the intersectionality of these impacts, being present in all states where the impacts of renewable energies are felt.

ROLE OF THE PUBLIC PROSECUTOR’S OFFICE (MP) IN SOCIO-ENVIRONMENTAL CHALLENGES

The Public Prosecutor’s Office has been actively working to combat these problems. Judicialization remains incipient given the multiple violations, which mobilizes the institution to seek other forms of action.

- **Recommendation from MPF/PB to INCRA:** The Federal Public Prosecutor’s Office and the Public Defender’s Office of the Union, along with the MP and DPE of Paraíba, issued a joint recommendation to the National Institute of Colonization and Agrarian Reform (INCRA) to demand FPIC for quilombolas and other traditional groups affected by renewable energy projects. This consultation must be mediated by public entities and funded by the developer, ensuring the participation of the peoples in the financial benefits and encouraging collective bargaining for contracts that avoid abusive clauses, such as secrecy and automatic renewal. Previous contracts signed without observing these points are considered null and void.
- **MPRN’s Action in Serra do Feiticeiro:** The Public Prosecutor’s Office of Rio Grande do Norte (MPRN), through the Lajes Public Prosecutor’s Office and the Specialized Group for Action on the Environment and Urbanism (GAEMA), issued a Ministerial Recommendation to the Institute for Sustainable Development and the Environment (IDEMA) for the IMMEDIATE CANCELLATION of the Installation License for a wind complex in Serra do Feiticeiro. The recommendation is based on the area’s extreme biological importance for the conservation of the Caatinga. The MP also recommended the creation of a Full Protection Conservation Unit in the area.
- **MPPI’s Public Civil Action (ACP) in São Gonçalo Solar Park:** The Public Prosecutor’s Office of the State of Piauí (MPPI) filed a Public Civil Action against ALBA ENERGIA LTDA and ENEL BRASIL S.A. due to the damages caused by the São Gonçalo Solar Park. The ACP states that the project damaged the soil, silted up water bodies, and caused socioeconomic and mental health dam-

ages to residents. The preliminary judicial decision granted several urgent measures, such as refraining from new interventions and providing water, and the establishment of independent multidisciplinary technical assistance funded by the companies. The court recognized the probability of the right and reversed the burden of proof in favor of the Public Prosecutor's Office.

- **Renewable Energy Project of the MPRN:** The Center for Environmental Support has played a central role in articulation, through seminars and the formal delivery of social cartographies and the “Northeast Power Safeguards” to the Government of RN and the Federation of Industries (FIERN).
- **Role of CNMP:** The Renewable Energy Studies Nucleus of the Environment Commission (CMA) Working Group of the CNMP acts in articulation with federal agencies and in the formulation of policies, having launched the first volume of the “CMA/CNMP Environmental Notebooks” project with guidelines for action in the area.

PROJECTS IN DEVELOPMENT

- Creation of a Just Energy Transition Network.
- The MPRN Renewable Energy Project seeks to urge the State Environmental Council (Conema) to meet and vote on wind and solar resolutions.
- The 45th Public Prosecutor's Office of Natal has administrative procedures for compensation under the SNUC Law and State Complementary Law 272/2004.

FOR A JUST AND INCLUSIVE ENERGY TRANSITION: THE ESSENTIAL ROLE OF THE PUBLIC PROSECUTOR'S OFFICE

A truly just and inclusive energy transition, according to the understanding of the Public Prosecutor's Office, presupposes:

- Investing in territorial planning instruments, such as ecological-economic zoning, integrated environmental assessment, and strategic environmental assessment, in addition to social cartographies.
- Compliance with socio-environmental safeguards.
- Information, transparency, and adequate technical-legal assistance for the population and municipal administrations.
- Guarantee of Free, Prior, and Informed Consent (FPIC) to indigenous peoples and traditional communities.

- Incentive for the territory to also host companies that supply services and components, promoting local development.
- Effective implementation of damage compensation and repair mechanisms.
- Recognition of judicialization as a tool in the face of multiple violations, and the search for responsible self-composition practices.
- Inclusion and consideration of these variables in public policy planning, ensuring that the productive sector follows the guidelines established by the public authorities.

FINAL CONSIDERATIONS - RESULTS AND PERSPECTIVES

From all that has been stated, it is clear that the problem is serious and demands institutional attention. The actions and projects of the Public Prosecutor's Office mentioned here resulted, at a minimum, in: awareness and visibility for the topic; positive repercussions in environmental studies and licensing, with their improvement (empirical observation in Rio Grande do Norte); assistance in strengthening and supporting the social movements of those affected; and also obtained some interesting results in judicialization, such as in the public civil action of the São Gonçalo Solar Project (Piauí). This also encourages new judicializations, with the perspective of also bringing the Judiciary into the debate and expanding the possibilities of avoiding, mitigating, repairing, or compensating for negative impacts.

The energy transition, therefore, is not merely a technological issue, but a profoundly social and environmental one. The Brazilian Public Prosecutor's Office, in its various spheres, has positioned itself as a fundamental actor in ensuring that this transition occurs in a just, inclusive, and sustainable manner, defending the rights of communities and the integrity of the environment.

BIBLIOGRAPHICAL REFERENCES

TEIXEIRA, Rylneive Leonardo Pontes. Renewable energies in the Northeast and the relations with adaptation to climate change. Doctoral thesis. IPP/UFRN. Annual Deforestation Report 2024.

MAPBIOMAS. Source: https://alerta.mapbiomas.org/wp-content/uploads/sites/17/2025/05/RAD2024_15.05.pdf. Accessed on August 8, 2025.

ACTING OF PROSECUTOR MINISTRY OFFICE OF THE FEDERAL DISTRICT AND TERRITORIES (MPDFT) IN CLIMATE CHANGE – AN INNOVATIVE PROJECT TO MITIGATE ADOLESCENTS’ ‘ECOANXIETY’

Roberto Carlos Batista¹

Summary: Climate emergencies have many impacts on the environment, economy, health, and other sectors, requiring integrated action strategies. In the Federal District, the Public Prosecutor’s Office of the Federal District and Territories (MPDFT), within the scope of the Prosecutor’s Office for the Defense of the Environment and Cultural Heritage (Prodemas), included climate change as a cross-cutting goal, developing initiatives aimed at mitigation, adaptation and inspection of environmental policies. Among the challenges identified is “eco-anxiety” in adolescents, a disorder related to fear and uncertainty in the face of the climate future, aggravated in contexts of social vulnerability. The project, under construction by the 1st Prodema, with a possible partnership with the Health and Education Prosecutors’ Offices, proposes the use of environmental education as a tool for preventing and coping with “eco-anxiety”, articulating existing programs, such as the School Health Program and the National Policy for Psychosocial Care in School Communities. The steps include diagnosis, teacher training, student awareness, implementation of continuous actions and annual evaluation of results. The initiative seeks to reduce cases of “ecoanxiety”, promote mental health and strengthen environmental awareness among public school students.

Keywords: climate change, mental health, ecoanxiety, adolescent students, public schools, Federal District, project, environmental education, MPDFT

Abstract: Climate emergencies have broad impacts on the environment, economy, public health, and other sectors, demanding integrated strategies. In Federal District, the Prosecutor Ministry Office of The Federal District And Territories (MPDFT), Through the Environmental and Cultural Heritage Defense Prosecutors (Prodemas), has adopted climate change as a transversal goal, implementing actions focused on mitigation, adaptation, and monitoring of environmental policies. One highlighted challenge is “eco-anxiety” among adolescents, a mental health condition linked to fear and uncertainty about the future of the planet, particularly affecting socially vulnerable groups. The project, under development by the 1st Prodema in potential partnership with the Health and Education Pros-

1 Prosecutor, head of the 1st Prosecutor’s Office for the Defense of the Environment and Cultural Heritage of the Public Prosecutor’s Office of the Federal District and Territories – MPDFT, Coordinator of the MPDFT International Cooperation Center and collaborating member of the CNMP’s Environment Commission

ecutor's Offices, aims to use environmental education as a tool to prevent and address eco-anxiety, integrating existing programs such as the School Health Program and the National Policy for Psycho-social Care in School Communities. The plan involves diagnosis, teacher training, student awareness activities, continuous multidisciplinary actions, and annual evaluation. The initiative seeks to reduce eco-anxiety cases, promote mental health, and strengthen environmental awareness among public school students.

Keywords: climate change, eco-anxiety, adolescent students, public schools, Federal District, project, MPDFT.

1. INTRODUCTION

Climate emergencies and their ecosystem repercussions, on the environment, on the economy, on the social and cultural sector, on food production and daily habits, on human health and in various sectors demand urgent strategies for action, not only of public policies, of business, personal and community conduct, but also of institutional policies, especially of entities with attributes of protection of diffuse and collective interests such as the Public Prosecutor's Office.

Within the territory that houses the federal capital, devoid of counties and municipalities, but with the same challenges that are inherent to it in terms of the matter at hand, the MPDFT has six Prosecutor's Offices for the Defense of the Environment and Cultural Heritage (Prodemas), which has long included the subject of climate change as a transversal goal of all units specialized in the environment.

The members of the aforementioned enforcement bodies have established procedures and elected different objectives in the field in question, such as, e.g.:

1. ensure the implementation of the policy of climate change and extremes in the Federal District, with a focus on mitigation and adaptation measures, based on the legal basis already existing in this unit of the Federation on environmental licensing, decarbonization of the fleet of collective public vehicles, among others;
2. monitor the ABC+ Plan (2020-2030 Decade)²;
3. to monitor and supervise, on an ongoing basis, the formulation and execution of public policies related to the confrontation of heat islands in the Federal District;
4. to verify the inventory of afforestation in urban, rural and forest areas;
5. supervise the control of the use and/or total burning of methane from Sewage Treatment Plants;
6. value fire prevention, especially in critical periods of drought.

2 Sectoral Plan for Mitigation and Adaptation to Climate Change for the Consolidation of a Low Carbon Economy in Agriculture.

In the field of projects with a problem-solving profile, an innovative initiative is being developed by the 1st Prosecutor's Office for the Defense of the Environment and Cultural Heritage, in a possible partnership with the Prosecutor's Office for Health and the Prosecutor's Office for Education, on "eco-anxiety" of adolescents, students in public establishments and with greater need and vulnerability. It is about the impacts of climate change on the mental health of this public in constant restlessness, discoveries, transformations and questions in the corresponding phase of life.

This work will focus on the announced project, after briefly demonstrating the inseparable correlation between climate change and public health in general dimensions.

2. GLOBAL AND NATIONAL PERCEPTION OF THE IMPACTS OF CLIMATE CHANGE ON PUBLIC HEALTH

As early as 1990, the World Health Organization (WHO) dealt with the health effects of climate change, as can be seen in the report entitled **Potential health effects of climatic change** (WHO, 1990).

In 1995, the Pan American Health Organization (PAHO), at the National Academy of Sciences of the United States in Washington, presented the subject to experts (PEREIRA *et al.*, 2020, p.02). Since then, the systemic approach has been the object of studies, scientific investigations, reports, strategic and political intentions at the level of countries, regions and in the international scenario.

In 2019, at the 72nd world assembly, he created the "WHO Global Strategy on Health, Environment and Climate Change: The Transformation Needed to Sustainably Improve Life and Well-Being Through Healthy Environments". The same UN body, in 2021, publishes a report on health and climate change in order to provide subsidies on mitigation and adaptation measures, in view of the diagnoses in 95 participating countries. COP28 itself issued, in partnership with the WHO, in 2023, a declaration on climate and health, which also considers impacts on mental health and psychological well-being, as well as refers to environmental determinants of health (WHO, 2023). In 2024, the WHO prepared a report on the topic called "COP29 Special Report on Climate Change and Health: Health is the Argument for Climate Action". Its purpose was show how human health can be promoted and protected by concrete actions. It is "a collective call to action", in the words of the director-general Tedros Adhanom Ghebreyesus (WHO, 2024).

Such an integrative view was also foreshadowed in the approach known as **One World, one Health** ("One World, One Health"), translated by the Ministry of Health as "One Health") and discussed in 2004 at a congress at Rockefeller University, based on the idea that human, animal, plant and environmental health and well-being are inseparable and interconnected. From there emerged the so-called "Manhattan Principles", with this concern. With the pandemic COVID19 and the acceleration of the negative health impacts of climate change around the world, the Foreign Climate and Environmental Policy Division of the German Federal Foreign Office and the Wildlife Conservation Society met with experts from 47 countries from the most varied areas of knowledge, including the Human Sciences, at the conference: "One Planet, One Health, One Future". This initiative resulted in the updating of the aforementioned principles, which are now enunciated as the "Berlin Principles" (GRUETZMACHER *et al.*, 2021, p.2). This conception supported the entire approach to matter in the

sense of not dissociating human health from the other elements inherent to it. Even within the scope of the WHO, in July 2021, this conception was incorporated under the title **One health initiative**, aiming to achieve, in an integrated manner, sustainable development objectives.³

In Brazil, on the one hand, Decree 12.007, of 04.25.2024, established the “Interinstitutional Technical Committee for One Health”, of an advisory and permanent nature, with the purpose of preparing and supporting the implementation of the “National Action Plan for One Health”. On the other hand, at the “Global Conference on Climate and Health”, held in Brasília until July 31, 2025, a partnership of the federal government with the World Health Organization (WHO), the Pan American Health Organization (PAHO) and the Alliance for Transformative Action on Climate and Health (ATACH), the Ministry of Health announced the construction of the “Belém Health Action Plan” to be presented at COP30, with measures to mitigate and adapt to the health impacts of climate change⁴.

Finally, the G20, which met in 2024 in Brazil under his presidency, had a working group on Health that drafted thematic notes that addressed, among other aspects, climate change and health, proposing actions. He admitted the impacts even on mental health.

All these initiatives and paradigm shifts have been triggered by the worrying reality of climate change across the globe and its disastrous and increasingly frequent interference in health in different and multiple nuances.

3. DISEASES AND THE “ECO-ANXIETY” SYNDROME

The studies reveal that pathologies are often increased by climatic extremes on all continents and that they victimize mainly the most economically vulnerable population or because of their human condition and health. Therefore, they also touch on SDGs, such as those related to drinking water and sanitation (SDG 6), health and well-being (SDG 3).

Among others, respiratory diseases are listed, given the worsening of air quality, especially due to fires; comorbidities and cardiovascular aggravations; vector-borne infectious diseases (including waterborne diseases, such as hepatitis A, schistosomiasis, and gastroenteritis)⁵, such as malaria, leishmaniasis, leptospirosis, and dengue (OLIVEIRA & IBAÑEZ, 2024, p.2). It is also worth mentioning zoonotic diseases from wild animals, due to the loss of ecosystem balance, in the face of deforestation and the reduction of biodiversity.

Nor can we forget the problems linked to food insecurity, due to the unavailability of food and costly access to low-income families, generating new eating habits such as the consumption of ultra-processed foods and low nutritional standards. As a result, inevitably, there is an increase in cases of malnutrition and obesity⁶.

3 SDGs 1 (no poverty), 3 (health and well-being), 6 (clean water and sanitation), 11 (sustainable cities and communities), 13 (action against global climate change), 14 (life below water), 15 (life on land), 17 (partnerships and means of implementation).

4 Check out the news available at: <<https://www.gov.br/saude/pt-br/assuntos/noticias/2025/julho/em-evento-pre-cop30-ministerio-da-saude-discute-plano-de-adaptacao-as-mudancas-climaticas>>. Accessed on 08.05.2025.

5 PAHO & BRAZIL, 2009, p.27.

6 On the subject, see ALPINO *et al.*, 2020.

In Brazil, in periods of greater drought, a correlation was found with the brevity of pregnancies, low weight of newborns, and higher infant mortality, due to water scarcity, also associated with poor hygiene and risk of disease spread (ASTORGA *et al.*, 2023, p. 10).

All these direct and indirect repercussions on public health are pointed out in numerous studies and scientific research. There is, however, another aspect of the health sciences, which is still little explored: mental health and, in particular, that of adolescents.

It is known that climate change and its effects, especially in the event of disasters, such as floods, tidal waves, earthquakes, affect mental health. Several technical reports record that the increase in temperature on the planet may be associated with medical consultations for mood disorders, anxiety, stress, in addition to generating between 9 thousand and 40 thousand suicides by 2050, only in Mexico and the USA. In this scenario, a new syndrome was defined by the American Psychological Association as “ecoanxiety”, which is imbued with fear, sadness, irritation as effects of long-term climate change (ASTORGA *et al.*, 2023, pp. 7-8). People with this pathology tend to make drastic decisions, such as not wanting children, because they fear the future⁷.

The feeling of insecurity, uncertainty, anger, fear, and apathy are manifested especially in adolescents (as well as children and the elderly), that is, in a public that, perhaps for this reason, has even been a relevant protagonist of questioning around the world, through climate demonstrations and actions, regarding the posture of countries that have committed to reducing greenhouse gas emissions and lowering the planet’s temperature. to ensure the life and its quality. It is accentuated in the case of high social vulnerability, for a Gap of safe information, difficulty in accessing it by this group, the way in which serious news on the subject is disseminated, misinformation from parents or the social environment in which they live, and educational negligence. Therefore, the project of the The 1st Prosecutor’s Office for the Defense of the Environment and Cultural Heritage of the MPD-FT, in a possible partnership with the Prosecutor’s Office for Health and the Prosecutor’s Office for Education, elected, in a resolute manner, this target audience and the instrument of environmental education as a mechanism to alleviate the situation.

3.1. PROJECT UNDER CONSTRUCTION

The project’s conception has as its motivational background the explicit framework and the observation that, although there is an institutional structure of education in coalition with health focused on the issue of psychological well-being and mental health of the student, it has not yet been incurred into environmental education actions and programs for the public of adolescent students, essentially in needier public education units.

Now, Law 6.286, of 12/05/2007 created the School Health Program (PSE) “with the purpose of contributing to the integral formation of students in the public basic education network through prevention, promotion and health care actions” (art.1), with provision for psychosocial assessment

7 HINOJOS; ZAPATA, 2023 VALADÃO, apud VALADÃO & GUAÑABENS, 2025, p.3.

(art.4, VII). Adherence to the PSE by municipalities and the Federal District guarantees financial resources for the execution of the Program⁸. Include the Federal District is one of the Federation Units covered, as indicated in Technical Note No. 23/2024-CGEDESS/DEPPROS/SAPS/MS⁹

Law 14,819, of 01/16/2024, institutes the National Policy for Psychosocial Care in School Communities and announces, as one of its objectives, the promotion of mental health in the school community (art.2, I). It points out that “its governance will be in charge of the PSE Intersectoral Working Groups, which will be responsible for the development of actions in the territories, with the mandatory participation of representatives of the Health area and the school community” (art. 4).

With this transversal scenario, typical of the National Policy for Environmental Education, the project proposes to promote environmental education aimed at the public mentioned within the Program provided for by the legal frameworks. It will have well-defined stages, namely:

1. first: seek a dialogue with the state departments of education and health of the Federal District to carry out a qualitative and quantitative diagnosis of the problem with a group of students in educational units in neighborhoods with poor population, through the application of a simple questionnaire, after its design by specialized professionals such as psychopedagogues, psychologists and doctors available in the public network. There will also be records, if any, of attendance of students in schools with reports about the problem;
2. second: with the survey of the state of the art, undertake the training of teachers of different disciplines in the Unit-School of Continuing Education of Education Professionals (EAPE) of the State Department of Education of the Federal District in order to train them in order to develop skills and competencies and show themselves able to serve students in the corresponding centers, as well as for the transmission of knowledge and the implementation of practices on the subject in the schools where they work;
3. third: plan and prioritize the work in teaching complexes with a higher incidence of cases of “ecoanxiety”, initially, with a sensitization of the students, through conversation circles, exhibition of viable practices in the school context, films, theater, exhibitions and debates, with the participation of members of the Public Prosecutor’s Office and experts in the field.
4. fourth: inclusion of a permanent and multidisciplinary program, as a curricular or extracurricular activity, such as the “science fair”, within the “Students’ Mental Health Program” (an initiative of the Departments of Education and Health since 2024), using the structure of the Federal Health at School Program and the National Program for Psychosocial Care in School Communities. At this stage, create an annual gymkhana focused on the theme of climate change and health, encouraging students with awards.

⁸ See Interministerial Ordinance No. 1,055, of 04/25/2017, of the Ministry of Health.

⁹ Available at: <<https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/notas-tecnicas/2024/nota-tecnica-no-23-2024-cgedess-deppros-saps-ms>>. Accessed on 08.06.2025.

5. fifth: evaluation of the project each year, to compute the data and examine the results achieved, to improve the actions to be developed in the coming year and expand the coverage network in schools.

The project, due to its transdisciplinary nature, tends to be formatted with the joint efforts of the Prosecutor's Offices for the Environment and Cultural Heritage; Education; and Health.

4. CONCLUSION

The lack of public policies aimed at serving the neediest adolescent students in state schools and their poor training on the subject of climate change, favors a syndrome known as “ecoanxiety”. It translates into true mental suffering, still little studied, although it is frequent and represents a potential cause of suicide, due to the little prospect of a prosperous avenir on the part of young people with it.

The Public Prosecutor's Office of the Federal District and Territories, with a transdisciplinary concern that the theme entails, by fulfilling its constitutional mission and improving itself for social and problem-solving actions, as a way of protecting health linked to the effects of climate change, seeks to fill the gap and awaken the engagement of the education and health portfolios with indispensable actions and practices to reduce the rate of cases of “eco-anxiety” and restore self-esteem and students' trust. Environmental education, as an instrument conceived within the School Health Program and the National Program for Psychosocial Care in School Communities, and also in the context of the District Student Mental Health Program, emerges as an illuminating tool for the MPDFT project in the field of climate change and health.

REFERENCES

ALPINO, Taís de Moura Ariza *et al.* The impacts of climate change on food and nutrition security: a literature review. **Ciênc. saúde coletiva** 27 (01), Jan 2022, available at: <<https://doi.org/10.1590/1413-81232022271.05972020>>. Accessed on 08.06.2025.

ASTORGA, Ignácio; SORIO, Rita; BAUHOFF, Sebastian. Health and climate change: how to protect people's health in the face of climate crises. **IDB Policy Bulletin**, 374, Apr. 2023.

BRAZIL, Ministry of Health. Interministerial Ordinance No. 1,055 of 04/25/2017.

_____. Technical Note No. 23/2024-CGEDESS/DEPPROS/SAPS/MS. Available at: <<https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/notas-tecnicas/2024/nota-tecnica-no-23-2024-cgedess-deppros-saps-ms>>. Accessed on 08.06.2025.

COFFEYA, Yumiko *et al.* Understanding Eco-anxiety: A Systematic Scoping Review of Current Literature and Identified Knowledge Gaps. **The Journal of Climate Change and Health**, Volume 3, August 2021, 100047. Available at: <<https://www.sciencedirect.com/science/article/pii/S2667278221000444?via%3Dihub>>. Accessed on 08.06.2025.

GRUETZMACHER, Kim *et al.* The Berlin principles on one health: bridging global health and conservation. **Science of the Total Environment**, Volume 764, 10 April, 2021.

G20 Brazil 2024. **Health Working Group – Issue Note**. Available at: <<https://www.g20.org/pt-br/noticias/documentos/issue-note-health-wg-g20-brasil.pdf/@download/file>>. Accessed on 08.05.2025.

OLIVEIRA, Leandro Dias de; IBÁÑEZ, Pablo. Geopolitics, climate change and health: what can we expect from the G20 Summit (Rio de Janeiro, Brazil, 2024)? **Cad. Saúde Pública** 40 (11), 13 Jan 2025/2024. Available at: <<https://www.scielo.org/article/csp/2024.v40n11/e00068524/pt/>>. Accessed on 08.06.2025.

PAN AMERICAN HEALTH ORGANIZATION; BRASIL, Ministry of Health. Climate change and health: a profile of Brazil. Brasília: PAHO, 2009.

PEREIRA, João Marcos Alves *et al.* Impact of climate change on public health: an integrative review. **Revista Eletrônica Acervo Saúde**, 12(11), e4720. <https://doi.org/10.25248/reas.e4720.2020>, available at: <<https://acervomais.com.br/index.php/saude/article/view/4720>>, accessed on 05.08.2025.

WORD HEALTH ORGANIZATION. **Prevention of Environmental Pollution Unit. Potential health effects of climatic change: report of a WHO task group**. Geneva: World Health Organization, 1990. Available at: , <<https://iris.who.int/handle/10665/62016>>. Accessed on 08.05.2025.

_____. COP28 UAE **Declaration on climate and health**. Available at: <<https://www.who.int/publications/m/item/cop28-uae-declaration-on-climate-and-health>>. Geneva: World Health Organization, 2023. Accessed on 08.05.2025.

_____. **COP29 special report on climate change and health: Health is the argument for climate action**. Geneva: World Health Organization, 2024. Available at: <<https://iris.who.int/bitstream/handle/10665/348068/9789240038509-eng.pdf>>. Accessed on 08.05.2025.

VALADÃO, A. C. B., & GUAÑABENS, P. F. S. (2025). Impact of climate change on mental health: a literature review on eco-anxiety and environmental education. **Delos Magazine**, 18(65), e4460. Available at <<https://doi.org/10.55905/rdelosv18.n65-105>>. Accessed on 08/06/2025.

THE WATER CONNECTION PROJECT THROUGH THE VOICES OF CLIMATE AND WATER: SOLUTION-ORIENTED STRATEGIES FOR CLIMATE JUSTICE

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ENVIRONMENTAL AND CLIMATE JUSTICE – INTRODUCTION

Environmental justice emanates from an interdisciplinary context wherein discussions address the disproportionate impacts of pollution on low-income social strata and ethnic communities.⁹ It presupposes equitable participation in decision-making processes and distributive economic justice.

Pollution is one of the portrayals of this conflict, a characteristic of a risk society where the negative externalities of production processes are socialised. Poverty and environmental degradation are interrelated, as low-income communities and racial minorities are prone to greater exposure to pollutants and, consequently, vulnerable to their dire effects.

Climate change is also a matter of justice and equity, and it bears similarities to the roots of the environmental movement.¹⁰ Its adverse impacts are anchored in inequality, resulting from a long historical process of predatory exploitation of natural resources that benefits small minorities at the expense of large sectors of the world's population.¹¹ Projections estimate that up to 3.6 billion people are in a state of vulnerability,¹² defined by the Intergovernmental Panel on Climate Change as “the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.”¹³

For this reason, the Intergovernmental Panel on Climate Change concludes, “prioritising equity, climate justice, social justice, inclusion and just transition processes can enable ambitious mitigation and adaptation actions and climate-resilient development”.¹⁴

9 MOHAI, Paul; PELLOW, David; ROBERTS, J. Timmons. **Environmental Justice**. Annual Review of Environment and Resources, vol. 34, 2009, pp. 405-430, p. 405. Available at: <https://doi.org/10.1146/annurev-environ-082508-094348>.

10 CUOMO, Chris J. **Climate Change, Vulnerability, and Responsibility**. Hypatia, vol. 26, no. 4, 2011, pp. 690-714, p. 693. Available at: <https://doi.org/10.1111/j.1527-2001.2011.01220.x>.

11 IPCC, 2023: **Summary for Policymakers**. In: **Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change** [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, p. 31, doi: 10.59327/IPCC/AR6-9789291691647.001.

12 IPCC, 2022: **Summary for Policymakers** [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: **Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change** [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3–33, doi:10.1017/9781009325844.001, p. 5.

13 IPCC, 2022: **Summary for Policymakers** [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: **Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change** [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3–33, doi:10.1017/9781009325844.001, p. 5.

14 IPCC. **Summary for Policymakers**. In: **Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change** [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 2023, pp. 1-34, p. 31. Available at: <https://doi.org/10.59327/IPCC/AR6-9789291691647.001>. Accessed April 13, 2024.

ON ENVIRONMENTAL RIGHTS OF PARTICIPATION

Procedural rights are frequently addressed in conjunction with substantive rights, being conceived as suitable legal instruments for seeking effective compliance with the law against illegalities.¹⁵ In its Advisory Opinion OC-23/17, the Inter-American Court of Human Rights addresses rights related to the environment from these two perspectives:

The rights specifically related to the environment have been classified into two groups: i) those rights whose enjoyment is particularly vulnerable to environmental degradation, also identified as substantive rights (for example, the rights to life, personal integrity, health, or property), and ii) those rights whose exercise supports better environmental policymaking, also identified as procedural rights (such as the right to freedom of expression and association, to information, to participation in decision-making, and to an effective remedy).¹⁶

The Rio Declaration, adopted at the United Nations Conference on Environment and Development in 1992, is the first international legal instrument to expressly and jointly address access rights.¹⁷ According to Principle 10 of its text:

Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.¹⁸

It should be noted that the Rio Declaration is a political document and lacks binding force—that is to say, its content is not mandatorily observable by the sole and express determination of its text.¹⁹ However, its influence on the adoption of international legal commitments and treaties, such as the Escazú Agreement,²⁰ is undeniable.

15 ATAPATTU, Sumudu. **Human Rights Approaches to Climate Change – Challenges and Opportunities**. Routledge, 2016, p. 47.

16 INTER-AMERICAN COURT OF HUMAN RIGHTS. Environment and Human Rights (State obligations regarding the environment in the context of the protection and guarantee of the rights to life and personal integrity – interpretation and scope of Articles 4.1 and 5.1, in relation to Articles 1.1 and 2 of the American Convention on Human Rights). Advisory Opinion OC-23/17 of November 15, 2017. Series A No. 23, para. 64.

17 ATAPATTU, Sumudu. **Human Rights Approaches to Climate Change – Challenges and Opportunities**. Routledge, 2016, p. 47.

18 UNITED NATIONS GENERAL ASSEMBLY. **Report of the United Nations Conference on Environment and Development**. August 12, 1992. A/CONF.151/26 (Vol. I). Annex I – Rio Declaration on Environment and Development, Principle 10. [author's translation]

19 BOON, Foo Kim. **The Rio Declaration and its Influence on International Environmental Law**. Singapore Journal of Legal Studies, 1992, pp. 347-364, p. 351. Available at: <https://ssrn.com/abstract=964987>.

20 Principle 10 of the Rio Declaration is expressly mentioned twice in the preamble of the Escazú Agreement.

An environmental or ecological judicial governance is being strengthened daily,²¹ in harmony with the so-called environmental rights of participation or procedural rights, originally enshrined in Principle 10 of the Rio Declaration (1992), and later in the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (1998).

The provisions of the Escazú Agreement act as a minimum standard of compatibility to be observed by signatory countries within their national jurisdictions, and may even serve for the creation of new procedural rights.²² Brazil was one of the countries most engaged in the development of the negotiations and conclusion of this treaty. However, to date, it has not yet proceeded with its ratification.²³ In any event, this has not prevented its reference in judgments delivered in Brazilian law,²⁴ or even by the Inter-American Court of Human Rights with respect to non-signatory countries,²⁵ as an inspiring norm and a basis for the evolving interpretation of international human rights law on procedural rights.²⁶

ON THE RIGHT OF ACCESS TO ENVIRONMENTAL INFORMATION AND TO SANITATION

The Inter-American Court of Human Rights has already addressed the right of access to environmental information on several occasions, consolidating a robust and essential body of case law for the promotion of environmental democracy in the region. In Advisory Opinion OC-23/17, it was asserted that access to information on activities and projects that may impact the environment is a “matter of evident public interest”.²⁷ In the case of *Inhabitants of La Oroya v. Peru*, the Court reinforced that “access to information on activities and projects that may have an environmental impact constitutes a matter of evident public interest.”

21 The role of the Judiciary in environmental matters was addressed in the **Johannesburg Declaration on “Principles on the Role of Law and Sustainable Development”**, adopted at the International Symposium of Judges held in Johannesburg, South Africa, in 2002. Available at: <https://www.eufje.org/images/DocDivers/Johannesburg%20Principles.pdf>. According to the Preamble of the document: “An independent Judiciary and judicial process are vital for the implementation, development, and enforcement of Environmental Law, and members of the Judiciary, as well as those contributing to the judicial process at national, regional, and global levels, are crucial partners in promoting compliance and enforcement of international and national Environmental Law.”

22 STEC, Stephen; JENDROSKA, Jerzy. **The Escazú Agreement and the Regional Approach to Rio Principle 10: Process, Innovation, and Shortcomings**. *Journal of Environmental Law*, vol. 31, pp. 533-545. Available at: <https://doi.org/10.1093/jel/eqz027>.

23 BRAZIL. **Chamber of Deputies. Message on Agreements, Conventions, Treaties, and International Acts – MSC 209/2023**. May 12, 2023. Available at: <https://www.camara.leg.br/proposicoesWeb/fichadetramitacao?idProposicao=2362125>. Accessed April 20, 2024.

24 SUPERIOR COURT OF JUSTICE (STJ). Special Appeal No. 1857098-MS (2020/0006402-8). Reporting Justice: Minister Og Fernandes. May 11, 2022.

25 INTER-AMERICAN COURT OF HUMAN RIGHTS. Case **Residents of La Oroya vs. Peru**. Judgment of November 27, 2023 (Preliminary Objections, Merits, Reparations, and Costs). Series C No. 511, paras. 148-150.

26 DÁVILA A., Sarah. **The Escazú Agreement: The Last Piece of the Tripartite Normative Framework in the Right to a Healthy Environment**. *Stanford Environmental Law Journal*, vol. 24, 2023, pp. 64-119, pp. 67-68.

27 INTER-AMERICAN COURT OF HUMAN RIGHTS. Environment and Human Rights (State obligations regarding the environment in the context of the protection and guarantee of the rights to life and personal integrity – interpretation and scope of Articles 4.1 and 5.1, in relation to Articles 1.1 and 2 of the American Convention on Human Rights). Advisory Opinion OC-23/17 of November 15, 2017. Series A No. 23, para. 214.

The Federal Constitution of Brazil affirms that “all have the right to receive from public bodies information of their private interest, or of collective or general interest, which shall be provided within the period prescribed by law (...)”;²⁸ it also lists publicity as a guiding principle of public administration.²⁹ With regard to environmental information, the Federal Constitution also mandates the publicity of the prior environmental impact assessment.

In Brazilian law, Law No. 12,527 of 18 November 2011 regulates access to information. Its text adopts as principles the observance of publicity as a general precept; the disclosure of information of public interest, regardless of solicitation; and the social control of public administration, among others. It is determined as a “duty of the State to guarantee the right of access to information, which shall be made available, through objective and swift procedures, in a transparent, clear and easily understandable language”; furthermore, “it is the duty of public bodies and entities to promote, regardless of requests, the disclosure in an easily accessible location, within the scope of their competences, of information of collective or general interest.”

Silva states that the Public Authority “must act with the greatest possible transparency, so that the administered may, at all times, have knowledge of what the administrators are doing”.³⁰ In this sense, the case law of the Superior Tribunal de Justiça (Superior Court of Justice) has consolidated its jurisprudence on the right of access to information under a dual aspect, considering the “right of the individual to have access to requested information (passive transparency) and the state’s duty to publicise the public information it holds (active transparency)”.³¹ Furthermore, in environmental matters, “reactive transparency” must be considered, consisting of the State’s obligation to produce environmental information when non-existent.

Law No. 15,012/2024, in turn, represents a milestone in the transparency of the basic sanitation sector. It establishes the mandatory publication of detailed reports on the regulation and inspection of services, including data on reservoir levels and water security indicators. It also guarantees public access to information on the rights and duties of users and service providers. The implementation of this law significantly strengthens social control over water resources. By democratising access to information, regardless of direct interest, the law empowers the population and fosters more active participation in water management, resulting in more efficient planning and more transparent and responsible decision-making by public managers.

To this end, it will be necessary to develop robust systems for data collection and dissemination. This includes the creation of accessible and intuitive online platforms or tools, as well as the training of public servants to handle the new transparency requirements. It will be crucial to establish integrated inspection mechanisms at the level of environmental and climate damage risk management to ensure effective compliance.

28 BRAZIL. **Constitution of the Federative Republic of Brazil of 1988**. October 31, 1988, Article 5, item XXXIII. Available at: https://planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Accessed April 21, 2024.

29 BRAZIL. **Constitution of the Federative Republic of Brazil of 1988**. October 31, 1988, Article 37, caput. Available at: https://planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Accessed April 21, 2024.

30 SILVA, José Afonso da. **Curso de Direito Constitucional Positivo**. 37th revised and updated ed. São Paulo: Malheiros, 2013, pp. 678-679.

31 SUPERIOR COURT OF JUSTICE (STJ). Special Appeal No. 1857098-MS (2020/0006402-8). Reporting Justice: Minister Og Fernandes. May 11, 2022.

Law 14,904/2024 establishes guidelines for the elaboration of climate change adaptation plans. Law 14,904/2024 also incorporates nature-based solutions (NbS) into climate change adaptation plans, requiring urban infrastructure projects to consider natural approaches. This represents a significant shift in Brazilian environmental policy, prioritising sustainable and multifunctional solutions. NbS offer multiple benefits, including climate change mitigation, water security, reduction of urban temperatures, flood prevention, and increased community resilience. These solutions promote biodiversity and improve the quality of life in cities and in the countryside.

It is worth highlighting that the universalisation of sanitation is not subject to geographical barriers, reaching urban and rural areas, especially in traditional and vulnerable communities, to propagate social, climate, and environmental justice. The Law on Payment for Hydrological and Ecosystem Services (Law 14,119/2021), by guiding the integrated action of public authorities, civil society organisations, and private agents in relation to Payment for Environmental Services (PES), at a national level and as a solution-oriented and important instrument of economic-environmental policy, under the primacy of the polluter-pays principle, and more specifically, the conservator-receives principle.

Thus, both the environmental right of participation and the right to environmental information and sanitation will encourage and support the implementation and effectuation of the fundamental human right to safe water and sanitation in traditional territories or housing units, regardless of titling or demarcation of indigenous lands or traditional communities, under the inescapable primacy of the universalisation of sanitation. Initiatives and good practices along these lines are more than welcome, in the times of the 30th edition of the Conference of the Parties to the Framework Convention on Climate Change – COP30, in Belém/PA, in the Legal Amazon, with a high concentration of traditional communities.

The Constitution of the Federative Republic of Brazil, in its Article 225, prescribes the right to a balanced environment which, combined with Article 23, item IX, reveals that the effectuation of services for the promotion and improvement of housing and basic sanitation conditions is a common competence of the Union, the States, the Federal District, and the Municipalities. Consequently, it is indisputable that this is not an obligation solely of the individual or of a restricted group of people, even in the implementation of individual or collective solutions, with the legal nature of a public service persisting, even in individual solutions or those by community associations.

Furthermore, today, the United Nations Guiding Principles of 2011, provided for in Decree No. 9,571 of 21/11/2018, consisting of an obligation to respect, protect, and guarantee Human Rights and fundamental freedoms, associated with instruments of the Economic Freedom Act (Law 13,874/2019), establish a new direct legal relationship between two poles—traditional and vulnerable communities and companies—which were previously represented by the State and individuals.

Decree 11,599/2023 presents itself as a new legal framework in relation to the regularisation and allocation of public resources to operations providing technical and financial support, as per Article 13. This norm, however, provides that the following do not constitute a public basic sanitation service, according to Article 4: I - basic sanitation actions executed through individual solutions, provided that the user does not depend on third parties to operate the services; II - private responsibility basic sanitation actions and services, including the management of waste for which the generator is responsible; and III - basic sanitation actions and services operated by the users themselves, through community or multi-community associations, including those with competence in the management of rural sanitation.

However, in Article 4, sole paragraph, individual or collective solutions are excepted from the provisions of items I to III when the Public Authority is assigned responsibility for their control, discipline, or operation, under the terms of a specific norm. The Water Safety Plan (WSP), provided for in Ministry of Health Ordinance 888 of 4/05/2021, as a national standard for drinking water potability, expresses in its Article 45: “For populations residing in indigenous areas and for traditional peoples and communities, the sampling plan for water quality control must be elaborated in accordance with the specific guidelines applicable to each situation.”

In single-family and collective systems, these structural issues are amenable to the articulation of efforts at the level of partnerships; the same, and with greater reason, applies to semi-collective systems, with the incidence of due environmental licensing, depending on a technical analysis at the level of impact studies in each specific case. It is worth noting that even for rural semi-collective systems, despite regulatory gaps, there are emission standards to guarantee the non-contamination of water, such as CONAMA Resolution 430/11 associated with CONAMA Resolution 357/2005 with ecotoxicological and hydrodynamic dispersion parameters. It is worth remembering that CETESB’s DD No. 28/2023/C, even for scenarios of low polluting potential and low vulnerability with greater environmental resilience, requires the environmental assessment of effluents.

Thus, the Water Connection Project, supported by the 4th Chamber of Coordination and Review of the Federal Public Prosecutor’s Office (MPF), has assisted in the integrated and articulated action of actors from various sectors for the implementation of common objectives for the universalisation of basic sanitation. Moreover, it is important to underline that the Federal Supreme Court has already ruled in ADI 1842 of 2013 that Municipalities must form a space or instance of articulation and participatory and inter-institutional governance to fulfil the universalisation of sanitation, integrating municipal sanitation plans with master plans, solid waste management plans, and agro-chemical plans. After all, this integration and concatenation in hydrological and sanitation planning is provided for in Law 14,026/2020 and has been a collaborative initiative widely encouraged by the MPF/4th CCR’s Water Connection Project.

THE WATER CONNECTION PROJECT OF THE 4TH CCR/MPF AND ITS SOLUTION-ORIENTED STRATEGIC METHODOLOGY

The report produced by the Research Group on Law, Environment and Justice in the Anthropocene highlights Brazil as the main jurisdiction in the Global South for climate litigation, concentrating the highest number of legal cases.³² According to the data collected, civil society has played an indispensable role in the distribution of these climate actions: of the 80 cases catalogued, 21 were

32 MOREIRA, Danielle de Andrade et al. **Panorama of Climate Litigation in Brazil: 2024 Report**. Rio de Janeiro: Research Group on Law, Environment and Justice in the Anthropocene (JUMA/PUC-Rio), 2024, p. 23. Available at: <https://www.juma.nima.puc-rio.br/pesquisas-litigancia-climatica>.

filed by civil society—only one case fewer than the Public Prosecutor’s Office, which heads the list.³³ Over the last few years, the consolidation of this leading role has been observed, in which civil society presents itself as one of the main interlocutors in national climate litigation.³⁴

The dialogical participation of social actors is not restricted to decision-making spaces in structural environmental and climate litigation, but also permeates representatives of society or the social segment involved in (inter)institutional governance structures, in the articulation of collaborative themed inter-institutional networks for the construction of common paths and open alternatives and solutions with effective compliance with the structural decision and also in monitoring compliance with these decisions, through action plans or plans for monitoring the implementation of the established social pact, with maps of responsible actors, definition of goals, execution deadlines, technical meetings, public hearings whenever necessary for new demands for readjustment for implementation, the components of development or improvement of execution monitoring, functional deliberative or advisory inter-institutional committees or commissions, and other value indicators), always imbued with due transparency, publicity, and continuous social communication through reports that universally translate the analytical structure of the governance of this monitoring and at the level of internal control. This mechanism tends to promote the strengthening of the decision by guaranteeing compliance with collective decisions and established pacts, with a performance assessment of the positive impacts of the structural litigation.

The Water Connection Project: Communication Management and Digital Network for Governance and Sustainability, established in 2015 and supported by the 4th Chamber of Coordination and Review of the Federal Public Prosecutor’s Office,³⁵ has been an innovative initiative based on 3 pillars: mediation, governance, and the promotion of activities based on the concepts of the Solution-Oriented Public Prosecutor’s Office. The Water Connection Project is a zero-cost initiative for the MPF, focused on collaborative and participatory governance, in light of the Sendai Framework (2015-2030),³⁶ by multidisciplinary and multi-sectoral groups of pro bono collaborators (members of the Brazilian Public Prosecutor’s Office; Members of the Judiciary; Members of the Office of the Comptroller General; BACEN, CVM, TCU; from Academia, the business sector, NGOs, public and private managers from various areas of sustainability).

33 MOREIRA, Danielle de Andrade et al. **Panorama of Climate Litigation in Brazil: 2024 Report**. Rio de Janeiro: Research Group on Law, Environment and Justice in the Anthropocene (JUMA/PUC-Rio), 2024, p. 23. Available at: <https://www.juma.nima.puc-rio.br/pesquisas-litigancia-climatica>.

34 See also: MOREIRA, Danielle de Andrade et al. **Climate Litigation Bulletin in Brazil – 2022**. Rio de Janeiro: Research Group on Law, Environment and Justice in the Anthropocene (JUMA/PUC-Rio), 2022, p. 6. Available at: https://www.juma.nima.puc-rio.br/_files/ugd/a8ae8a_91656c738e2447b3a97f2030d717a7de.pdf. MOREIRA, Danielle de Andrade et al. **Climate Litigation Bulletin in Brazil – 2023**. 2nd ed. Rio de Janeiro: Research Group on Law, Environment and Justice in the Anthropocene (JUMA/PUC-Rio), 2023, p. 9. Available at: https://www.juma.nima.puc-rio.br/_files/ugd/a8ae8a_b61968c7b2c043bbb108cde9c806d586.pdf

35 Strategic Project supported by the 4th CCR/MPF and approved by the Office of the Prosecutor General of the Republic under Administrative Order PGR/MPF No. 636 of July 9, 2018, which, by VOTE No. 500/2023/4th CCR, in the 27th Ordinary Session of July 21, 2023, of the collegiate body of the 4th Coordination and Review Chamber of the MPF, in the records of PGEA – 1.00.000.004843/2023-24, unanimously decided to convert the Water Connection Project into an Initiative linked to the 4th CCR/MPF, highlighting the relevance of this measure as a way to ensure the continuity and improvement of actions aligned with the 2030 Agenda for the SDGs – Sustainable Development Goals, aimed at water governance in the country.

36 Available at: http://www.defesacivil.pr.gov.br/sites/defesa-civil/arquivos_restritos/files/documento/2018-12/MarcodeSendaiPortugues.pdf

The implementation of structural decisions, combined with the best practices of risk management and compliance for implementation, endowed with formal commitments of participatory inter-institutional cooperation with various sectors of society in collaborative governance, are solid criteria that strengthen the legitimacy and effectiveness of structural decisions, collectively constructed through open and transparent channels of dialogue and social participation, so as to contribute effectively to facing complex demands in a challenging scenario of many bottlenecks and few real dialogical and inclusive spaces. Such innovative collaborative governance structures, like the MPF's Water Connection Project, with its solution-oriented methodology of dialogical articulation, invariably embed effectiveness and positive impacts at the level of implementation results, on a large scale, meeting the structural demands in environmental and climate litigation across various sectors of society.

Indeed, given that the vast majority of environmental and social disputes are structural. This is also highlighted in the business sector. The "ESG Litigation" Guide from the World Business Council for Sustainable Development (WBCSD) of November 2020 highlights the potential of structural litigation to profoundly impact a company on a large scale, as it strikes at the core of its business purpose, encompassing issues of reputation, corporate values, risk management, and relationships with investors, suppliers, customers, employees, and other stakeholders.³⁷

With the aim of discussing and promoting a better understanding of issues related to ESG Principles - Environmental, Social, Governance - the Water Connection Project conceived and coordinated the production of the book entitled "Sustainable Finance: ESG, Risk Management, Compliance and SDGs",³⁸ which was published jointly in December 2021 by the CNJ - National Council of Justice, CNMP - National Council of the Public Prosecutor's Office, ABRAMPA, and the Water Connection Project-MPF. The book aims to bring together regulatory, legal, and technical contributions from authorities and specialists from the public powers and bodies (CGU, CVM, BACEN, TCU, judiciary, and others), representatives from the business, financial, and academic sectors, NGOs, and the third sector, as well as corporate and public governance practices that honour the best governance practices, control and risk management instruments, the UN SDGs, and the ESG Principles.

The same applies to the structural results derived from the solution-oriented strategic methodology of the Water Connection Project at the level of ESG structural litigation or climate litigation involving large-scale complex causes, for public interest objectives that demand changes in governance structures. The MPF's Connection Project, through a solution-oriented methodology, builds collective strategies and innovations, with intelligence, mediation, and communication tools, for risk control and social control, in a collaborative governance between the Public Prosecutor's Office and various actors in society, from the public, business, financial, and academic sectors.

If the dialogical-deliberative legitimacy and the effectiveness of climate justice depend on the level of participatory democratic performance of society and on solution-oriented models of risk management and legitimate processes of active listening and dialogical persuasion, at the level of implementing structural decisions, the effectiveness of the execution will depend on the degree of risk control, with an expansion of precaution and the sphere of sanctioning justice. For this reason,

37 Available at: <https://www.wbcsd.org/Programs/Redefining-Value/Making-stakeholder-capitalism-actionable/Enterprise-Risk-Management/Resources/ESG-Litigation-Roadmap>, last accessed on July 29, 2024.

38 Available at: <http://www.mpf.mp.br/regiao3/sala-de-imprensa/noticias-r3/conexao-agua-lanca-obra-coletiva-financas-sustentaveis-esg-compliance-gestao-de-riscos-e-ods>, last accessed on August 15, 2025.

the anti-corruption law or the corporate compliance law expresses a new extraordinary legitimation for the sanctioning Public Prosecutor's Office, consisting of the extraordinary supplementary legitimation of command and control to execute administrative fines, legally endowing the Public Prosecutor's Office with administrative police power in its public civil actions, according to the wording of Article 20 of Law 12,846/2013.

In legal doctrine, it also prevails that "compliance or enforcement techniques lead to an 'enforcement model' with the application of sanctioning and coercive techniques for the implementation of the structural decision".³⁹ The empirical and technical approach in monitoring the implementation of the agreement or collective decision tends to start from a general, flexible, and provisional standard, from both a substantive and procedural point of view, for the remediation of the structural problem, so as to even foresee how the implementation will be measured, with continuous participation and collaborative social control by parties and social actors, including in the choice of means of implementing the decision, in light of technical and legal deference.

The importance of the roles that can be played by private individuals, NGOs, and the private sector in protecting the environment is recognized. All these actors can also contribute greatly to the STF (Federal Supreme Court), in the figure of *amicus curiae*, as they will be in a better position to know and evaluate the decisions taken by the Public Administration which, it is imagined, will be more transparent. With this, public awareness for the safeguarding of a balanced and healthy environment is increased.

At the level of due integrated sanitation management, the Water Connection Project in practice has fostered and participated in dialogical discussion processes for the elaboration of rural sanitation plans as an integral part of true hydrological planning in the creation or revision of Municipal Basic Sanitation Plans, participating in meetings at the invitation of Basin Committees. Today, Terms of Reference with minimum technical, logistical, and legal content have been collectively constructed for the implementation of alternative individual or collective rural sanitation solutions in the PCJ Committees—Piracicaba, Capivari, and Jundiaí, and in a Term of Reference from the Brazilian Association of Sanitary Engineering (ABES) covering technical orientations and guidelines for the survey of necessary data, choice of technologies, cost assessment, and sustainable management of sanitation systems, including in isolated communities, with shared management of the rural sanitation system by the Municipal Sanitation Authorities, Secretariats of the Environment, Concessionaire, researchers, and environmental managers, in addition to the participation of the member of the Public Prosecutor's Office as an observer. This Term of Reference, prepared by the Brazilian Association of Sanitary Engineering-SP through its Technical Chamber for Health and Sanitation in isolated communities, provides a list of minimum content for the elaboration of municipal rural sanitation plans, with objectives that allow for the detection of the needs for expansion and improvement of existing rural systems for water supply, sanitary sewage, and final waste disposal; the analysis of demands for the implementation of new systems; the guarantee of the sustainability of all services and the permanent participation of the local population.⁴⁰

39 CHAYES, Abram; CHAYES, Antonia Handler. **The New Sovereignty – Compliance with International Regulatory Agreements**. Cambridge: Harvard University Press, 1995, p. 3.

40 Available at: http://abes-sp.org.br/arquivos/tr_versao_final_diagramado.pdf

The Technical Chamber for Water Use and Conservation in Rural Areas of the PCJ Committees—Piracicaba, Capivari, and Jundiaí, elaborated its own Term of Reference for the Hydrographic Basin, based on the ABES-SP Term of Reference, aligned with the current National Rural Sanitation Programme of FUNASA. The Water Connection Project of the 4th CCR/MPF has effectively collaborated with suggestions and participation in working meetings at the invitation of these Technical Chambers of Committees and Regional and Basin Agencies, based on 2 primary indicators: 1) Social mobilisation, with the protagonist participation of indigenous peoples and traditional communities, to associate inclusive education endowed with traditional ways of life and culture with projects for alternative collective sanitation solutions, and the participation of women from these communities in the implementation of indigenous or traditional sanitation, fostering the participation of community leaders and organisations, with the support of researchers, collaborators, and partners of the Water Connection project, of the Federal Public Prosecutor's Office (MPF) and 2) environmental decisions based on primary and secondary data, adding innovation to traditional technologies to increase adaptive resilience, in accordance with the Hyogo Framework (2005-2015)⁴¹ and to reduce vulnerabilities in traditional communities, promoting the permanence of the alternative collective sanitation solution system, better customised to a given community reality.

The procedural opening, including along the lines of an open society of the interpreters of the Constitution, as proposed by Häberle,⁴² which is seen today within the judicial process, in view of the holding of public hearings and the action of entities as *amicus curiae* (see the emblematic example of the STF in these matters for over a decade with the holding of judicial public hearings), allow for an ever-greater integration between case law and doctrine (and not only legal, but also with other areas of knowledge, which is particularly relevant in the field of Environmental Law). The direct intervention of specialists (legal and non-legal) and scholars in the judicial process contributes to the elaboration of case law in a more qualified manner, nourished by a more robust arsenal of information and technical precision.

The constitutional legitimacy of judicial review of administrative discretion, in terms of public policies, is recognized, privileging the normative force of constitutional principles, as well as the action of the Judge as a political agent linked to the realisation of the order of fundamental constitutional principles and values, especially in relation to complex and structural litigation such as occurs with environmental and socio-environmental issues. A map or a matrix of cross-impacts with the synergistic motricity of risks and possible damages is fundamental in strategic climate litigation, whether contentious or advisory, the configuration of which could be sought through an inter-sectoral articulation orchestrated in a solution-oriented action of the Public Prosecutor's Office. This would compensate for a structural informational failure regarding the real sustainability of positive impacts and would help in an assessment of the environmental or socio-environmental carrying capacity, in any activity or stage of the production chain that does not tarnish the product or service, or from which some defect of insecurity or defect due to inadequacy could arise, according to the Consumer Defence Code (Articles 12 and 18 of Law 8,078/1990).

41 Available at: http://www.defesacivil.pr.gov.br/sites/defesa-civil/arquivos_restritos/files/documento/2018-12/MarcodeHyogoPortugues20052015.pdf. Accessed August 15, 2025.

42 HÄBERLE, Peter. **Constitutional Hermeneutics: The Open Society of Constitutional Interpreters**. Porto Alegre: SAFE, 2002, p. 11. Translated by Gilmar Ferreira Mendes.

The innovative, reliable, and easy-to-use tool for social monitoring of water quality in each and every Brazilian municipality, *Água Boa de Beber* (agua.mpf.mp.br), based on public data from official results of human consumption water quality analyses, translatable into more than 100 languages, including for the indigenous Guarani, and awarded the Dakar Initiative seal at the 9th World Water Forum in Senegal, and built by the solution-oriented articulation of efforts from various sectors of civil society catalysed by the solution-oriented action of the MPF,⁴³ is an example of good practice and an innovative solution at the level of strategic structural litigation, which began with the holding of a public hearing for the unrestricted opening of public data on the quality of water for human consumption from the Ministry of Health (SISAGUA), which until 2018, were kept with restricted access.

The different problems presented, each with its particularities, originate from the combination of multiple factors, such as the dimensionality and isolation of the studied region, the absence of the State as a regulatory institution, intensive land-use change, large migratory flows, and irregular territorial occupation. For this reason, the “Water Connection” Project supported different initiatives both for the conservation of local biodiversity and its water resources, and actively acted in reducing the infant mortality of the Xavante People, through three complementary actions between the Xingu and Tocantins-Araguaia basins, both recognised as the cradle of the waters of the Brazilian biomes.

THE GOOD PRACTICES AND RESULTS OF THE “XAVANTE HEALTH: HUMAN RIGHT TO SANITATION PROJECT” ENCOURAGED BY THE MPF’S WATER CONNECTION

This refers to the project “Using clean technologies to build and install basic sanitary infrastructure in the indigenous Etenhiritipá village, in order to address the main causes of infant mortality,” carried out in the triennial 2018 to 2020, coordinated by researcher Dr. Fernanda Viegas Reichardt and by the Xavante chief Jurandir Siridiwe, and financed by the Embassy of Canada, with institutional articulation and encouragement provided by the MPF’s Water Connection Project. This indigenous sanitation initiative was mainly based on SDG 6.2: “Objective 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.”

To this end, the project encouraged the construction and installation of sanitary units, showers, and sinks in homes and schools; the self-management of the constructed facilities, contributing to the reduction of waterborne disease rates; and the empowerment of women in the prevention and confrontation of the causes of high infant mortality rates. To achieve the objective, the project was proposed through a partnership established between the Xavante Association of Etenhiritipá – “AXE”; the Institute of Advanced Studies of the University of São Paulo – “IEA/USP”; and the Advanced Study Centre for Social and Environmental Promotion – “Health & Happiness Project”.

Given the complex challenges presented in the execution of this project, the direct involvement of women was the indispensable factor for the success achieved. Among the fruitful results achieved, since the implementation of the indigenous sanitation project in the cerrado of the Legal

43 Federal social monitoring tool *Água Boa de Beber* for water quality, available at <https://agua.mpf.mp.br/>, developed under collaborative governance within the scope of the Water Connection Project of the 4th Coordination and Review Chamber of the Federal Prosecution Service (<https://conexaoagua.mpf.mp.br/>). Last accessed July 29, 2024.

Amazon until mid-2024, no infant death due to waterborne disease has been recorded, whereas before, indigenous infant mortality was nine times higher than the national average. The implemented indigenous sanitation project also played an essential role in confronting the Covid-19 pandemic.

Institutionally, this concluded indigenous sanitation project led the Water Connection/4th CCR to be one of the finalists in the World Water Forum competition in Kyoto and to be awarded as a Dakar Initiative at the 9th World Water Forum in Senegal in 2022. This initiative, combined with the social monitoring tool for water quality Água Boa de Beber, also led the Water Connection to an official presentation at the UN Water Conference (2023), in New York/USA.⁴⁴

Image 1. Female Mobilization in the Project. Photo: Utebrewe Xavante. September 2018.



Image 2. Female Participation in a sanitation workshop. Photo: Utebrewe Xavante.



44 More information available at: <https://www.youtube.com/watch?v=PFIOw7rJk3c&t=1s>.

Institutional innovations come not only from governments but from social movements and non-governmental organisations in a regime of engaged collaborative governance, and beyond national borders, according to the visionary outlook of Jürgen Habermas, “Institutional innovations are not realized in societies in which their political elites are generally capable of such initiative if they do not find resonance and support in the—previously reformed—value orientations of their populations”.⁴⁵ The integration of intergenerational and global solidarity is being recognised in the integration of solution-oriented paths and initiatives tending towards the effectiveness of participatory environmental and climate justice, under the primacy of a collective ecological governance, with legal certainty, effectiveness, and socio-environmental pacification.

CONCLUSIONS

Undoubtedly, environmental and climate justice are primordial pillars for confronting the global challenges related to social inequality and the climate and environmental crisis, associated with the need to increase adaptive climate resilience and reduce vulnerabilities and disaster risks in the face of the social, socio-environmental, and environmental impacts of climate change. The interdisciplinary approach and the integration of substantive and procedural rights are fundamental to ensuring equity and inclusion in public policies.

There is a crucial role for civil society and collaborative initiatives, such as those of the MPF’s Water Connection Project, in promoting differentiated environmental governance structures and in resolving structural litigation. Examples like the social monitoring tool Água Boa de Beber (agua.mpf.mp.br) and the “Xavante Health” project demonstrate that local actions, based on sustainable solutions and community participation, can generate significant positive impacts, such as effective support for the improvement of public policies in environmental and public health, reduction of infant mortality, and the strengthening of resilience in the face of climate crises.

There have been advances, but there are still many institutional and structural challenges that limit the effectiveness of environmental and climate policies. The absence of adequate infrastructure, informational failures, and the need for greater transparency, the absence of solution-oriented articulation, and the deficit of inter-sectoral engagement are obstacles that need to be overcome. The ratification of international treaties and the strengthening of compliance mechanisms are essential steps to consolidate robust environmental governance.

Climate and environmental justice depend on an integrated approach that combines social participation, transparency, and innovative solutions. The construction of sustainable paths requires joint efforts among governments, Public Prosecutor’s Offices, civil society, and the private sector, with a focus on inclusion and equity. Only in this way will it be possible to face the climate challenges and promote resilient and sustainable development.

45 HABERMAS, Jürgen. **The Postnational Constellation – Political Essays** (1929). São Paulo: Littera Mundi, 2001, p. 74. Translated by Márcio Seligmann Silva.

PUBLIC PROSECUTOR'S OFFICE RESPONSE TO SOCIO-ENVIRONMENTAL DISASTERS AND THE GABCLIMA INITIATIVE

Sílvia Cappelli¹

1. INTRODUCTION

The climate emergency has transformed our world, underscoring the fact that all aspects of life are interconnected and that our survival as a species depends on collective health and solidarity.

Rio Grande do Sul lies in a region particularly vulnerable to severe weather conditions, due to its geomorphology and atmospheric circulation patterns. The impacts of climate change in the state are marked by a combination of extreme events, including significant shifts in regional precipitation patterns.

Over recent years, climate change has intensified meteorological phenomena in the state. From 2020 to 2022, Rio Grande do Sul endured a severe three-year drought. In 2023, three extreme weather events triggered floods across several regions in the second half of the year.

The prolonged drought led over 70% of municipalities to declare a state of emergency in early 2023. In June, an extratropical cyclone struck Caraá, isolating residents as the Rio dos Sinos rapidly overflowed. This event marked the beginning of a series of disasters that culminated in major flooding in the Taquari Valley in September. In November 2023, torrential downpours affected nearly 700,000 people. Rivers swelled to 27 meters, and Lake Guaíba rose to 5.37 meters. These events cannot be explained solely by El Niño, but also by the region's heightened susceptibility to extreme weather.

A socio-environmental disaster occurs when human activity overlaps with atmospheric, hydrological, or geological phenomena. Without human presence, such occurrences would be extreme natural events rather than disasters.

Several factors contribute to disasters: occupation of high-risk areas, weakened environmental legislation, inadequate alert systems, insufficient data from limited studies on river topography and bathymetry, and low public risk awareness. Governance challenges also play a role, with responsibilities fragmented across federal, state, and municipal levels, and significant resource disparities among municipalities within the same watershed.

1 Prosecutor of Justice, Coordinator of GabClima MPRS.

The disasters of 2023 and 2024 underscored the urgent need for planning, preventive investment, and coordinated action. Multidisciplinary approaches and simultaneous engagement with multiple political actors became indispensable.

Legal specialization often hinders a comprehensive understanding of disasters. In response, the Public Prosecutor's Office of Rio Grande do Sul established the Climate Studies Office – GabClima, an unprecedented institutional initiative.

2. CLIMATE STUDIES OFFICE – GABCLIMA

GabClima was created on November 7, 2023, through Provision No. 90/2023-PGJ², with the mission of developing a permanent institutional policy to address the climate emergency and related disasters. Its objectives include identifying vulnerabilities, mapping needs, and adapting the Public Prosecutor's Office to this new reality.

Linked directly to the Office of the Attorney General, GabClima comprises the Support Centers of the Public Prosecutor's Office (MPRS), prosecutors and district attorneys operating in disaster-affected areas, regional prosecutor's offices for hydrographic basins, and the Technical Assistance Cabinet.

Climate emergency response is now considered an institutional priority—an inherently challenging commitment. Internally, initiatives have included measuring greenhouse gas emissions from MPRS³ headquarters through the “MP Less Carbon” campaign, alongside measures to procure clean energy in the free market.

In a pioneering move among state public prosecutor's offices, the MPRS, through GabClima and the General Directorate, contracted the exclusive supply of electricity from renewable sources. This agreement not only generates annual savings of R\$ 1.05 million but also marks the first concrete step toward implementing a public policy for reducing carbon emissions⁴.

The experiences and coordinated actions of all institutional bodies during the 2024 flood are documented in the e-book Socio-Environmental Disasters in Rio Grande do Sul: The Role of the Public Prosecutor's Office, available on GabClima's webpage⁵. GabClima also contributed to the National Strategic Plan for Public Prosecutor's Action in Combating Forest Fires and Their Impacts⁶ and the National Pact for Sustainable and Disaster-Resilient Cities⁷, both initiatives of the CNMP.

Additionally, GabClima and the Operational Support Center for Environmental Protection, in partnership with the State Civil Protection and Defense Sub-Chief, launched the Basic Course on Civil Protection and Defense⁸. This unprecedented initiative trained and standardized procedures among State Civil Defense teams and municipal coordinators.

2 <https://www.mprs.mp.br/legislacao/provimentos/16907/>

3 <https://storage2.me-qr.com/pdf/7f9de5c8-2c21-4d00-bd11-a03cbeb78ff4.pdf>

4 <https://www.mprs.mp.br/noticias/62740/>

5 <https://www.mprs.mp.br/media/areas/gabclima/arquivos/ebookgabclima.pdf>

6 https://www.cnmp.mp.br/portal/images/Publicacoes/documentos/2024/plano_incendios.pdf

7 <https://www.mprs.mp.br/media/areas/imprensa/arquivos/pactocidadesresilientes.pdf> e <https://www.mprs.mp.br/noticias/ambiente/61329/>

8 <https://www.mprs.mp.br/noticias/ceaf/61921/>

This innovative work earned the Environmental Excellence Seal in the category Socio-Environmental Disasters: Initiatives for Prevention, Mitigation, Preparedness, Response, and Reconstruction, awarded by the CNMP's Environmental Commission⁹.

3. THE PUBLIC PROSECUTOR'S OFFICE IN THE DISASTERS OF RIO GRANDE DO SUL

Even before the floodwaters of May reached Porto Alegre, the Public Prosecutor's Office convened and created a crisis cabinet, relocating its headquarters to the Specialized Prosecutor's Office building, situated in a non-flooded area of the capital. A collective effort was undertaken, with action in previously unimaginable areas—a true turning point, marking a new path of learning and organization.

Guided by empathy and the principle of human dignity, prosecutors and attorneys maintained a strong presence in affected communities and shelters, both in the capital and rural areas. Their initial response focused on direct support, with voluntary daily visits to shelters to assess needs. Teams departed at 8 a.m., following lectures from the MEDIAR department, and returned for evening feedback sessions to refine operations. These efforts uncovered shelters taken over by criminal factions, requiring police intervention. Meanwhile, the Deputy Attorney General for Management swiftly developed applications to track and support both displaced people and animals.

A donation collection and distribution center was also established. In urban planning, site visits were conducted to levees, pump houses, and high-risk neighborhoods such as Arquipélago in Porto Alegre, while technical assistance was provided to municipalities affected by landslides, including Gramado and communities in the Taquari-Antas basin.

In the protection of public assets, the Office combated misinformation by removing false publications, blocking fraudulent PIX accounts, and overseeing the use of resources and donations, including electoral implications. Actions were taken against municipalities that falsely declared a state of calamity.

Consumer protection measures addressed price gouging - such as inflated gasoline prices - ensured telecom companies shared networks, secured tariff agreements, and prevented flood-damaged goods from reentering the market. Additional actions targeted show cancellations, airfare spikes, and abusive payroll loans.

In human rights, task forces renewed lost documents, facilitated access to social benefits, and opened channels for reporting missing persons. Procedures for social rent and temporary housing were implemented. Visits to Long-Term Care Institutions were conducted, with evacuations carried out when necessary.

Environmental measures included creating and maintaining animal shelters, promoting adoption and neutering campaigns, and intervening to close illegal dumps that posed public health risks. Waste management and dam safety monitoring were prioritized.

9 <https://www.mprs.mp.br/noticias/61417/>

In health, the Office developed preventive care guides, launched the “Acolhe MP” support channel for members and staff, and provided guidance on cleaning, vaccination, and disease prevention.

In education, the Office supported students and teachers, assessed impacts on schools, distributed supply kits, and coordinated restoration efforts. In child and youth protection, a protocol was established to prevent and address violence in shelters.

GAECO (Special Task Force to Combat Organized Crime) operations resulted in 21 search and seizure warrants and three suspensions from public office. Regarding the Task Force on Abusive Pricing, over 600 complaints were received, 300 establishments were inspected, and 65 were fined. 163 PIX keys were blocked, and 18 fake profiles were taken down. 244 Long-Term Care Institutions and Foster Homes were monitored by the Public Prosecutor’s Office, and a total of 580 shelter visits were conducted.

4. THE PUBLIC PROSECUTOR’S OFFICE AFTER THE DISASTER

Following the critical phase of the disaster, the Public Prosecutor’s Office shifted its focus to mitigation, recovery, and reconstruction efforts, as well as prevention of future disasters.

In this context, the Public Prosecutor’s Office of Rio Grande do Sul (MPRS) is identifying projects within the “Plano Rio Grande” that intersect with its areas of operation, in order to prioritize monitoring, define terms of reference, oversee contracting processes, and allocate resources. Additionally, the Specialized Prosecutor’s Office in Porto Alegre created a working group to monitor the Metropolitan Flood Control Plan.

A Cooperation Agreement was signed with the Federal Comptroller General’s Office to establish a working group named “GT State of Calamity in RS – Transparency, Integrity, and Oversight”; with the State Court of Auditors and the Public Prosecutor’s Office of Accounts for interinstitutional cooperation in external control, training activities, information exchange, and technical-scientific collaboration, especially on issues related to climate disasters; and with the company AECOM to assist in formulating the reconstruction strategies for the state and disaster prevention following the floods of May this year.

The MPRS is also creating a support network to prioritize soil recovery, seeking partnerships with EMBRAPA, EMATER, and the Boticário Group Foundation for Nature Protection.

Furthermore, a priority was established for the second half of 2025 and the year 2026: to promote proactive and cooperative action by the Public Prosecutor’s Office of Rio Grande do Sul in municipalities especially impacted by the disasters, aiming at prevention and preparedness for future events, both internally and at the municipal level. The project, titled “DISASTER PREVENTION AND PREPAREDNESS: THE PROSECUTOR’S PERSPECTIVE”, seeks to raise awareness among Prosecutors and staff in the region about disaster-related issues, strengthen local resilience to extreme climate events, and foster interinstitutional coordination, technical training, and awareness among stakeholders with responsibilities related to the topic.

5. CONCLUSION

This summary of the Rio Grande do Sul Public Prosecutor's Office's actions during the 2023 and 2024 floods has necessarily condensed a wide range of initiatives. For a full account - particularly of the May 2024 flood - reference should be made to the e-book mentioned earlier.

We assumed roles beyond our traditional scope, confronting situations rarely encountered in our profession. This period was defined by unprecedented challenges, invaluable learning, and, above all, unwavering resilience.

We are invited to reflect on the depth and breadth of the work carried out in response to the tragedies that struck our state in 2023 and 2024.

These tragedies taught us that effective disaster response requires cross-sectoral and collaborative action. We learned that integration among the various departments and sectors of the Public Prosecutor's Office is essential for a coordinated and efficient response. Areas such as environment, urban planning, human rights, consumer protection, public assets, criminal justice, education, child and youth protection, and violence against women were all mobilized. Additionally, the work of the Crisis Cabinet, "Mediar", Technical Assistance Cabinet, and Communications Department demonstrated that internal collaboration is vital to overcoming complex challenges.

These experiences marked a turning point, ushering in a new phase of action for the Public Prosecutor's Office of Rio Grande do Sul and Brazil. The tragedies demanded swift, innovative, and creative responses - even under adverse conditions such as power and internet outages. We proved to be mediators and catalysts of unique actions, coordinating efforts that transcended physical and institutional limitations. Thus, a new Public Prosecutor's Office emerged in Rio Grande do Sul - better prepared and closer to society.

One of the most significant aspects of this transformation was the renewed direct contact with society. For a long time, our work had distanced itself from the streets and human interaction, confined to offices and documents. However, the tragedies forced us out of our rooms and back to the people, addressing their real needs. This return to our roots reminded us of the true purpose of the Public Prosecutor's Office: to serve society in a direct and effective manner.

The experiences brought by the tragedies in Rio Grande do Sul remain a powerful reminder that, in times of crisis, unity and compassion are our greatest strengths.

STRATEGIES TO PROMOTE THE ADVANCEMENT OF THE MUNICIPAL CLIMATE AGENDA BY THE BRAZILIAN PUBLIC PROSECUTOR'S OFFICE

Vinicius Lameira Bernardo¹

This article aims to address strategies available to the Brazilian Public Prosecutor's Office aimed at promoting climate planning at the municipal level, both through judicial and extrajudicial instruments. The strategies addressed are as follows: elaboration of municipal policies to combat climate change, operation of climate collegiate bodies and elaboration of municipal climate action plans. At the end, the actions of the MPRJ related to the theme are presented.

The **Municipal Climate Action Policies** are a central point and consist of the elaboration of a municipal law on the subject. I highlight here the initiative of the Public Prosecutor's Office of the Court of Auditors of Amazonas (MPC-AM),² which made available to the municipalities of Amazonas a model of a municipal draft bill to assist in the creation of their legal frameworks, an initiative that can be reproduced by the other members of the Public Prosecutor's Office.

The model made available is a powerful strategy to boost the public debate in municipal instances regarding the edition of legislation disciplining local actions related to mitigation, adaptation, governance, financing and research. The following provisions stand out from the general structure of the draft bill: General provisions; climate actions in charge of the municipalities; principles, goals and instruments; articulation with sectoral policies; articulation with budget laws and climate fund and Guidelines for climate change adaptation plans. We will briefly comment on the main points of the draft bill.

The policy must be **based on scientific evidence**, linking to the reports of the Intergovernmental Panel on Climate Change (IPCC), thus ensuring the rationality of municipal actions and avoiding decisions that are out of line with the climate goals of the Brazilian State. Strategies should include **mitigation, adaptation, and financing with defined deadlines**, as well as **incentive economic instruments** such as Payment for Environmental Services (PES) and carbon credits.

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2 <https://mpc.am.gov.br/2025/05/mpc-am-disponibiliza-modelo-de-pl-para-atuacao-climatica-nos-municipios/#:~:text=Com%20o%20objetivo%20de%20colaborar%20com%20os,modelo%20de%20anteprojeto%20de%20lei%20municipal%20para>

Environmental licensing is highlighted, with the need for **climate impact assessment** (impact on GHG concentration and ecosystem services), use of the **best available technology** (less emitting), and carrying out **inventories, mitigation and compensation**. At this point, the reader is referred to Abrapa's technical note that discusses the insertion of the climate variable in environmental licensing processes³.

Also included in the draft bill is the express adoption of principles of environmental law. I highlight some already traditional principles, such as prevention and precaution, and others that have recently been applied by the higher courts in cases involving environmental protection, such as prohibition of retrogression and insufficient protection. **Climate Justice**, a fundamental principle, is also remembered, focusing on the protection of peoples and communities most exposed to risks. I add here that, in terms of climate justice, the concern must also extend to groups impacted by the transition to a low-carbon economy, whose jobs may be lost, such as the coal sector.

An extremely important forecast is the requirement that the municipality's sectoral goals be, at least, as ambitious as Brazil's Nationally Determined Contribution (NDC) to the Paris agreement, and appropriate to the local reality, with an accessible monitoring panel, in order to provide ample transparency and publicity in the monitoring of the city's strategies.

The document also lists a series of instruments necessary to achieve the objectives of the municipal climate change policy, namely: Municipal Adaptation Plan, with a deadline for preparation; Sectoral strategies for mitigation and expansion of sinks; Municipal contingency and risk reduction plans; Municipal Climate Council; Municipal Climate Fund, and Sustainable Logistics and Carbon Inventories.

Articulation with sectoral policies, budget laws and the creation of a climate fund were also contemplated. The draft bill requires compliance with climate policy in all sectoral policies, works, programs, actions and projects, under penalty of nullity. It establishes a minimum percentage of the municipal budget for climate actions and the need for regulation of the Fund, with a prohibition of contingencies and extensive revenue forecasting, in order to ensure sufficient resources for the funding of municipal mitigation and adaptation actions.

In addition to the municipal climate change policy, a second point of attention is the municipal collegiates, a powerful tool for boosting municipal climate planning, as they promote the opening of the political process to civil society, increasing the pressure points for the agenda to advance locally. As for the collegiate bodies, we highlight the need to provide for the participation of civil society, academia, the public sector and the business sector; definition of the collegiate's attributions, including the competence to discuss the preparation, monitoring and updating of the climate plan; holding periodic meetings, in an easily accessible place and with remote participation expected; Broad transparency and publicity.

In order to qualitatively deepen the discussions, it is suggested the creation of Thematic Chambers, as was done with the State Forum on Climate Change of the State of Rio de Janeiro⁴, which provided for the creation of the following sectoral chambers: Thematic Chamber of Mitigation

3 chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://abrapa.org.br/file?url=/wp-content/uploads/2023/09/Avaliacao-de-impactos-climaticos-em-empreendimentos-de-energia-fossil-estrategias-juridicas-para-o-licenciamento-ambiental.pdf

4 instituted by State Decree No. 46,912/2020 and amended by Decree No. 47,162/2020 as an instrument of the State Policy on Global Climate Change and Sustainable Development, implemented by State Law No. 5,690/2010.

of GHG Emissions and Decarbonization; Thematic Chamber of Adaptation and Resilience to Climate Change; Thematic Chamber of Research on Climate Change; Thematic Chamber of Environmental Education and Social Communication; and Thematic Chamber of Climate Justice.

Finally, we emphasize the need for the Brazilian Public Prosecutor's Office to supervise and demand the preparation of municipal climate action plans. A climate action plan can be described as a strategic instrument that guides local actions to address the challenges of climate change. It establishes goals and guidelines to reduce greenhouse gas emissions, promote adaptation to climate impacts, and integrate sustainability into public policies. The plan involves environmental diagnosis, social participation, definition of priorities and continuous monitoring, aiming to make the municipality more resilient, fair and environmentally responsible.

The National Council of Attorneys General has a statement recommending to the members of **the Brazilian Public Prosecutor's Office the establishment of procedures aimed at monitoring the preparation, execution and improvement of federal, state and municipal climate action plans**, ensuring that the ambitions of the states and municipalities are at least equivalent to the nationally determined contribution presented by the Brazilian state to the Paris Agreement.

In reinforcement of this statement, we highlight statement 66 of the Center for Judicial Studies of the Federal Justice Council (CEJ/CJF), approved during the I Legal Conference on the management of prevention and management of environmental crises⁵. According to the statement, *the environmental structural processes should favor the dialogued elaboration of plans and schedules for implementation, evaluation and review of the necessary reforms, always with the integration of all interested parties, including the agencies specialized in the protection of the environment and the affected communities, unless this is not possible*. As can be seen, the statement supports the claim now defended that municipalities be required to provide climate action plans and their respective implementation schedule.

The requirement for the implementation of plans by the executive branch, in order to make up for a constitutionally relevant omission in the protection of fundamental rights, also finds support in THEME 698 of the STF, according to which *"The judicial decision, as a rule, instead of determining specific measures, must point out the purposes to be achieved and determine the public administration to present a plan and/or the appropriate means to achieve the result"*.

Climate action plans must be prepared in line with the National Climate Change Policy and Law 14,904/2024, which establishes guidelines for the preparation of adaptation plans. The latter presents important provisions in this context, such as the duty to align plans with the Paris Agreement and the Brazilian NDC, adoption of nature-based solutions, need for social participation, grounding in scientific evidence from the IPCC, and provision for financing by the Climate Fund.

If the Public Prosecutor's Office chooses to start demanding municipal climate action plans in a strategic way, we suggest some guiding criteria for this choice. Priorities for the preparation of plans may include capitals, vulnerable municipalities (by consulting the federal ICM or hydrological/geological risk maps), municipalities that have already declared a public calamity, and municipalities with significant GHG emissions (by consulting SEEG data and state inventories).

5 <https://www.cjf.jus.br/cjf/noticias/2025/janeiro/cej-publica-caderno-de-enunciados-da-i-jornada-juridica-de-prevencao-e-gerenciamento-de-crisis-ambientais>

It is suggested to the members of the Brazilian Public Prosecutor's Office that when dealing with the fight against global warming, they seek to act in a network, standing shoulder to shoulder with partners whose purposes and competencies on the subject improve ministerial performance. The mapping of these partners includes universities, the third sector (ICLEI, UN-Habitat, C40), and government articulation with Public Defenders and Courts of Accounts. As for the courts of accounts, we note the launch of the joint recommendatory note ATRICON-IRB-CNPTC No. 04/2024⁶ - on the need for a priority, systemic and uniform action with regard to climate mitigation and adaptation actions.

The **scale of the plans** should also be considered, as the preparation of the plan for a single municipality may not be the best option, due to technical or financial obstacles of the municipality. In light of the specific case and local peculiarities, it is possible to foresee the elaboration of plans for a set of municipalities located in the same hydrographic basin, which are part of the same metropolitan region or that are already gathered in a consortium.

Integration with other plans, such as the Municipal Master Plan (which must be adjusted to include mitigation and adaptation measures according to Law 14.904/2024) and water resources plans, is crucial. We note the edition of statement 46 of the CJF, according to which *"municipalities are required to prepare and review their master plans to adjust them to arts. 42-A and 42-B of the Statute of Cities; and must also introduce in its master plans, measures to mitigate and adapt to climate change, contemplated in Law No. 14,904/2024"*.

Social **participation and transparency** are essential elements to be observed in the preparation of climate action plans. It is recommended that public consultations and hearings, thematic workshops, and the guarantee of hearing of the most impacted communities, as well as the groups that will be affected by the energy transition, be included in the process, according to Law 14,904/2024 and ILO Convention No. 169.

In order to boost the performance of the members of the Public Prosecutor's Office of the State of Rio de Janeiro, the Operational Support Center of the Environmental and Urban Planning Prosecutor's Offices is in the final stages of publishing a recommendation model. The recommendation guides the municipalities of the State to prepare their climate action plans, simultaneously contemplating, and in an integrated manner, mitigation, adaptation and financing strategies.

In addition to the factual and legal reasons that impose on municipalities the duty to plan to confront climate change, the recommendation has two annexes, one contemplating the minimum content of a climate action plan to be observed by municipalities (inspired by similar documents produced by ICLEI, UN Habitat and C40), and another annex indicating to the municipalities existing financing lines in public and development banks (BNDES, Banco do Brasil, Caixa Econômica Federal) that can finance their initiatives. The same annex contains the indication of programs within the federal government and the state of Rio de Janeiro aimed at supporting and financing the preparation of local plans (resilient environment program, in the State of Rio de Janeiro, and adaptabilities program, of the Ministry of Environment and Climate)

6 <chrome-extension://efaidnbmninnibpcjpcglclefindmkaj/https://atrimon.org.br/wp-content/uploads/2024/07/NOTA-RECOMENDATORIA-CONJUNTA-04-2024-.pdf>

The federal government's adaptacidades program provides for several actions to support municipalities, and the list of municipalities that will be covered by the program has already been made available⁷. The program offers technical training for climate change adaptation planning, consisting of the provision of methodological guidelines for the construction of municipal and regional climate change adaptation plans, as well as mentoring and training for the construction of municipal or regional climate change adaptation plans. In addition, it offers information on the municipal or regional risk to climate change and lists guidelines on access to investments and financing for local adaptation actions, including: Green Climate Fund (GCF), with opportunities for adaptation and mitigation projects; Global Environment Facility (GEF); and credit lines and programs operated by development banks, such as BNDES and Banco do Brasil.

The Resilient Environment program, of the Department of Environment and Sustainability of the State of Rio de Janeiro, provides for the preparation of 34 municipal climate action plans (adaptation and mitigation), whose chosen cities had not yet been published by the closing date of this article. In addition to the preparation of municipal plans, the program offers municipalities training, preparation of territorial diagnoses, promotion of financing opportunities, a sponge city pilot program and a pilot of nature-based solutions for sustainable drainage.

Finally, it is important to register here some actions underway in the Public Prosecutor's Office of the state of Rio de Janeiro, aimed at confronting climate change.

The Specialized Action Group on the Environment develops the following actions:

- Monitoring the preparation of the State Plan for Climate Change of the state of Rio de Janeiro;
- Monitoring the execution of the municipal climate change plan of the city of Rio de Janeiro;
- Demand for the regular functioning of the climate forums of the State of Rio de Janeiro and the city of Rio de Janeiro;
- Assessment of climate impacts in the context of the environmental licensing processes of the State of Rio de Janeiro and the city of Rio de Janeiro;
- Implementation of the instruments of the state policy of Rio de Janeiro and the city of Rio de Janeiro;
- Administrative procedure on the subject of socio-environmental disasters, thoroughly investigating numerous initiatives on the subject, such as monitoring systems, hydrological and geological risk maps, existence of contingency and risk reduction plans for municipalities, inter-institutional articulation with actors at the federal, state and municipal levels to increase the capacity for disaster prevention and response, among others.

The operational support center for the environmental and urbanism prosecutors' offices has been developing the following actions:

⁷ <https://www.gov.br/mma/pt-br/composicao/smc/adaptacidades>

- Development of strategies that intensify and improve the performance of members in the fight against deforestation, such as access to georeferencing and remote sensing platforms, such as Brasil Mais, Map Biomas and Olho no verde (a program of the government of the state of Rio de Janeiro) and training of members and technical teams for better use of available technologies;
- Access to CAR and Sinaflor;
- Support material to combat environmental crimes;
- Implementation, still under development, of an environmental damage calculator developed by the Public Prosecutor's Office of Mato Grosso (Siscal MPMT), which will include the quantification of climate damage;
- Production of support material for prosecutors on the topic of socio-environmental disasters;
- Agreement with the Rural University and the Federal University of Rio de Janeiro for joint action in the analysis of the climate action plan of the city of Rio de Janeiro;
- Model of Recommendation for the preparation of Integrated Municipal Climate Action Plans and Annex minimum content;

In view of the urgency imposed by the climate crisis, it is essential to strengthen the judicial and extrajudicial action of the Public Prosecutor's Office in the promotion and inspection of the municipal climate agenda. As an institution constitutionally dedicated to the defense of fundamental rights and the legal order, the Public Prosecutor's Office has a strategic role in inducing environmental public policies, accountability for omissions, and interinstitutional articulation. The action of subnational entities, especially municipalities, is decisive for confronting global warming, as it is in the local territory that the impacts are manifested with greater intensity and where responses can be more effective. Thus, the active engagement of the Public Prosecutor's Office contributes not only to the advancement of climate governance, but also to the construction of more resilient, inclusive, and sustainable cities.

SOCIO-ENVIRONMENTAL DISASTERS AND RESILIENCE: A LEGAL AND PRACTICAL ANALYSIS BASED ON THE EXPERIENCE OF PETRÓPOLIS

Zilda Januzzi Veloso Beck¹

Summary: This article proposes an analysis of risk and socio-environmental disaster management, with a special focus on the experience of the municipality of Petrópolis, State of Rio de Janeiro, following the extreme events of 2022 and the pursuit of resilience. Based on the premise that disasters result from the interaction between extreme meteorological phenomena and social and urban vulnerability, the article explores planning, execution, and awareness strategies adopted by public authorities, driven by the Public Prosecutor's Office and civil society participation. It highlights structural and non-structural measures implemented to enhance the city's resilience, including alert systems, drainage infrastructure, training, and community engagement. It also addresses the role of the Public Prosecutor's Office in mediating and overseeing these actions in building safer and more resilient communities.

1. INTRODUCTION: THE CHALLENGE OF SOCIO-ENVIRONMENTAL DISASTERS

Socio-environmental disasters represent one of the greatest threats to sustainable development and the safety of populations, especially in countries with high social vulnerability and precarious infrastructure, such as Brazil. Understanding these events goes beyond the mere occurrence of an extreme natural phenomenon and its impacts on ecosystems; disasters must also be understood in their social dimension.

According to the perspective adopted by Law 12.608/12, a disaster is defined as the result of an adverse event, either natural or induced by human action, affecting ecosystems and vulnerable populations, causing significant human, material, or environmental damage and economic and social losses.

This equation between adverse event (hazard) and vulnerability results in disaster, emphasizing that catastrophe is not merely an act of nature, but a product of the complex interaction between intensified natural processes and the social, economic, and urban conditions of a city.

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The events of 2022—both on February 15 and March 20 in Petrópolis—brought to light the urgency of discussing the relationship between disasters and climate change, and what must be done to adapt communities to the reality of these events. The intensification and recurrence of extreme phenomena, such as heavy rains and the triggering of mass movements and floods, highlight the pressing need for adaptation and mitigation.

The State of Rio de Janeiro, in particular, appears in the disaster atlas developed by the Ministry of Regional Development as the federative unit with the highest number of disaster-related deaths in the country. Within this concerning scenario, the city of Petrópolis unfortunately stands out as the deadliest city in Brazil for disasters of natural origin.

This alarming reality led to the worst disaster in its history, which occurred in 2022—when 241 people died due to landslides and floods—demanding planning and execution of public policies, as well as a strategy to raise awareness and ensure public investment that prioritizes and allocates the necessary resources for risk and disaster management in the city.

Thus, Petrópolis' recent experience has focused on measures to improve resilience, both in terms of resilient infrastructure and, above all, in building resilient communities.

2. THE EXPERIENCE OF PETRÓPOLIS POST-2022: TOWARD RESILIENCE THROUGH INTEGRATED MEASURES

Following the tragedies of 2022, Petrópolis undertook a multifaceted effort to strengthen its capacity to adapt to climate change through risk mitigation and resilience in the face of future extreme events. The actions implemented reflect an integrated approach, combining non-structural preparedness measures with medium- and long-term structural interventions, along with strong social and institutional engagement.

The post-2022 experience in Petrópolis is marked by diversified investments in resilience, with results already observable in a short period, such as the reduction in fatalities in subsequent disasters—recording four deaths in 2024 and none in 2025, despite intense rainfall of 302mm in 24 hours in 2024 and 324mm in 24 hours in 2025.

2.1. NON-STRUCTURAL MEASURES: PREPAREDNESS, ALERTS, AND COMMUNITY ENGAGEMENT

Resilience is built through resilient infrastructure (structural works) and resilient communities (non-structural measures). Non-structural measures are crucial for risk management, focusing on prevention, population preparedness, and rapid response capacity. In Petrópolis, these systems have undergone significant modernization: Enhanced Alert and Monitoring Systems; Meteorological Radar Acquisition Additional Radars; Community Mobilization and Training; Pilot City for Cell Broadcasting Alerts; Real-Time River Monitoring; Public Transport Safety, and Interactive Mapping.

2.2. ADDITIONAL PREPAREDNESS MEASURES AND COMMUNITY-BASED STRATEGIES

Emergency preparedness included the definition of clear protocols in contingency plans, which are reviewed annually. In addition to the civil defense contingency plan, the city also has a municipal risk reduction plan currently under revision.

Non-structural resilience measures have also been improved based on needs observed in each disaster. Among the non-structural resilience actions adopted from 2024/2025, the following stand out:

Suspension of Classes; Optimization of Support Points; Decentralization of Civil Defense Operations and Operational and Logistical Reinforcement.

Additionally, the Municipal Guard began patrolling support points, contributing to safety and organization, aiming to prevent and resolve conflicts that may arise in these locations.

Communication with the population also became more effective through meteorological bulletins, social media, and access to information on the municipal Civil Defense website. Transparency was enhanced through the Civil Defense's interactive map, which displays escape routes and support points, allowing citizens to plan their actions with crucial self-protection information.

The Risk Map of Petrópolis was updated and finalized in 2024 and is accessible to all on the website of the Department of Mineral Resources (DRM).

Petrópolis was also selected by the State Government of Rio de Janeiro to participate in the "Inclusive and Sustainable Rio" program and the "Resilient Mountain Region" program.

Currently, the city has a temporary shelter for disaster victims, located in a building acquired by the Municipality of Petrópolis, with thirty-two humanized apartments designed to ensure privacy for those affected.

The Piabanha Committee signed a contract with Eco Tools Engenharia LTDA to define a structure for managing, operating, and maintaining the micro and macro drainage systems of Petrópolis.

Furthermore, the Piabanha Committee has been a key partner of the Public Prosecutor's Office in discussions and public engagement regarding flood solutions in Petrópolis.

Finally, Petrópolis was selected in 2025 for the Integrated Urban Development Project for the Reduction of Geo-Hydrological Disaster Risks.

2.3. STRUCTURAL MEASURES: INFRASTRUCTURE INTERVENTIONS

Structural measures are physical interventions in the environment aimed at reducing vulnerability to disasters. Petrópolis has benefited from significant investments in disaster risk mitigation and reconstruction of affected areas. Some actions that clearly contribute to the city's resilience include: INEA's Integrated Study of the Piabanha Basin; Flood Mitigation in the Historic Center; - Slope Containment Works - PAC Selections 2025.

3. LEGAL IMPLICATIONS

The complexity of disaster management requires coordinated action from different levels of government and civil society, with a strong legal foundation.

The Public Prosecutor's Office plays a role in mediating and overseeing risk and disaster management actions. Vulnerability to disasters is also a matter of human and social rights.

It is essential to emphasize that prevention, mitigation, and preparedness for disasters must be permanently included in government agendas.

The absence or failure to implement these measures may constitute specific omissions and lead to liability. The primary institutional goal should be promoting institutional and social engagement and reducing the number of deaths and people affected by disasters.

Petrópolis has pursued coordinated action among institutions and vulnerable populations, aiming to improve outcomes through a shared responsibility model. The reduction in fatalities demonstrates that the choices made are on the right path.

4. CONCLUSION: TOWARD RESILIENT AND SAFE COMMUNITIES

The post-2022 experience of Petrópolis is a testament to the complexity and urgency of socio-environmental disaster management. The city has shown a commitment to transforming disaster into a catalyst for resilience.

Through a comprehensive set of resilience investments, Petrópolis seeks to redefine its future. The city's journey toward resilience is a continuous and challenging process, but the actions implemented demonstrate a promising path toward building safer and more aware communities.

BIBLIOGRAPHY:

ASSUMPÇÃO, Rafaela dos Santos Facchetti Vinhaes; PAIVA, Julieta; COSTA, Cláudia Karina Wilberg; CORTINES, Erika; SANTOS, Laize Rafaelle Aguiar dos; DANTAS, André. Petrópolis: existem soluções para suas inundações? In: ENCONTRO NACIONAL DE ÁGUAS URBANAS, 15.; SIMPÓSIO DE REVITALIZAÇÃO DE RIOS URBANOS, 5., 2024, Petrópolis. Anais [...]. Petrópolis: Comitê Piabanha, 2024. Disponível em: <https://www.comitepiabanha.org.br>. Acesso em: 14 jul. 2025.

BRASIL. Ministério da Integração e do Desenvolvimento Regional. Atlas Digital de Desastres no Brasil é atualizado com dados consolidados de 2024. Brasília, DF: GOV.BR, 10 jul. 2025. Disponível em: <https://www.gov.br/mdr/pt-br/noticias/atlas-digital-de-desastres-no-brasil-e-atualizado-com-dados-consolidados-de-2024>. Acesso em: 14 jul. 2025.

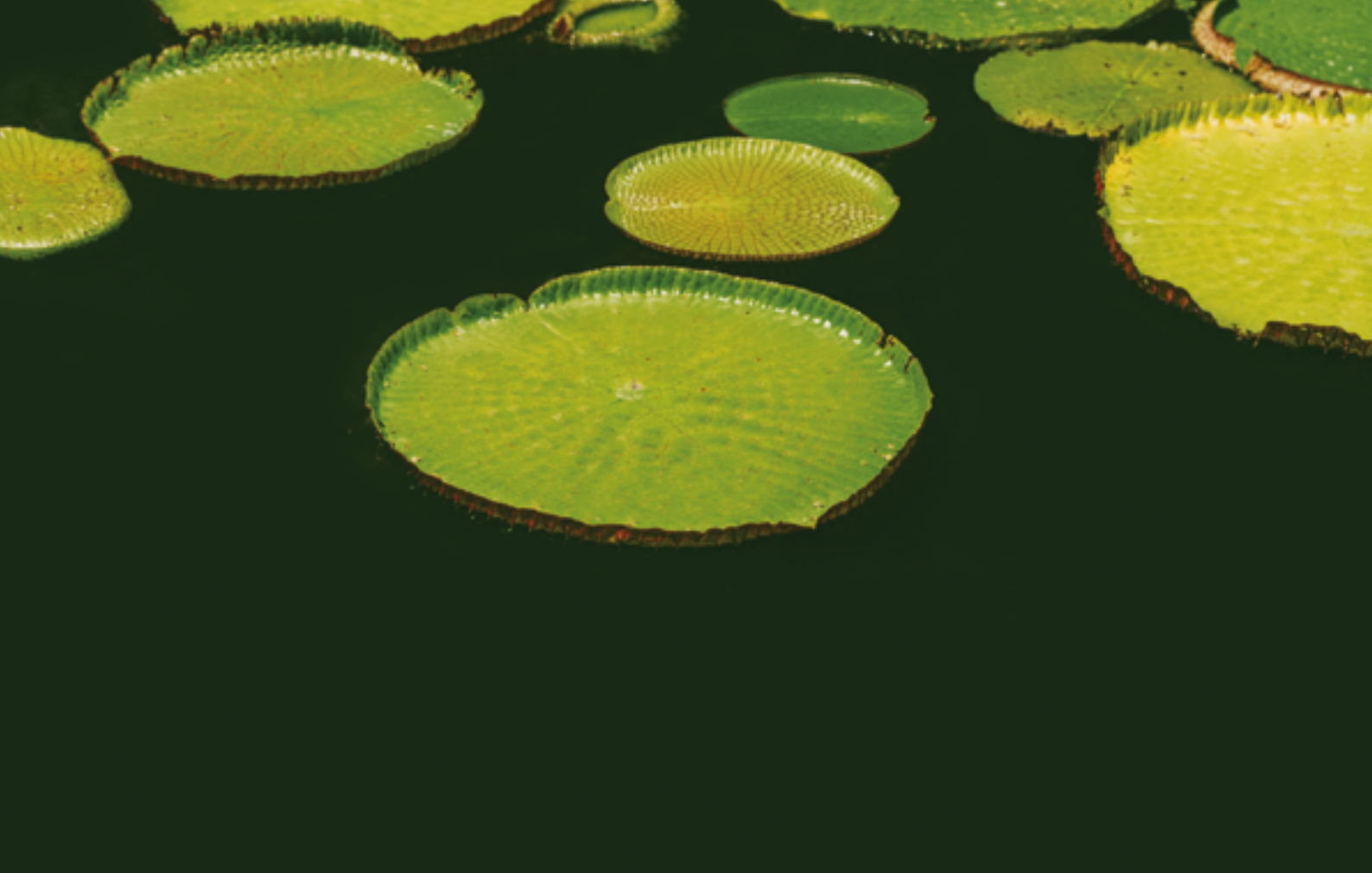
BRASIL. Lei nº 12.608, de 10 de abril de 2012. Institui a Política Nacional de Proteção e Defesa Civil - PNPDEC; dispõe sobre o Sistema Nacional de Proteção e Defesa Civil - SINPDEC e o Conselho Nacional de Proteção e Defesa Civil - CONPDEC; autoriza a criação de sistema de informações e monitoramento de desastres; e dá outras providências. Diário Oficial da União: seção 1, Brasília, DF, 11 abr. 2012.

BECK, Zilda Januzzi Veloso. Meio ambiente e cidades resilientes: reflexões sobre o desastre em Petrópolis no ano de 2022. **Revista da EMERJ**, Rio de Janeiro, v. 24, n. 2, p. 13–34, maio/ago. 2022. Disponível em: <https://ojs.emerj.com.br/index.php/revistadaemerj/article/view/484>. Acesso em: 15 ago. 2025.

BECK, Zilda Januzzi Veloso; VIEIRA, Gil Correia Kempers; DOS SANTOS, Alexandre Luís Belchior. Desastre socioambiental – Ministério Público, Defesa Civil e a garantia de direitos. **Revista do Ministério Público do Estado do Rio de Janeiro**, n. 92, p. 207-225, abr./jun. 2024

RIO DE JANEIRO (Estado). **Diário Oficial do Estado do Rio de Janeiro: parte 1: Poder Executivo**, Rio de Janeiro, ano [ano], n. [número], p. [página], 14 jul. 2025. Disponível em: https://www.ioerj.com.br/portal/modules/conteudoonline/mostra_edicao.php?session=.... Acesso em: 14 jul. 2025.

RIO DE JANEIRO (Estado). Decreto nº 49.310, de 03 de outubro de 2024. Institui o Programa Região Serrana Resiliente e dá outras providências. **Diário Oficial do Estado do Rio de Janeiro**, Rio de Janeiro, 03 out. 2024. Disponível em: <https://leisestaduais.com.br/rj/decreto-n-49310-2024-rio-de-janeiro-institui-o-programa-regiao-serrana-resiliente-e-da-outras-providencias>. Acesso em: 14 jul. 2025.



GUESTS

PARTICIPATORY CONSTRUCTION OF CONTRIBUTIONS TO IMPROVE THE TRACEABILITY AND TRANSPARENCY OF THE TIMBER CHAIN OF CUSTODY IN PARÁ

AXLE: 2. SUSTAINABLE MANAGEMENT OF FORESTS, OCEANS AND BIODIVERSITY;

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SUMMARY

One of the activities that most contribute to the climate crisis is the change in land use caused, mainly, by deforestation. About 70% (seventy percent) of Brazil's greenhouse gas emissions are related to the sectors of land use change and forests, especially the deforestation of the Amazon biome (Sirene, 2023). Among the 10 cities that emit the most carbon dioxide in Brazil, 8 are in the Amazon (Chiaretti, 2022).

One of the actions with the greatest positive impact to change this scenario is the fight against the illegal commercialization of forest products, both in terms of imports and exports. In this context, one of the main instruments refers to the regularity of the production chain, which must be safeguarded in order to ensure that, in the end, the products offered to the market will, in fact, be the result of sustainable production and not the result of deforestation.

DEVELOPMENT

The main instrument for managing the production process that aims to ensure the regularity of the chain of custody is the **National System for the Control of the Origin of Forest Products (Sinaflor)**, launched in 2017. Currently, the "[DOF+ Traceability System](#)" version is in operation, an important innovation that included the "tracking code" that must "accompany the product from origin to its final destination" (IBAMA, 2025).

However, it is estimated that about 42% of logging in the State of Pará is illegal (SIMEX, 2024). Alongside the State of Mato Grosso, Pará continues to stand out in the ranking of deforestation and illegal logging. Instead of adopting SINAFLOR, both states maintain their own systems, and in the case of Pará, the System for the Commercialization and Transportation of Forest Products of Pará (SISFLORA/PA), established in 2006¹.

The lack of effective integration of SISFLORA/PA with SINAFLOR and the concrete problems to ensure a healthy chain of custody led the Federal Supreme Court (STF) to determine that the states of Pará and Mato Grosso adopt effective measures for integration, under penalty of invalidity of the vegetation suppression authorizations issued (ADPF 743).

In addition, SISFLORA/PA has critical vulnerabilities in the control of the timber chain of custody in Pará. These weaknesses have facilitated recurrent illegal practices and fostered the illegal trade of timber to foreign markets, compromising the effectiveness and credibility of the system. Among the main structural and systemic weaknesses found, the following stand out: monitoring; management authorizations; transport; storage and marketing.

In the international scenario, the persistence of these weaknesses puts Brazil, and especially Pará, in a position of risk in relation to foreign markets. More than half of the volume of wood and the revenue collected by the export of native wood by Brazil comes from the State of Pará (Imaflora, 2024). Legislation such as the European Regulation on Deforestation-Free Products (EUDR), approved in 2023, requires companies to strictly control their supply chain and the legality of the origin of their products. The absence of an integrated and reliable national traceability system compromises Brazil's competitiveness, which can generate trade barriers, loss of credibility and restriction of access to markets.

FINDINGS

In this context, based on the survey of critical situations and indication of possible solutions, this project seeks to contribute to the improvement of SISFLORA/PA, in order to ensure effective control over the chain of custody of timber production in the State of Pará, strengthening, mainly, the protection of the forest, in addition to contributing to the credibility of the sector both in the domestic and international markets.

1 State Decree No. 2,592 of 11/27/2006, revoked by State Decree No. 2596 of 08/31/2022.

THEMATIC AXIS TO WHICH THE PROJECT ADHERES, AND THE PRACTICES DERIVE FROM IT: TRANSFORMING AGRICULTURE AND FOOD SYSTEMS

AMAZONIAN RIGHTS CONNECTION – FAMILY AGRICULTURE AND CLIMATE JUSTICE

Herena Neves Maués Corrêa de Melo¹

Summary: The project began in 2021 with the Commission for the Traditional Food of the Peoples of Pará and was established in its own bases and flows between 2024/2025, constituted in relation to climate justice and the appreciation of the intangible cultural heritage contained in the food of traditional populations. From the interinstitutional articulation between the Public Prosecutor's Office, family agricultures from indigenous, quilombola, extractivists and riparian people, municipal departments of agriculture and municipal departments of education. The main objective is to connect existing public policies that have the potential to achieve sustainable development, based on the concept of **triple bottom line**, that is, sustainability based on environmental, social and economic logics. As indigenous, quilombola and agrarian reform settler family agriculture have agroecological techniques as a priority and without the use of pesticides and pesticides, this project is positioned in the axes of promoting food security and promoting the protection of the environment and the food cultural heritage of traditional communities, considering that it also considers food as intangible cultural heritage of traditional peoples and communities. This project guarantees the transversality of fundamental rights in all ministerial activity, based on the dissemination of governance and management practices, guided by the results of the promotion of inter-institutional articulation with a view to effective social participation in the construction of socio-environmentally sustainable public policies.

1 Prosecutor of Agrarian Justice of the State of Pará, PhD in Sustainable Development of the Humid Tropics (NAEA/UFPA), PhD in Strategic Management for Sustainability (PPAD/UNAMA), Master in Human Rights, Socio-Environmental Law and the Amazon (PPGD/UFPA), Specialist in Environmental Management (NUMA/UFPA).

1. DEVELOPMENT

Family farming, with its agroecology techniques² and diversified systems, are important tools for climate justice³, boosting environmental sustainability and food security.

The project Connection of Amazonian Rights: Family agriculture and climate justice, promotes inter-institutional dialogue, focusing on existing public policies in Brazil, in favor of traditional peoples and communities in Pará, so that there is a concrete territorial valorization and therefore effective forest protection, protection of the soil and human health itself.

Existing public policies should include family agriculture in adapting to climate change, promoting social and adaptive technologies related to sustainable practices. It is essential to ensure that family farming is related to climate discussions and decisions, recognizing its role in building fairer and more sustainable agri-food systems, ensuring food security. Therefore, it is also desirable that financing plans for agriculture prioritize family farming and promote the transition to agroecological practices.

It is undeniable that family farming faces significant challenges in the face of climate change, while playing an essential role in the search for solutions. Climate justice requires public policies and social actions to prioritize family agriculture, promoting its adaptation, mitigation, and the construction of fairer and more sustainable agri-food systems.

In the scope presented, the agrarian prosecutor's office of Western Pará will focus primarily on two public policies provided for in the legislation, namely, the National School Feeding Program (PNAE) and the Pará State School Feeding Program (PEAE). Although they are long-lived programs, it is perceived that they act as true affirmative state actions in favor of family farming of traditional peoples, which directly involves the territories of traditional communities in the Amazon of Pará, as they impose the direct purchase of 30% (thirty percent) of school meals from family farming, as well as focus on the issue of gender equality, because of the legal minimum of 30%, 50% must be acquired from women who practice family farming.

In this sense, the project and its practices in question involved the direct articulation of the prosecutor's office with family farmers present in 19 (nineteen) municipalities, with the holding of more than 20 (periodic meetings), all of which were structured and with concrete objectives to promote public policy and the sustainable use of traditionally occupied areas, from the structural extrajudicial process with the search for the prioritization of the purchase of production from agrarian reform settlers, traditional indigenous peoples, quilombolas, riparian people and extractivists, from participatory articulation measures such as the launch of a differentiated public call contemplating

2 Agroecology: agroecology is classified within the multidisciplinary field of knowledge, whose teachings intend to contribute to the construction of ecologically-based agriculture styles and the elaboration of rural development strategies, having as reference the ideals of sustainability in a multidimensional perspective. The three main concepts synthesized in Agroecology are definitions of the most researched by Miguel A. Altieri, Stephen R. Gliessman, and Eduardo Sevilla Guzmán.

3 Climate justice: is an interdisciplinary concept that recognizes the breadth of climate change beyond protecting the environment. Especially, it infers that the climate crisis does not affect everyone equally: the poorest economically and most vulnerable in terms of residential and food issues, which as a rule have advanced in a reduced way in terms of greenhouse gas (GHG) emissions, suffer severe impacts. In this sense, climate justice argues that climate policies and solutions take into account social, economic, and historical issues.

traditional peoples, in order to ensure respect for culturally appropriate food in indigenous and traditional schools in general, pursuant to Technical Notes No. NT No. 3/2020/6°CCR/MPF and NT No. 09/2021/SAF/MAPA.

In turn, among the strategies of the project, the orientation and expansion of the dissemination of the exact launch schedule and regular progress of municipal and state public calls for indigenous peoples, quilombolas and traditional communities (riverside/extractivists) were carried out, with the adjustments built with civil society and other public agencies, ensuring compliance with Law No. 11,947/2009, Law No. 13,987/2020 and Law No. 14,660/2023.

Emphasizing that the project continues to be fully developed and monitored, and in terms of description of results, given the limit of this test, we will outline our last technical visit carried out in the community of the floodplain area, Piracoerã de baixo, belonging to the municipality of Santarém-PA, which is 60 minutes away by speedboat, departing from the edge of Santarém.

2. RESULTS

The municipality of Santarém, through the Amazonian rights connection project, promoted, under the terms of the governance carried out with SEMED, MPPA, Emater-PA and other partners, the special public call for the territory of the floodplain areas, which included 33 families of riverside family farmers, for the supply of nutritionally and culturally appropriate food to the schools of the territory itself, that is, there was an appreciation of agriculture on ecological bases, as it was verified in a technical visit that there is no use of any type of pesticides or pesticides, as well as there are irrigation techniques that take advantage of the river waters in a sustainable way, in suspended gardens so that there can be vegetables in periods of flood and periods of drought, for instance. As well as the planting of species suitable for the floodplain areas themselves, such as bananas and watermelons.

Remembering the productive seasonality that adapts to the nature of the region, that is, the products can only be planted and harvested during the season known as “Amazonian summer”, between the months of June and November. This calendar also coincides with classes in riverside schools in this territory, and do not follow the calendar of the urban part of Santarém.

The nutritional values are duly complied with from the formatting of the menu by the nutritionist in charge of the technique, the difference of the project in relation to the established interinstitutional governance, is endorsed exactly at the time of the construction of the menu. We explain: the menu for these riverside territories and for the other traditional territories is only made after the survey of the items produced by the farmers of the territory, from the list of the secretariats of agriculture and then communicated to the nutritionist, technical responsible. In this way, the acquisition of items available and possible to be produced by family farming is guaranteed.

In addition to the visit carried out in the farmers’ areas, it was possible to evaluate the food served in the community’s riverside school containing vegetables, string beans with vegetables, rice and free-range chicken, all coming directly from the territories near the school. A face-to-face meeting was also held with the women farmers in the community, where it was found that among the 10 present, all received directly, through the Family Agriculture Registry (CAF) in their own name, the amounts from the supply of food produced in the floodplain territories. At the moment, he was

advised not only about this right, provided for in the legislation since 2023, but about issues about women's health and violence against women, forms of protection and access to the institutional network, even in rural Amazonian areas of difficult access.

We believe that, by understanding the different facets of socio-environmental innovation from the point of view of problem-solving governance, we can build a more effective path for the sustainable development of family farming, promoting not only food production, but also the dignity and quality of life of communities, with a focus on sustainable traditional production and ensuring the promotion of the UN Sustainable Development Goals, namely, SDGs 2 (zero hunger and sustainable agriculture), 8 (gender equality), 12 (sustainable consumption and production), 13 (Action Against Global Climate Change), 17 (Partnerships and means of implementation) and 18 (Ethnic-racial equality).

3. BIBLIOGRAPHY CONSULTED

BACCARIN, J. G.; BUENO, G.; ALEIXO, S. E.; SILVA, D. B. P. da. **Family farming and school feeding under Law 11.947/2009**: adequacy of public calls and availability of products in the state of São Paulo in 2011. In: 50th Sober Congress. 2012. Vitória-ES, Anais, Cd-rom.

BALLESTRIN, Luciana. Latin America and the decolonial turn. **Brazilian Journal of Political Science**, n. 11, p. 89-117, 2013

BARACCHINI, S. A. **Innovation present in the Brazilian Public Administration**. RAE. São Paulo, v. 42, n. 2, 2002.

BARRETT, Pat. **2001 'Governance and Compliance' a presentation to the Public Risk Conference, Brisbane, 29-31 May, and McPhee, Ian 2001 'Strategies for Better Governance' an address to the PSMPC Conference on Corporate Governance, 17 August.**

BERNARDI, A.. **Local and regional development strategies**: a study on the Fruit Circuit and its articulation with the Metropolitan Region of Campinas (SP). 2009. 182 f. Dissertation (Master's Degree in Geography) – Institute of Geosciences, State University of Campinas, 2009.

BESSANT, J. Challenges in Innovation Management. In fashion. **The International Handbook on Innovation**. SHAVINI-NA, L.V. (ed.). Elsevier Science, 2003, p. 761-774.

BRANDIN, Laurence. **Content Analysis**. Lisbon, Portugal; Edições 70, LDA, 2009.

BRAZIL. **National Fund for the Development of Education (FNDE)**. Resolution No. 06/2020.

BRAZIL. **Law No. 11,947, of 06/16/2009**: Provides for the provision of school meals and the Direct Money at School Program to basic education students; amends Laws No. 10,880, of June 9, 2004, 11,273, of February 6, 2006, 11,507, of July 20, 2007; repeals provisions of Provisional Measure No. 2,17836, of August 24, 2001, and Law No. 8,913, of July 12, 1994; and makes other provisions. Brasília-DF. Available at: <<http://www.mda.gov.br/portal/saf/programas/alimentacaoescolar/2478043>>. Accessed in: 05/15/2022.

BRAZIL. Ministry of Agriculture, Livestock and Fisheries (MAPA). **Technical Note No. 01/2017/ADAF/SFA-AM/MPF-AM**, 2017.

BRAZIL. Federal Public Prosecutor's Office. Available at: <<https://www.mpf.mp.br/atuacao-tematica/ccr6/catrapovosbrasil>> consulted on 22.08.2023 Accessed on: 2023-08-28.

BRAZIL. Federal Court of Accounts. **Basic governance framework applicable to bodies and entities of the public administration** / Federal Court of Accounts. Version 2 - Brasília: TCU, Secretariat of Planning, Governance and Management, 2014. 80 p.

CAMERON, K. S.; QUINN, R. E. **Diagnosing and changing organizational culture**. Reading, MA: Addison-Wesley, 1999.

CARVALHO, Hélio Gomes de; REIS, Dálcio Roberto dos; CAVALCANTE, Márcia Beatriz. **Innovation Management**. Curitiba: Aymar, 2011.

CAVALCANTI, C. (org.) **Development and Nature: Studies for a Sustainable Society**. S. Paulo: Cortez, 1995.

CAVALCANTI, C. (org.) **Environment, Sustainable Development and Public Policies**. S. Paulo: Cortez, 1997.

CUNHA, Rosani Evangelista da. **Federalism and intergovernmental relations: public consortia as an instrument of federative cooperation**

GOHN, M. G. M. Empowerment and participation of the community in social policies. *Saúde e Sociedade* v.13, n.2, p.20-31, May-Aug 2004

GOHN, M. G.; FILIPE, Fabiana Alvarenga; BERTAGNA, Regiane Helena. Management councils and socio-political participation. Cortez, São Paulo, 2001.

GOHN, Maria da Glória Marcondes. Social movements at the beginning of the twenty-first century: old and new social actors. Vozes, 2003.

GRAMSCI, Antonio. Prison Notebooks. Vol. 3. Rio de Janeiro: Civilização Brasileira, 2000.

GUERREIRO RAMOS, Alberto. The new science of organizations: a reconceptualization of the wealth of nations. Translated by Mary Cardoso. Rio de Janeiro: Editora da Fundação Getúlio Vargas, 1981.

HABERMAS, Jürgen. Structural change of the Public Sphere: investigations into a category of bourgeois society / Jürgen Habermas; translation by Flávio R. Kothe. Rio de Janeiro: Tempo Brasileiro, 2003. 398 p.



ENVIRONMENTAL OPERATIONAL SUPPORT CENTERS

ENVIRONMENTAL UNITS OF
PUBLIC MINISTRIES

THE PERFORMANCE OF THE PUBLIC PROSECUTOR'S OFFICE OF ALAGOAS IN THE FACE OF CLIMATE CHANGE: STRUCTURING PROJECTS FOR CONSERVATION, INSPECTION AND ENVIRONMENTAL EDUCATION

Kleber Valadares Coelho Junior¹

The **Public Prosecutor's Office of the State of Alagoas**, aware of the centrality that the environmental theme occupies in the contemporary public agenda and in the global debate on planetary limits, has been developing, in recent years, a consistent, proactive and articulated performance, which transcends the strictly reactive and procedural perspective, investing in projects with potential for long-range social and environmental transformation.

In this context, the integrated execution of the **Pro-Reserves, Pro-Mangroves, Pro-Species, Safe Dam and Integrated Preventive Inspection (FPI) programs** in the São Francisco River basin (under the coordination of the Prosecutors Lavínia S. de Mendonça Fragoso and Alberto Fonseca) stands out, initiatives that reflect the institutional commitment to the conservation of biodiversity, the mitigation of changes and the promotion of a citizen culture of respect for the environment.

Pró-Reservas is an innovative strategy to promote the creation, consolidation and regularization of **Private Natural Heritage Reserves (RPPNs)**, understood as essential instruments to ensure the continuity of ecosystem services, protect endangered species and favor the connectivity of forest fragments. Among its central objectives, the promotion of actions aimed at the creation of new RPPNs, the notary regularization of reserves already recognized by environmental agencies, but pending registration of the perpetuity clause, and the interinstitutional articulation between public agencies, rural landowners and partner entities stand out.

The activities of Pró-Reservas include technical visits aimed at providing legal and technical guidance to interested parties, encouraging the formation of **ecological corridors** and mosaics of protected areas, the execution of projects for **the rewilding** and dissemination of seeds, permanent environmental education actions and the dissemination of good practices for responsible management of natural resources. This action also ensures relevant climate benefits, by expanding areas of vegetation cover with the capacity **to sequester and store carbon** in biomass and soil, regulate local temperature, protect water resources, and reduce the vulnerability of coastal and hillside areas to erosive processes and extreme weather events.

In the coastal sphere, the Public Prosecutor's Office of Alagoas develops the **Pro-Mangroves** program, recognizing mangroves as critical ecosystems both for maintaining biodiversity and for facing the climate emergency. The program is based on the diagnosis that these areas play an irreplace-

1 Prosecutor Coordinator of the MPAL Environment Center

able role in **capturing and storing carbon**, with sequestration potential up to four times greater than that of terrestrial forests, in the protection of coastal communities against floods and undertows, in the filtration of pollutants and sediments, and in sustaining complex marine and estuarine food chains.

Among the general objectives of Pró-Manguezais are the execution of strategic actions for the integrated management of these ecosystems, the elaboration of detailed diagnoses about their current situation, the implementation of environmental recovery measures and the promotion of conservation activities that reconcile the protection of fauna and flora with the appreciation of traditional uses and knowledge of local communities.

The program also includes the elaboration of **geospatial mapping of the mangroves** in the selected municipalities, the installation of nurseries for the production of seedlings for the rehabilitation of degraded areas, the construction of specific action plans for the conservation of fauna, the carrying out of technical visits and the execution of environmental education initiatives aimed at raising awareness among the population. This combination of technical and pedagogical actions reinforces the conviction that **climate justice can only be achieved through inclusive strategies**, capable of contemplating the rights of traditional populations, artisanal fishermen and vulnerable communities.

The **Safe Dam** project is part of an equally strategic aspect of ministerial action, aimed at strengthening water security and preventing socio-environmental risks associated with the collapse of containment structures. Recognizing the growing worsening of water scarcity due to climate change and the intensification of extreme events, the program is structured in inspection, risk assessment, regularization and monitoring actions of dams located in the territory of Alagoas. Among its objectives, it is important to ensure the supply of water in periods of prolonged drought, contribute to flood control, protect human lives, prevent environmental catastrophes and foster the sustainable development of communities located in areas of influence of these projects.

Such actions are in line with the provisions of the **National Dam Safety Policy**, as well as the constitutional guidelines for the protection of the environment and the protection of the fundamental rights to life, health and safety.

In a transversal way, the Public Prosecutor's Office of the State of Alagoas also coordinates and actively participates in the **Integrated Preventive Inspection (FPI)**, especially in the São Francisco River basin. This interinstitutional operation brings together multidisciplinary teams and brings together efforts in environmental inspection, technical guidance, environmental education and land regularization. Among the most expressive results, the fact that Alagoas was the first state in the North-Northeast to **close all dumps in its 102 municipalities** stands out, overcoming a historical liability of methane and other greenhouse gases that directly impacted the climate.

The FPI also works on fronts such as diagnosing deforested areas, supporting **the Rural Environmental Registry**, inspecting dams, promoting environmental scavenger hunts, training teachers, carrying out educational activities with the school boat and planting seedlings, in a strategy that combines prevention, control and education.

Finally, the **Pro-Species program** occupies a central role in the MPAL's biodiversity conservation agenda. The program is guided by the execution of **Action Plans aimed at the protection of endangered species**, both in situ and ex situ, guaranteeing ecological integrity and ensuring that future generations have access to the natural heritage that is currently threatened. Among the tar-

get species are the **Alagoas Curassow (*Mitu mitu*)**, the **Mangrove Parrot (*Amazona amazonica*)**, the **Chauá Parrot (*Amazona rhodocorytha*)**, the Macuco (*Tinamus solitarius*) and the **Galician Capuchin Monkey (*Sapajus flavius*)**.

The objectives of Pró-Espécies include fostering the creation of RPPNs for the reintroduction of these species, articulation with scientific institutions and non-governmental organizations, the development of environmental education projects that instigate the population around the conservation units, support for enforcement actions against illegal hunting and deforestation, as well as the execution of compensatory and mitigating measures provided for in environmental legislation.

The projects described here unequivocally demonstrate that the Public Prosecutor's Office of Alagoas has been consolidating a **proactive, multisectoral and replicable model of action**, based on the premise that the mitigation of climate change and the conservation of biodiversity are inseparable from the promotion of socio-environmental equity. By combining rigorous inspection, environmental education and the construction of innovative solutions, MPAL reaffirms its institutional commitment to the defense of diffuse rights and the safeguarding of natural assets essential to life.

The example of Alagoas shows that, even in contexts of budget constraints and structural challenges, it is possible to implement transformative public policies, capable of reconciling environmental conservation, climate justice and human development. The experience reported here may serve as a paradigm for other units of the Brazilian Public Prosecutor's Office, demonstrating that facing the climate crisis requires not only norms and protocols, but above all **institutional will, strategic vision and ethical commitment to present and future generations**.

Maceió-AL, July 7, 2025.

PERFORMANCE OF THE PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF AMAPÁ IN THE ENVIRONMENTAL FIELD

Elissandra Toscano Barreto Nogueira Verardi¹

Project/ Action	Summary	Climate Implication	Key Results
Environmental Radar (Radar Ambiental)	The application represents an innovation in the Public Prosecutor's Office's actions to protect the environment, promoting citizen participation, agility in responding to environmental crimes (such as fires, deforestation, noise pollution, among others), and greater transparency in monitoring complaints.	Facilitates access to and registration of environmental and related crime complaints that directly and indirectly impact the climate, also contributing to more agile action, biodiversity conservation, and reduction of greenhouse gas emissions. It strengthens co-responsibility and the effective monitoring of complaints filed.	Nearly 5,000 registrations made and with national coverage.
Institutional Articulation for strengthening the network in solid waste management	Given the new Basic Sanitation framework, the absence of the State Integrated Solid Waste Management Plan and the apparent lack of priority on the topic by the government administration were highlighted. The need to meet with federal entities and institutions responsible for public solid waste policies was verified, which proved beneficial, given the adherence of those already contacted. In essence, the initiative acts preventively and strategically for the closure of landfills, implementation of selective collection, and reverse logistics.	The creation of a group to monitor solid waste management has positive climate implications, as it favors the organization, monitoring, and continuous improvement of actions related to proper waste management, making possible the closure of landfills, a practice that contributes to methane emissions, as well as promoting the implementation of selective collection, encouraging reuse, recycling, and composting. Efficient public management of these residues directly reduces environmental degradation and the risks of urban flooding.	Not specified separately as "Key Results" in the document. Results are integrated into the description of the action, such as the adherence of contacted entities.

¹ Public Prosecutor and Coordinator of the Environmental Operational Support Center

Project/ Action	Summary	Climate Implication	Key Results
Combating Climate Change/Climate Resilience	It is an initiative of the Public Prosecutor's Office for Environment and Housing of Santana/AP, whose central purpose is to ensure efficient drainage systems to protect the population from urban floods. This action includes the implementation of sustainable solutions for rainwater management, aiming at flood prevention and the improvement of the quality of life for Santana residents. Furthermore, it seeks to develop adequate urban drainage infrastructure, focusing on the protection of the Amazonian environment, including the monitoring of urban paving and drainage works and the proposal of public civil actions to ensure compliance with obligations related to drainage projects and services. In summary, the action aims to transform Santana into a city prepared for rains, for the dry season, and committed to a sustainable future.	The climate impacts are evident, such as correction in the flow of rainwater, directing water to areas that form micro and macro basins, identification of irregularly backfilled or anthropized areas, removal of solid waste accumulation in areas that obstruct drainage systems, which intensifies floods; alert for the increase in soil impermeabilization, which contributes to the expansion of high-risk flood areas, and the demand for resilient solutions.	Commitments made to the execution of macro and micro drainage plans, monitoring of paving and drainage works, proposal of Public Civil Actions for correction of interventions and compensation for impacted residents.
Promotion of Environmental Education - Axis: Vicious Dumps	The topic of "vicious dumps" (irregular waste disposal) is, without a doubt, a constant and intrinsic daily challenge, especially in urban areas like Santana. It is not merely a distant environmental issue, but a problem that directly affects the quality of life, health, and well-being of every citizen. Inadequate waste disposal contributes to the proliferation of diseases, attracts vectors, obstructs the drainage system, and degrades the urban landscape. It is therefore fundamental that this topic be treated as a top priority by public agencies. Only with continuous engagement and effective collaboration between institutions and the community will it be possible to build a healthier and more sustainable environment for all.	Poor waste management causes serious problems for the environment and the climate, given the degradation it causes, such as irregular accumulation and its decomposition, releasing leachate, which contaminates soil and water bodies, and methane, a gas that promotes the greenhouse effect, warming the planet much more than other pollutants.	Visit by the Public Prosecutor's Office in conjunction with the State Secretariat for Urban Development of Amapá to identify the main locations with vicious dumps to be recovered. Reformulation of the vicious dumps recovery policies for the Municipality of Santana, monitoring of urban solid waste collection service and large generators.

Project/ Action	Summary	Climate Implication	Key Results
Periodic Cleanups in Ambrósio Community	The Strategic Action of Periodic Cleanups in the Ambrósio Community, developed by the Public Prosecutor's Office for Environmental Defense of Santana-AP, was structured to address the specific sanitation challenges of this Amazonian community, characterized by the absence of basic sanitation, significant generation of açaí seeds (organic compound), and the presence of various commercial establishments that require specialized waste management. To date, two major clean-up actions have been carried out in the bridge area, in addition to establishing partnerships with SEMOP/PMS and the company Tratalix to optimize regular waste collection. The main challenge identified is the lack of periodicity of actions due to the scarcity of municipal equipment.	The accumulation of waste in the Ambrósio Community has climate implications by polluting the soil, water, and air, contributing to the intensification of the greenhouse effect and the formation of gases like methane, which worsen air quality and increase the risk of respiratory problems for residents. Furthermore, poor waste management can lead to flooding and the proliferation of disease vectors, directly affecting local health and well-being, as part of the water consumed by residents comes from the river itself affected by waste discharge. Prospects include a new intervention planned for 2025 and the installation of specific eco-points for açaí seeds, demonstrating the adaptation of the strategy to the environmental and cultural peculiarities of the Amazon region, with a focus on sustainability and community awareness.	To date, two extensive cleanups have taken place in the Ambrósio Community, monitored by PJMAHU/STN, with the first already evaluated by residents as positive but needing expansion, and the second to be evaluated at a future date.

WATER RESILIENCE AND ENVIRONMENTAL JUSTICE: THE PERFORMANCE OF THE PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF GOIÁS IN THE FACE OF CLIMATE CHANGE

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Summary: Building resilience in cities and promoting water security are essential in the face of climate change and its impacts on water resources. In line with Axis 4 of the COP30 Action Agenda, the Public Prosecutor's Office of the State of Goiás (MPGO) has implemented good practices and solutions that strengthen environmental governance and improve water and climate management. In this context, the Water Commitment Program stands out, which includes the Hydrodialogue Project, the Sponge Cities Impulse Project, the Sustainable Legacy Project and the Living City Project, in addition to the Being Nature Service. These initiatives, through inter-institutional dialogue and social participation, expand the adaptation of cities, promote the sustainable use of water, and contribute to resilient and integrated public policies.

Keywords: Water resilience, Environmental justice, Environmental public policies.

Abstract: Building resilience in cities and promoting water security are essential in the face of climate change and its impacts on water resources. In line with Axis 4 of the COP30 Action Agenda, the Public Prosecutor's Office of the State of Goiás (MPGO) has implemented best practices and solutions that strengthen environmental governance and improve water and climate management. In this context, the Water Commitment Program stands out, which includes the Hidrodiálogo Project, Impulso Cidades-Esponja Project, Legado Sustentável Project, and Cidade Viva Project, as well as the Ser Natureza Service. These initiatives, through inter-institutional dialogue and social participation, enhance city adaptation, promote sustainable water use, and contribute to resilient and integrated public policies.

Keywords: Water resilience; Environmental justice; Environmental public policies.

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1. WATER COMMITMENT PROGRAM

Climate change represents one of the greatest challenges to socio-environmental sustainability and the guarantee of fundamental rights, manifesting itself in water scarcity, extreme events and the collapse of urban infrastructure. The construction of water resilience is essential to ensure the right to a balanced environment, according to article 225 of the Federal Constitution.

The effective implementation of this resilience depends on adaptive governance, characterized by institutional flexibility, continuous learning, and social participation, recognizing the complexity of socio-ecological systems and the need for integrated responses. In this context, the Public Prosecutor's Office of the State of Goiás (MPGO) plays a strategic role in inducing and supervising public policies aimed at water security, territorial governance and climate adaptation. Through the Water Commitment Program and the Ser Natureza Service, it articulates inter-institutional actions that incorporate the principles of precaution, the socio-environmental function of property and environmental equity, strengthening water resilience and socio-environmental rights.

The Water Commitment Program, created in 2021 by the MPGO's Environment and Consumer Activity Area, responds to the climate crisis with an integrated and multi-scale approach, based on institutional innovation, intersectoral articulation, and social participation, aiming at water sustainability, climate justice, and intergenerational responsibility.

Based on five pillars — proactivity, transparency, innovation, cooperation, and problem-solving capacity — the program operates through three action plans (urban, rural, and normative), supported by technical diagnoses, agreements between actors, and verifiable goals. Governance is ensured by Management and Interinstitutional Committees composed of public representatives, the productive sector, academia and civil society, in a co-production model.

Among the program's strategic projects are: Hidrodiálogo (territorial articulation), Sponge Cities Impulse (urban green infrastructure), Sustainable Legacy (heritage and climate) and Cidade Viva (nature-based solutions), which reflect a model of public action oriented to innovation, risk prevention and climate justice, aligned with international sustainability and adaptation agendas.

2. HIDRODIÁLOGO PROJECT

The Hidrodiálogo Project aims to promote alignment between municipal master plans, basic sanitation plans, climate adaptation plans and river basin plans, preventing regulatory conflicts and fostering integrated solutions for water management.

The worsening of climate change has exposed the fragility of urban and rural systems in terms of the availability and management of water resources. According to the World Meteorological Organization (WMO) report *The State of the Global Climate 2023*, the year 2023 was marked by historical records of extreme events, whose socioeconomic impacts especially affected the most vulnerable populations (WMO, 2024).

In this scenario, Brazil and its federative entities face the challenge of developing resilient and integrated strategies for water management and territorial planning, with a preventive and adaptive focus. In the State of Goiás, where the Cerrado biome predominates and there is intense land use dynamics, the compatibility between urban planning and water resources policy is essential.

The proposal of the Hidrodiálogo Project is supported by Federal Law No. 9,433/1997, which institutes the National Water Resources Policy, by attributing to municipalities the duty to promote the articulation between local sanitation, land use and environmental policies with state and federal policies. The City Statute (Law No. 10,257/2001), in its article 42-A, paragraph 2, also establishes this obligation.

The project articulates the municipal master plans with the hydrographic basin plans in the five hydrographic regions of Goiás: Alto Paranaíba, Araguaia, Baixo Paranaíba, Entorno de Goiânia and Tocantins. Among its specific objectives, the following stand out: Consolidate contingency actions and efficient use of the hydrological cycle; Identify critical points and municipalities at climate risk; Foster the structuring of regional Civil Defenses with technical and institutional capacity.

The methodology involves an interinstitutional and dialogical approach, with training workshops, cooperation terms, technical materials and operational flows. It is an innovative strategy that institutionalizes integrated water governance, promoting water security and climate resilience in Goiás. Its replicability depends on the capacity for federative, institutional and normative articulation in other territories.

3. SPONGE CITIES IMPULSE PROJECT

The Sponge Cities Impulse project disseminates technical solutions for the sustainable management of rainwater, such as rain gardens, infiltration basins and green roofs, with the aim of reducing soil waterproofing and mitigating the effects of flooding.

Climate change, coupled with accelerated urbanization and increasing surface sealing, exacerbates challenges related to urban drainage. More than 70% of the Brazilian population lives in municipalities vulnerable to events such as flooding and landslides. In this context, the project proposes the adoption of Rainwater Detention and Infiltration Systems (SDIAPs) in urban drainage projects in the State of Goiás.

Conventional drainage prioritizes the rapid flow of water, transferring impacts to water bodies. Such an approach generates relevant social and environmental costs. According to the WMO Atlas of Mortality and Economic Losses (2021), extreme events, such as floods and droughts, caused about 1.3 million deaths between 1970 and 2019. IPEA (2022) highlights the need for sustainable technical solutions in the face of changes in rainfall regimes.

In view of the changes in rainfall regimes, the **Sponge City Impulse Project** promotes sustainable technical solutions through Rainwater Detention and Infiltration Systems (SDIAPs), such as retention basins, rain gardens, infiltration trenches and permeable pavements. These structures reduce surface runoff, promote groundwater recharge, and improve water quality. The project includes the preparation of a technical manual, training of managers and professionals, awareness actions and monitoring of urban and environmental impacts. The results are measured by indicators such as municipalities trained, interventions implemented, increased soil permeability and improvements in drainage, with proven potential for local adaptation (UN-Water, 2010; MDR, 2023).

4. SUSTAINABLE LEGACY PROJECT

The Sustainable Legacy: Preserving the Past, Adapting Tomorrow project is an unprecedented inter-institutional proposal in the State of Goiás, aimed at preserving historic cities in the face of the impacts of climate change and disorderly urbanization. The initiative, articulated between the Public Prosecutor's Office of the State of Goiás (MPGO), academic institutions and cultural heritage bodies, seeks to develop normative, technical and educational instruments to ensure climate resilience and the protection of cultural heritage.

Goiás is home to a significant historical and cultural collection, expressed in urban centers, architectural traditions, archaeological sites and listed landscapes. Cities such as Goiás, Pirenópolis, Pilar de Goiás and Corumbá de Goiás exemplify the coexistence of contemporary urban dynamics with colonial and imperial heritages that make up the local identity.

However, these cities have been affected by extreme weather events, aggravated by soil sealing, deforestation and the absence of integrated public policies. The flood in the City of Goiás in 2001, on the eve of its recognition as a World Heritage Site by UNESCO, illustrates this vulnerability. Similar situations, such as the flooding of the historic center of Porto Alegre in 2023/2024, reinforce the urgency of policies that integrate heritage and climate.

Although there are regulations such as the National Policy on Climate Change (Law No. 12,187/2009, updated by Law No. 14,904/2024), many municipalities in Goiás lack specific adaptation plans that contemplate cultural heritage. The disorderly occupation compromises the landscape and architectural integrity of the listed areas.

The Sustainable Legacy Project seeks to protect cultural heritage in the face of climate change, through face-to-face and distance learning training, awareness campaigns, regional lectures, inter-institutional articulation and the publication of the Cultural Heritage Preservation Manual and the Guide to Good Practices on Heritage and Climate Change. The effectiveness of the actions will be evaluated by indicators such as the percentage of affected buildings, avoided costs with preventive restoration, number of trained professionals and metrics of engagement and social perception.

5. LIVING CITY PROJECT

The Living City Project: Natural Solutions for a Sustainable Future proposes an innovative model of urban and environmental planning, based on the adoption of Nature-Based Solutions (NbS), articulated with climate resilience and socio-environmental sustainability. The initiative, developed by the Public Prosecutor's Office of the State of Goiás in partnership with academic, technical and civil society institutions, aims to implement transformative actions in the urban territories of Goiás, at various scales.

Brazilian cities, especially in the Midwest region, face rapid urban expansion, marked by soil impermeabilization, replacement of native vegetation and compromise of hydrological cycles. In Goiás, this reality is aggravated by low vegetation cover, overload in drainage systems and recurrent flooding.

Nature-based Solutions (NbS) have been internationally recognized as effective strategies to reconnect urban infrastructure to ecological cycles, promoting the restoration of ecosystem services and climate adaptation. Reports by UN-Habitat and the IPCC (2022) indicate that urban areas con-

centrate about 70% of global greenhouse gas emissions and face growing challenges related to water scarcity, pollution, and extreme weather events. In this context, the **Cidade Viva proposal** is configured as a replicable model of sustainable urban transformation, with a focus on green infrastructure, water resilience and ecological integration. The enactment of Law No. 14,904/2024 and the launch of the Resilient Green Cities Program (Decree No. 12,041/2024) reinforce the normative support for the adoption of NBS in Brazilian cities.

The project is led by MPGO, through CAOMAC and CATEP, in partnership with CAU-GO, UFG, UEG, NGO Ideias Urbanas, Ministry of Agrarian Development, SANEAGO and the company Bio Design. Periodic meetings between partners align guidelines, structure deliveries, and consolidate the content of the Technical Manual on NbS, scheduled for release in the second half of 2025.

The Cidade Viva Project promotes Nature-Based Solutions (NbS) in buildings, neighborhoods and cities, focusing on climate-vulnerable municipalities. The actions include training, preparation of a technical manual, pilot project and awareness campaigns, in addition to the Cidade Viva Award for good practices. Effectiveness will be evaluated by indicators such as partnerships, implemented projects, increase in vegetation and improvements in water and air quality, aiming at the replicability of the initiative.

6. SERVICE BEING NATURE

The Ser Natureza Service, although not formally part of the Water Commitment Program, acts in a complementary way, strengthening the out-of-court resolution of conflicts and the implementation of environmental public policies through self-settlement. Created as a project, it has been consolidated over 17 years as a stable institutional service, with significant results in the State of Goiás. Coordinated by the Environment Area of the Operational Support Center, in partnership with COMPOR, its main objective is the protection of springs in watersheds responsible for supplying the municipalities of Goiás. Its execution is carried out by the Prosecutor's Offices, through working groups formed with partner institutions and community participation.

Since its creation, the Ser Natureza Service has already promoted the protection of more than 381 springs on 265 properties, the creation of 4,347 hectares of terraces, the recovery of permanent preservation areas (PPAs) and the agreement of measures for the proper management of solid waste.

In 2023, Ser Natureza received the **Certificate of Good Problem-Solving Practice** from the CNMP, recognizing its effectiveness in promoting socio-environmental solutions through dialogue. In 2025, it was strengthened with a **Technical Cooperation Agreement** between MPGO, EMATER, SANEAGO, EMBRAPA and SEAPA, aimed at protecting water sources and expanding water security.

Adherence to the service occurs via public notice, with objective criteria and the requirement of a Letter of Commitment signed by the prosecutor and with the consent of the municipal manager. Currently, the counties in which the Ser Natureza service has been or is currently being implemented include Acreúna, Bela Vista, Bom Jardim, Campinorte, Cirilândia (Rialma), Goianésia, Goiânia, Jandaia, Jussara, Leopoldo de Bulhões, Morrinhos, Niquelândia, Novo Gama, Orizona, Porangatu, Taquaral de Goiás, Trindade, Vianópolis and Uruana. In addition to these, the service is in the monitoring phase in Goiás, Paranaiguara, São João da Paraúna, Serranópolis, Uruaçu and Urutaí; while in the municipalities of Campos Belos, Corumbaíba, Goiandira, Minaçu, Nova Aurora, Pires do Rio, Professor Jamil and Quirinópolis, the advisory has already been finalized.

Ser Natureza is consolidated as a strategic instrument of collaborative governance, with effective extrajudicial solutions based on dialogue, promoting environmental protection and the right to an ecologically balanced environment.

7. GOVERNANCE, PROBLEM-SOLVING CAPACITY AND INNOVATION

The integration between the Water Commitment Program and the Ser Natureza Service shows the capacity of the Public Prosecutor's Office of the State of Goiás to lead solid, collaborative and multisectoral environmental governance models. The articulation between public institutions, the private sector, academia, and civil society qualifies the formulation and execution of public policies, strengthens transparency, and stimulates a cultural change oriented towards harm prevention, social participation, and self-resolution of conflicts — in line with the guidelines of the UN 2030 Agenda.

Institutional innovation is manifested in the adoption of technologies for monitoring and predictive analysis of water resources; proactivity, in anticipating climate and hydrological risk scenarios; problem-solving, in the search for concrete, integrated and appropriate solutions to the territorial context; and transparency, in the commitment to the broad dissemination of results and accountability to society — according to good practices recommended by the Organization for Economic Cooperation and Development (OECD) in terms of water governance.

These elements consolidate a ministerial action oriented to effectiveness, legitimized by social dialogue and aligned with contemporary challenges, contributing to the transformation of the legal and administrative culture towards a responsive, democratic environmental justice committed to the urgencies of the twenty-first century.

8. FINAL CONSIDERATIONS

The performance of the Public Prosecutor's Office of the State of Goiás (MPGO) in the fight against climate change stands out as a reference in the promotion of **water resilience and environmental justice** at the subnational level. These initiatives exemplify the feasibility and effectiveness of extrajudicial action based on sustainability, participation and innovation. Such practices demonstrate how it is possible to promote urban resilience and water security based on structuring and collaborative solutions.

By articulating technical knowledge, institutional dialogue and social participation, the MPGO reaffirms its role as a transforming agent, articulator of public policies and guarantor of diffuse and collective rights. The actions described are aligned with **the COP30 Action Agenda** and the **Sustainable Development Goals (SDGs)**, strengthening the role of the Public Prosecutor's Office in the Brazilian climate and environmental agenda.

Each project developed by MPGO incorporates principles of environmental law and contemporary public policies, with an emphasis on Nature-Based Solutions (NbS) as tools to realize the right to a balanced environment. The initiatives prioritize social participation, territorial equity, and adaptive planning, demonstrating that the articulation between legal instruments, technical solutions, and institutional mobilization can generate effective responses to the impacts of climate change, especially in vulnerable urban contexts. The focus on prevention, green and agroecological requalification, and integration with national public policies — such as the National Plan for Adaptation to Climate Change (PNA) and the New Sanitation Framework — reinforces the systemic character of these

actions. By acting primarily in peripheral areas and socio-environmentally vulnerable territories, the MPGO contributes directly to the strengthening of environmental justice and to the fulfillment of the Sustainable Development Goals (SDGs), especially SDGs 11, 13 and 15.

Overcoming contemporary environmental challenges requires collective construction, co-responsibility and commitment to future generations. In this context, the projects and programs developed by MPGO in Goiás offer concrete contributions to the strengthening of environmental governance and climate justice, demonstrating that the construction of water resilience and the protection of the environment depend on coordinated, multidisciplinary and innovative efforts. This experience can serve as a model for other federative units and public institutions, by highlighting the transformative potential of integrated responses to climate challenges, with a focus on sustainable and fair development.

9. BIBLIOGRAPHIC REFERENCES

BRAZIL. Constitution (1988). Constitution of the Federative Republic of Brazil of 1988.

BRAZIL. Law No. 10,257, of July 10, 2001. Regulates arts. 182 and 183 of the Federal Constitution, establishes general guidelines for urban policy and provides other provisions (City Statute). *Diário Oficial da União*, Brasília, DF, 11 jul. 2001.

BRAZIL. Law No. 12,187, of December 29, 2009. Establishes the National Policy on Climate Change. *Official Gazette of the Union*, Brasília, DF, 30 Dec. 2009.

BRAZIL. Law No. 14,026, of July 15, 2020. Updates the legal framework for basic sanitation and amends Law No. 9,984/2000 and other legal provisions.

BRAZIL. Law No. 9,433, of January 8, 1997. Establishes the National Water Resources Policy. *Diário Oficial da União*, Brasília, DF, 9 jan. 1997.

BRAZIL. Ministry of the Environment. National Plan for Adaptation to Climate Change – PNA. Brasília: MMA, 2016.

BRAZIL. United Nations. Transforming our world: the 2030 Agenda for Sustainable Development. Resolution A/RES/70/1, of September 25, 2015.

IPCC. Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report. Geneva: IPCC, 2022.

IPEA – Institute of Applied Economic Research. Atlas of social vulnerability in Brazilian municipalities. Brasília: IPEA, 2022.

LOUREIRO, Carlos Frederico; AZEVEDO, José Antônio Sanna. Environmental education and climate justice: for a transformative praxis. São Paulo: Cortez, 2020.

MACHADO, Paulo Affonso Leme. Brazilian environmental law. 23. ed. São Paulo: Malheiros, 2017.

PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF GOIÁS. Water Commitment Program. Goiânia, 2023.

PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF GOIÁS. Service Being Nature. Goiânia, 2019.

MOSS, Timothy; NEWIG, Jens. Multilevel water governance and problems of scale: setting the stage for a broader debate. *Environmental Management*, v. 46, n. 1, p. 1–6, 2010.

OECD – Organization for Economic Cooperation and Development. *Principles on Water Governance*. Paris: OECD Publishing, 2015.

UNDRR. *Global Assessment Report on Disaster Risk Reduction 2022*. Geneva: United Nations Office for Disaster Risk Reduction, 2022.

UN-WATER. *Water and Climate Change*. Geneva: United Nations Water, 2010.

WMO – World Meteorological Organization. *Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970–2019)*. Geneva: WMO, 2021.

THE PANTANAL IN ALERT PROGRAM: INTERAGENCY ACTION AND MONITORING IN WILDFIRE MANAGEMENT IN THE PANTANAL BIOME (MS, BRAZIL)

Luciano Furtado Loubet

Abstract: Wildfires in the Pantanal, a biome of critical importance for biodiversity conservation and global climate regulation, have intensified by approximately 40%, driven by climate change¹. In the Pantanal, these events are linked to both the expansion of anthropogenic activities and natural causes, which inherently induce significant alterations to the biome and its hydrological regime. This is compounded by the recurrence of prolonged drought periods. In response to this critical scenario, the Public Prosecutor's Office of the State of Mato Grosso do Sul (MPMS) established the Pantanal in Alert Program in 2021, an interagency initiative focused on the prevention, monitoring, accountability, and mitigation of wildfires. The program utilizes the Pantanal in Alert System, a technological platform that integrates heat hotspot data from the Fire Information for Resource Management System (FIRMS)² with the Rural Environmental Registry (SICAR), enabling near real-time identification of impacted areas and the automatic issuance of notifications to the involved rural properties. Between 2022 and 2024, a total of 985,937.86 hectares were burned, leading to the production of 378 technical reports, the initiation of 54 Civil Investigations, and the imposition of fines totaling BRL 124,831,760.00.

A key innovation currently under development is a new Technical Note on Environmental Damage Valuation, which aims to incorporate the climate valuation of environmental damages by quantifying Greenhouse Gas (GHG) emissions resulting from wildfires, based on estimates of the affected dry biomass. This approach represents an advancement in environmental accountability by integrating economic mechanisms for pricing and internalizing environmental costs, thereby incentivizing sustainable practices. In 2025, the program began incorporating systematic preventive actions, selecting priority properties in the Mato Grosso do Sul Pantanal to support the joint efforts of the Military Fire Brigade (CBMMS), the Environmental Military Police (PMA), and the Mato Grosso do Sul Environmental Institute (IMASUL). These measures seek to reduce fire spread and the accumulation of dry biomass through coordinated actions based on technical and scientific criteria.

1 Climate change intensified wildfires in the Pantanal by 40% in June, study shows. Available on: <https://www.gov.br/mma/pt-br/assuntos/noticias/mudanca-do-clima-intensificou-em-40-incendios-no-pantanal-em-junho-mostra-estudo>

2 <https://pantanalemalerta.bombeiros.ms.gov.br/> Firms software de dados ativos sobre focos de calor da NASA, disponível em <https://firms.modaps.eosdis.nasa.gov/map/#d:24hrs;@-54.8,-4.5,4.6z>

This article analyzes the Pantanal in Alert Program as an innovative and potentially replicable model of environmental management in the face of the climate crisis, highlighting the role of coordinated interagency actions as strategic tools for the protection and conservation of sensitive biomes. By acting to prevent and combat wildfires, the program directly contributes to mitigating the effects of climate change by preventing the massive emission of greenhouse gases from the burning of native vegetation and ecosystem degradation.

Keywords: Pantanal; Wildfires; Climate Change; Greenhouse Gases; Environmental Crimes; Carbon Credits; Public Prosecutor's Office; Environmental Monitoring.

1. INTRODUCTION

The Pantanal has faced an unprecedented intensification in the frequency, extent, and severity of wildfires. In 2020, amid a critical and catastrophic scenario, the Pantanal in Alert Program emerged as a coordinated institutional response to the environmental crisis that had taken hold in the biome. Wildfires in the Pantanal stem from multiple factors, both natural and anthropogenic, and are exacerbated by the uncontrolled expansion of human activities, which alter the hydrological regime and ecological dynamics, as well as by extreme climate events such as prolonged droughts, high temperatures, strong winds, and low relative humidity (Ferreira; Larcher; Rabelo, 2018).

The rapid and often uncontrollable spread of fire has had devastating effects on biodiversity, human health, and ecosystem stability, with impacts extending beyond the biome's territorial boundaries. Although fire is part of the Pantanal's natural ecological processes—as indicated by MapBiomas data, which recorded approximately 7.8 million hectares burned between 2010 and 2020—it is estimated that only 5% of these occurrences are of natural origin (Azevedo, 2022). The annual recurrence of fires in certain areas, identified through remote sensing, points to the repeated and often improper use of fire as a pasture management technique, frequently outside legally permitted periods.

The vulnerability of the Pantanal has been aggravated by climate change and inadequate anthropogenic practices. With its fragile and seasonally complex ecosystems, the biome has become even more susceptible to fire, especially in areas that would normally be predominantly humid. Grasslands, flooded fields, marshlands, and savanna formations have been the most affected, accounting for over 80% of the areas burned in 2024, which highlights the exposure of naturally moist phytophysionomies to the effects of fire. According to Fiocruz (2020), these fires are persistent and lethal, with immeasurable impacts on biodiversity, health, and the economy.

In 2024, wildfires in the Mato Grosso do Sul Pantanal devastated 1.9 million hectares, representing a 64% increase compared to the average of the last six years, second only to the area burned in 2020, when fire affected 2.3 million hectares of the biome³. According to Report n. 001/2025/ NUGEO, Corumbá was the most affected municipality, followed by Aquidauana and Porto Murtinho. The majority of ignitions originated on private properties, mainly rural estates, many with a history of fires in previous years. In 95% of cases, it was not possible to identify the parties responsible for

3 Data from MapBiomas's Fire Monitor show that more than half of the area burned in Brazil last year was in the Amazon. Available on: <https://brasil.mapbiomas.org/2025/01/22/area-queimada-no-brasil-cresce-79-em-2024-e-supera-os-30-milhoes-de-hectares/>

the fires. In the remaining 5%, confirmed causes included scientific research accidents, loss of control during authorized burns, roadside incidents, improper disposal of cigarette butts in dry pastures, and the illegal use of fire in agricultural and pastoral areas.

The effects of the fires also reached legally protected territories, causing significant impacts on Conservation Units and Indigenous Lands. According to Technical Report n. 002/2025/NUGEO, a temporal analysis of geospatial data from 2020 to 2024 revealed the persistence of heat hotspots and the concentration of ignitions on large rural properties—with nearly all repeat offenders owning areas larger than one thousand hectares. This pattern indicates weaknesses in territorial governance and recurrent failures in adopting preventive measures. Given the gravity of the situation, the Public Prosecutor's Offices of Mato Grosso and Mato Grosso do Sul have intensified their actions based on geospatial mapping, identifying ignition points and issuing alerts to guide enforcement, accountability, and prevention efforts.

Large-scale wildfires are a critical factor in climate change, primarily due to the massive release of greenhouse gases into the atmosphere. The burning of forest biomass releases carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), which are potent greenhouse gases that directly contribute to global warming. Studies indicate that carbon emissions from wildfires have increased significantly in recent decades, with a 60% growth between 2001 and 2023⁴. The consequences of wildfires extend beyond atmospheric impact, directly affecting populations surrounding the burned areas. The relationship between wildfires and climate change is bidirectional: while fires contribute to global warming, climate change, in turn, creates more favorable conditions for the occurrence and intensification of these events, such as prolonged droughts and rising temperatures⁵.

In this context, the Pantanal in Alert Program, led by the Public Prosecutor's Office of the State of Mato Grosso do Sul (MPMS), presents an innovative strategy by integrating remote sensing technology, interagency action, and the use of technical-ecological information about the Pantanal's phytophysiological characteristics. Although the climate valuation of environmental damage is not yet performed, the program incorporates data on the accumulation of dry biomass and the characteristics of native vegetation, which are fundamental to understanding burn potential and fire dynamics. According to Technical Report n. 002/2025/NUGEO, the selection of 332 priority properties in 2025 considered the presence of critical factors such as ignition risk, dry biomass accumulation, fragments relevant to conservation, and adverse climatic conditions.

Given the advance of wildfires and the recurrence of ignitions, it is imperative to consolidate integrated strategies for prevention, monitoring, combat, and accountability, capable of protecting the Pantanal and fostering a culture of environmental enforcement guided by climate justice—a concept that transcends the strictly technical or environmental debate on greenhouse gas emissions by considering who is most impacted by climate change and who historically bears the greatest responsibility for causing it.

2. METHODOLOGY

4 CO₂ emissions associated with wildfires increased by 60% worldwide between 2001 and 2023. IPEA. Available on: <https://www.ipea.gov.br/cts/pt/central-deconteudo/noticias/noticias/455-emissoes-de-co-associadas-a-incendios-florestais-aumentaram-60-no-mundo-entre-2001-e-2023>.

5 Climate change has increased conditions favorable to unprecedented wildfires, research says. FAPESP Agency. Available on: <https://agencia.fapesp.br/mudancas-climaticas-aumentaram-condicoes-favoraveis-a-incendios-florestais-sem-precedentes-diz-pesquisa/52493>

The Pantanal in Alert Program uses satellite imagery combined with climate data, such as wind direction and intensity, to identify and monitor areas affected by wildfires in the Mato Grosso do Sul Pantanal. Analyses are conducted continuously and inform immediate actions by enforcement agencies. The monitoring considers the history of wildfires since 2020 and assesses the impacts on rural properties, municipalities, Conservation Units, and Indigenous Lands. Despite limitations caused by clouds, smoke, or sensor failures, the program employs various data sources and digital tools to ensure analytical precision.

Technical reports produced by the Geotechnology Unit (NUGEO/MPMS) are forwarded to the Environmental Military Police (PMA), which is responsible for field inspections and issuing infraction notices in cases of criminal fires. Information from the Infraction Notices is attached to the reports and sent to the Public Prosecutors with jurisdiction over the affected areas for the potential initiation of Civil Investigations, the execution of Conduct Adjustment Agreements (TACs), or the filing of a Public Civil Action. When the offender is not identified, the Prosecutor evaluates whether to open a Civil Investigation to potentially secure a preventive TAC with the landowner.

The program selects and studies priority properties, providing support for monitoring, accountability, and environmental education actions by partner agencies (MPMS, CBMMS, PMA, and IMASUL). In cases of recurring fires, properties classified as priority are notified by the CAOMA/MPMS to adopt prevention and control measures.

3. RESULTS AND DISCUSSION

The Pantanal in Alert Program was established in 2021 by the Public Prosecutor's Office of the State of Mato Grosso do Sul (MPMS) with the goal of consolidating integrated actions for the prevention, monitoring, and accountability for wildfires in the Pantanal biome. Its main fronts involve: studying the causes of fires since 2020; creating the Pantanal in Alert System; acting jointly with public agencies in situations of imminent risk; and coordinating interagency efforts with the Public Prosecutor's Offices of Mato Grosso and the Federal Public Prosecutor's Office.

Between 2022 and 2024, the program recorded approximately 1 million hectares affected by wildfires. During this period, the MPMS's Geotechnology Unit (*NUGEO*) produced 378 technical reports, which supported 139 on-site inspections carried out by the Environmental Military Police, resulting in 15 enforcement actions.

In addition, the Environmental Institute of Mato Grosso do Sul (*IMASUL*) imposed an administrative fine of BRL 4,245,000 based on geoprocessing analysis concerning a 4,200-hectare area in the municipality of Corumbá. The Brazilian Institute of the Environment and Renewable Natural Resources (*IBAMA*) also sanctioned those responsible for wildfires in an area of 39,764.63 hectares in the same municipality, imposing fines totaling BRL 100,000,000. Taking into account the enforcement actions of the Environmental Military Police, IMASUL, and IBAMA, administrative penalties were applied in cases with identified offenders, amounting to approximately BRL 125 million in fines.

As a result of the Pantanal in Alert Program, 152 Unified Protocols were registered, leading to 81 Factual Reports and 66 Civil Investigations. Of these proceedings, 84 were closed, 68 remain ongoing, and 3 were referred to the Federal Public Prosecutor's Office, as they involved fires on Kadwéu indigenous lands and in areas under the responsibility of the National Institute for Colonization and Agrarian Reform (INCRA). Notably, 6 Conduct Adjustment Agreements (TACs) were signed with the responsible parties.

Starting in 2024, the program began operating on three interconnected strategic fronts: wildfire regression, through retrospective analysis of hotspots to identify responsible parties during prohibited periods; strengthening the culture of enforcement, with joint actions among the Environmental Military Police, Civil Police, Federal Police, and technical forensic services; and initiating Civil Investigations in all cases, leading to preventive Conduct Adjustment Agreements (TACs). These agreements reinforce the initiative's proactive nature by requiring landowners to adopt fire management measures and promote environmental recovery and damage valuation in cases of recurrence.

In 2025, 357 properties were prioritized based on criteria such as: wildfire history, biomass accumulation, presence of sensitive species, recurrence, proximity to protected areas, extreme weather conditions, and ecological vulnerability. The municipalities with the highest incidence were Corumbá (279 prioritized properties), Aquidauana (39), and Porto Murtinho (28), according to Technical Report n. 002/2025/NUGEO.

The Pantanal in Alert System, developed in partnership with the Military Fire Brigade, integrates near real-time heat hotspot data (by FIRMS) with the Rural Environmental Registry (SICAR). This allows for automated cross-referencing of information and the instantaneous sending of alerts to landowners and enforcement agencies whenever thermal occurrences are detected on their properties or adjacent areas.

It is important to acknowledge that, according to data from LASA-UFRJ (direct communication, not yet published), the efforts of public authorities were significant in mitigating the 2024 fires. It is estimated that these efforts prevented an additional 1 million hectares from burning, as this year was more conducive to fires than 2020.

Despite these significant advances, the program still faces technical and operational challenges, such as limited physical access to remote areas and reliance on secondary data for offender identification. Future research should assess the impact of alerts on landowner behavior and explore economic instruments for environmental restoration based on carbon credits, thereby aligning the initiative with the principles of climate justice and sustainable finance.

4. PANTANAL IN ALERT PROGRAM AND CLIMATE CHANGE:

Climate change projections indicate significant alterations to the hydrological balance in the Brazilian Pantanal, notably the increase in water deficit and the intensification of extreme events⁶. Recent studies, such as Cunha et al. (2024), highlight the growing frequency of compound drought-heat events in the region, phenomena strongly linked to climate change. These authors point out that such events are likely to become more severe and recurrent, thereby exacerbating the pressures on the biome's ecological dynamics.

In this context, the Pantanal in Alert Program constitutes a strategic institutional response to the climate crisis affecting the biome, integrating wildfire prevention and monitoring actions with approaches aimed at mitigating greenhouse gas (GHG) emissions. In light of intensifying heat waves, prolonged droughts, and changes to the hydrological cycle, the Program's capacity to anticipate risks and promote preventive action has contributed to containing the advance of wildfires and their climate-related impacts.

6 Climate change projections for the Pantanal - an analysis of the CMIP6 scenarios. Available on: <https://www.alice.cnptia.embrapa.br/alice/bitstream/doc/1170866/1/AA-Projecoes-mudanca-Geopantanal-2024.pdf>

Large-scale fires in the Pantanal, in addition to undermining biodiversity and degrading native vegetation, are a significant source of GHG emissions, including carbon dioxide (CO₂), methane (CH₄), and nitrogen oxides (NO_x). The burning of biomass in wetlands rich in organic matter, such as the Pantanal, amplifies the greenhouse effect and weakens climate neutrality efforts. In this regard, the Program operates on the front line of mitigation by preventing the massive release of such gases through coordinated, evidence-based actions.

Of particular note is the forthcoming inclusion of climate valuation of environmental damage based on estimated emissions from the burning of dry biomass. This approach represents a methodological advance in calculating environmental liabilities, thereby supporting the application of compensatory measures. In the future, this model may be integrated into carbon credit mechanisms, strengthening environmental accountability and enabling restoration actions through climate finance instruments.

Furthermore, by prioritizing areas with a higher risk of ignition and recurrent fires, the Pantanal in Alert Program fosters territorial adaptation to climate change, promoting sustainable fire management practices, restoration of native vegetation, and protection of environmentally sensitive areas. Collaboration with scientific institutions, environmental agencies, and the productive sector reinforces an interinstitutional and systemic approach, aligning local action with Brazil's national environmental goals and its international commitments under the Paris Agreement.

Thus, the Pantanal in Alert Program stands as a strategic tool for environmental and climate governance, operating at the intersection of disaster prevention, environmental justice, and climate responsibility. Its methodology has high potential for replication in other Brazilian biomes, representing a concrete opportunity to expand the scope of actions to address climate change, especially in vulnerable and ecologically significant regions.

5. CONCLUSION

The intensification of wildfires in the Pantanal, exacerbated by climate change and persistent human action, reveals the urgent need for robust, interagency, and integrated public policies that are preventive, monitored, and capable of sanctioning and mitigating environmental damage. In this context, the Pantanal in Alert Program, established by the Public Prosecutor's Office of the State of Mato Grosso do Sul, stands out as an innovative and strategic response by articulating the use of geospatial technologies, legal tools, and environmental accountability instruments with a focus on climate mitigation.

The program distinguishes itself by linking heat-spot detections in real time to specific rural properties, enabling the automatic issuance of notifications and the execution of Terms of Conduct Adjustment (similar to consent decrees), with an emphasis on prevention.

Consolidated data from 2022 to 2024 demonstrate both the effectiveness of the monitoring system and the critical scale of the problem: approximately one million hectares affected, 378 technical reports produced, dozens of investigations initiated, and administrative fines totaling roughly BRL 125 million imposed. The recurrence of fires in large estates and the concentration of impacts in environmentally sensitive areas reinforce the need to prioritize efforts and implement sustained, structural measures.

Notwithstanding ongoing challenges—such as difficulties in accurately attributing responsibility for ignitions, limitations in accessing remote areas, and the need for greater private-sector engagement—the Pantanal in Alert Program has proven to be a replicable institutional model with the potential to inspire integrated public policies in other threatened biomes.

REFERENCES

AZEVEDO, Ana Lúcia. **Climate Change Poses Environmental Challenges to the Pantanal**. OEco, Oct. 10, 2022. Available at: <https://oeco.org.br/reportagens/mudancas-climaticas-impoem-desafios-ambientais-ao-pantanal/>. Accessed Mar. 6, 2022.

CUNHA, A.P.M.A.; BUERMANN, W.; MARENGO, J.A. 2024. **Changes in Compound Drought-Heat Events over Brazil**. Proceedings of the 8th Symposium on Geotechnologies in the Pantanal, Poconé, MT, Nov. 11–13, 2024. Embrapa Digital Agriculture/INPE, p. 648.

FERREIRA, S.W.T.; LARCHER, L.; RABELO, A.P.C. **Analysis of the Spatiotemporal Distribution of Fire Outbreaks in the Pantanal (2000–2016)**. Proceedings of the 7th Symposium on Geotechnologies in the Pantanal, Jardim, MS, Oct. 20–24, 2018. Embrapa Agricultural Informatics/INPE, pp. 563–573.

FIOCRUZ – Oswaldo Cruz Foundation. **Wildfires in the Pantanal 2020**, Technical Note 01.

Technical Report No. 001/2025/NUGEO – General Report on Wildfires in the Southern Mato Grosso do Sul Pantanal, 2024.

Technical Report No. 002/25/NUGEO – Priority Properties – 2025 – MPMS.

THE ENVIRONMENTAL DNA PROGRAM: THE ROLE OF THE PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF MATO GROSSO DO SUL IN COMBATING ILLEGAL DEFORESTATION AND MITIGATING CLIMATE CHANGE

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Abstract: The Environmental DNA Program, developed by the Public Prosecutor's Office of Mato Grosso do Sul (MPMS), constitutes a strategy to combat illegal deforestation and value environmental damages resulting from the suppression of native vegetation in the Cerrado, Pantanal, and Atlantic Forest biomes. The initiative integrates advanced geotechnologies, continuous geospatial monitoring via satellite imagery, and geographic information systems (GIS), enabling the precise identification of degraded areas and the quantification of environmental and climate impacts. Between 2016 and 2024, the program identified over 354,000 hectares of deforestation, of which 71,000 hectares were classified as illegal, with an estimated emission of 4.5 million tons of carbon. One of the program's distinguishing features is the application of its own methodology for the economic valuation of environmental damages and carbon pricing, which supports the accountability of offenders through technical reports used in Public Civil Actions and, where applicable, in the execution of Conduct Adjustment Agreements (TACs). These instruments not only aim to repair the damages caused but also impose the obligation to recover the degraded areas. The results demonstrate not only the effectiveness of repressive and compensatory measures but also the strengthening of environmental governance, reflected in the reduction of illegal deforestation and in the process of legal-environmental and territorial regularization. The Environmental DNA Program is consolidated as a replicable public policy model by adopting clear methodologies, producing measurable results, and promoting coordinated interagency action. Its application effectively contributes to the protection of biodiversity, the mitigation of climate change effects, and the strengthening of climate justice and sustainable development.

Keywords: Illegal deforestation. Public Prosecutor's Office of Mato Grosso do Sul. Geotechnologies. Environmental valuation. Carbon pricing. Climate change.

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1. INTRODUCTION

The State of Mato Grosso do Sul, home to the Cerrado, Pantanal, and Atlantic Forest biomes, has experienced significant environmental transformations in recent decades, primarily driven by the expansion of agricultural and livestock activities (GONÇALVES et al., 2021). According to these authors, this dynamic has led to a considerable loss of native vegetation cover, including in legally protected areas, resulting in various degrees of environmental degradation. The consequences include biodiversity loss, water resource degradation, and disruption of local ecosystem cycles, directly impacting regional climate stability.

Brazil, possessing one of the largest expanses of tropical forests and over 9,000 native tree species (BEECH et al., 2017), faces deforestation as one of its foremost environmental challenges. Beyond biodiversity loss, vegetation suppression compromises ecosystem services, exacerbates extreme events linked to climate change, and diminishes forests' carbon sequestration capacity. In this context, the expansion of deforestation within the Cerrado, Pantanal, and Atlantic Forest biomes threatens water security, ecological functionality, and territorial sustainability.

Given the scale and complexity of this issue, the Public Prosecutor's Office of Mato Grosso do Sul (MPMS), in exercising its constitutional mandate to protect the environment (Art. 225, Brazilian Federal Constitution, 1988), developed the Environmental DNA Program — Detection of Illegal Deforestation of Native Vegetation. This pioneering governance initiative combines technology, science, and law to effectively address illegal deforestation in native vegetation areas across the state.

The program rests on three main pillars: continuous geospatial monitoring of vegetated areas; legal accountability grounded in technical-scientific evidence; and economic and climatic valuation of environmental damages, including the pricing of emitted or unsequestered carbon, aimed at full reparation and environmental compensation.

Operationally, the Environmental DNA Program is managed by the Geotechnologies Unit (NUGEO), linked to the Operational Support Center for Public Prosecutors' Offices on Environment, Housing and Urbanism, and Cultural Heritage (CAOMA/MPMS), in coordination with the CORTEC/MA Technical Group, Dom Bosco Catholic University (UCDB) via its Environmental Practice Center (NUPAM), and partner agencies such as IBAMA, the Mato Grosso do Sul Environmental Institute (IMASUL), and the Environmental Military Police (PMA-MS). Leveraging satellite imagery and technology, NUGEO performs periodic monitoring of vegetation removal, enabling the accurate identification of unauthorized deforestation. Following detection, technical reports are drafted to underpin extrajudicial and judicial actions by MPMS, targeting offender accountability and damage remediation.

Legally, the program is anchored in the Brazilian Forest Code (Law n. 12.651/2012), particularly Articles 4 and 17 concerning Permanent Preservation Areas (APPs) and Legal Reserves (RL). The existence and integrity of these areas are essential to fulfilling the social-environmental function of property (Arts. 5, XXIII; 186, I and II; and 225 of the Federal Constitution), underscoring the foundational role of prosecutorial action. Hence, the Environmental DNA Program can be regarded as an innovative, effective, and replicable public policy, based on the integrated application of geotechnologies, environmental damage valuation, and legal instruments of accountability, consolidating the Public Prosecutor's Office as an institutional agent of sustainability and transformation.

2. METHODOLOGY

The methodology underpinning the Environmental DNA Program is grounded in the integrated application of geotechnologies, legal-technical analysis, and interinstitutional collaboration. The process begins with remote sensing through multitemporal and multisensor satellite imagery, processed using open-source software such as QGIS and the Google Earth Engine platform. Supervised classification techniques and geospatial modeling are employed to detect unauthorized native vegetation suppression.

Integration of Geographic Information Systems (GIS), land registry databases (Rural Environmental Registry—CAR), and overlays of APPs and RLs enables the identification of illegal deforestation, prioritization of critical areas, and the structuring of preventive action plans at the micro-watershed scale. GIS integration allows for overlaying environmental and land tenure data—including CAR, APPs, and RLs—to identify illegal deforestation occurrences, assess recidivism, and establish enforcement priorities based on micro-watershed boundaries.

NUGEO produces Technical Reports confirming deforestation, which are forwarded to the Environmental Military Police for on-site inspection; in cases of illegal deforestation, property owners are fined. These documents—technical reports and infraction notices—are then submitted to the Environmental Practice Center (NUPAM) or directly to Public Prosecutor's Offices with environmental jurisdiction, triggering Civil Inquiries and, when applicable, the negotiation of agreements for restoration or the filing of Public Civil Actions.

NUPAM, established via cooperation between MPMS and Dom Bosco Catholic University (UCDB), functions as a specialized legal task force. This unit drafts TACs and legal pleadings based on technical data from NUGEO and infractions documented by competent environmental bodies, consistently aligned with the Forest Code provisions.

In cases where illegal deforestation is confirmed, offenders are held accountable through: payment of compensation for past environmental damages; an obligation to restore the degraded area; supplementary civil damages; application of administrative fines by environmental agencies; and potential criminal liability, as applicable.

MPMS's model seeks to ensure speed and efficacy in environmental accountability while deterring future illegal conduct through systematic, technically grounded enforcement. By combining continuous monitoring with prompt legal and technical action, the Environmental DNA Program enables comprehensive deforestation control throughout Mato Grosso do Sul, fostering natural heritage protection, environmental restoration, and institutional coordination.

2.1. ENVIRONMENTAL DNA PROGRAM: VALUATION OF DAMAGES FROM NATIVE VEGETATION REMOVAL AND CARBON EMISSIONS

Valuation of environmental damages from native vegetation removal is a core pillar of the Environmental DNA Program developed by MPMS. The applied methodology aims to measure objectively, technically, and uniformly the harm caused to the environment, especially forest ecosystems, accounting for ecological, economic, and climatic variables.

Among the main parameters used are the volume of suppressed plant biomass; the estimated cost of restoration per hectare; the time required for ecological recovery; the loss of ecosystem services; and, innovatively, the pricing of carbon emitted as a result of deforestation (MPMS, 2022). This approach expands the scope of the prosecutor's office by incorporating the climate dimension of the damage into the environmental valuation, in line with national and international commitments to mitigate climate change.

Carbon loss estimation is based on average carbon content per hectare, considering vegetation type and biomass density, according to data from MapBiomas, IBGE, IBAMA, and specialized scientific literature. The total carbon released into the atmosphere from vegetation removal is monetized by multiplying by the average carbon price in the international voluntary market, referencing platforms like the Voluntary Carbon Market (VCM).

Carbon pricing allows not only quantification of the climatic impact of illegal deforestation but also assigns an economic value to the loss of a key ecosystem service provided by tropical forests: carbon sequestration.

Due to the complexity and high cost of valuation, MPMS guidelines recommend prioritizing this methodology for Public Civil Actions, limiting its use in civil inquiries and extrajudicial recommendations to specific, technically justified cases.

The methodology partly derives from Klotz (2016), combining the replacement cost method with income capitalization to estimate direct and indirect use values of affected environmental resources. Adapted to Mato Grosso do Sul's ecological, normative, and institutional realities, it introduces the following innovations (MPMS, 2022):

- Legal Protection Factor (VPL_e): The final environmental damage value (VDEF) incorporates direct (VD) and indirect (VI) use values, augmented by a factor considering the presence of legally protected areas, such as APPs and RLs, distinguishing impacts in protected zones.
- Value of Profits Gained After Damage (VLAD): Calculates the economic benefit illegally obtained by offenders from degraded land use (livestock, agriculture, forestry, etc.), representing illicit enrichment linked to the environmental infraction.
- Carbon Emissions Valuation (CO₂eq): The methodology includes quantification of carbon emitted from native vegetation suppression using the concept of carbon dioxide equivalent (CO₂eq), as defined by Decision 2 of COP-3 and Article 5 of the revised Kyoto Protocol, allowing comparison across greenhouse gases based on global warming potential.

Monetary estimates result from integrating remote sensing monitoring with on-site inspections across the Cerrado, Pantanal, and Atlantic Forest biomes in Mato Grosso do Sul.

By internalizing greenhouse gas emissions as a damage valuation variable, the Environmental DNA Program establishes a juridical and technical-scientific framework linking environmental accountability with the global climate agenda, effectively supporting Brazil's emission reduction targets under the Paris Agreement.

3. RESULTS ANDA DISCUSSION

Between 2016 and 2024, the Environmental DNA Program identified over 354,000 hectares of deforested areas in Mato Grosso do Sul, with 71,714 hectares classified as illegal deforestation. This unauthorized vegetation removal corresponded to an estimated emission of 4,533,719 tons of carbon directly related to the loss of vegetation cover without proper authorization. During this period, the Public Prosecutor's Office's Geotechnologies Unit (NUGEO/MPMS) produced 1,888 technical reports, which supported 628 administrative sanctions issued by the Environmental Military Police (PMA), IMASUL, and IBAMA. These sanctions resulted in administrative fines totaling approximately BRL 41,153,959.00.

The accumulated program data also show significant achievements in the legal and extra-judicial spheres, including the initiation of 1,147 civil inquiries, filing of 116 Public Civil Actions, and formalization of 543 TACs. These efforts yielded over BRL 6 million in environmental damage compensation and promoted the full restoration of deforested areas, reinforcing MPMS's environmental commitment. Initially, illegal deforestation exceeded authorized deforestation; however, strengthened monitoring, enforcement, and accountability reversed this trend, with legal deforestation now surpassing illegal, reflecting advances in territorial control and rural environmental regularization.

Biome-specific analysis illustrates the program's wide reach across Mato Grosso do Sul. From 2016 to 2024, illegal deforestation accounted for 11,338 hectares in the Cerrado, 8,481 hectares in the Pantanal, and 1,580 hectares in the Atlantic Forest. These figures underscore the critical role of the program's technical, legal, and interinstitutional actions in curbing illegal deforestation, valuing environmental damages, and fostering public policies for accountability and environmental restoration at the state level.

3.1. THE ENVIRONMENTAL DNA PROGRAM'S CONTRIBUTION TO ADDRESSING CLIMATE CHANGE CHALLENGES

The Environmental DNA Program stands out as an essential tool in combating climate change by directly targeting Brazil's principal greenhouse gas emission source: deforestation. Forests play a crucial role in regulating the global climate, storing carbon, reflecting solar radiation, and aiding rain-water retention, thereby providing vast benefits to ecosystems and society. For this reason, the international scientific community agrees that halting deforestation is vital to limiting global warming².

Land use changes caused by deforestation release previously stored carbon into the atmosphere as carbon dioxide (CO₂), a leading greenhouse gas³.

The Environmental DNA Program employs advanced geotechnologies—satellite imagery and GIS—to accurately identify illegal deforestation across Mato Grosso do Sul's biomes. Its contribution, however, goes beyond detection.

The program's innovation lies in its proprietary carbon pricing methodology, which quantifies the climate damage linked to native vegetation removal by estimating the carbon volume lost to sequestration and assigning an economic value to that loss.

² Florestas ajudam a equilibrar o clima. Disponível em: <https://www.wwf.org.br/?10542/Florestas-ajudam-a-equilibrar-o-clima>

³ Como o desmatamento acelera as mudanças climáticas? Disponível em: <https://ipam.org.br/entenda/desmatamento-clima/>

In addition to holding offenders accountable, the MPMS, through Conduct Adjustment Agreements, requires restoration of degraded areas, emphasizing ecological restoration as indispensable for mitigating climate impacts from deforestation. Restoring native vegetation directly contributes to carbon sequestration, reinforcing the climate mitigation cycle and enhancing ecosystem resilience.

Thus, the Environmental DNA Program transcends enforcement and sanctions by fostering public policies aligned with climate justice and international global warming mitigation directives. It demonstrates that environmental protection and climate change mitigation are interdependent processes wherein legal and technological innovation are fundamental for success.

4. CONCLUSIONS

The Environmental DNA Program of the Public Prosecutor's Office of Mato Grosso do Sul represents an innovative and effective strategy against illegal deforestation and climate change impacts in the state. By integrating advanced geotechnologies, technical-legal analysis, and coordinated interinstitutional action, the program enables precise identification of degraded areas, offender accountability, and economic and climatic valuation of environmental damages.

The carbon pricing methodology and the execution of Conduct Adjustment Agreements requiring restoration demonstrate MPMS's commitment not only to punishment but also to ecological restoration, underscoring native vegetation recovery as an essential tool for carbon sequestration and ecosystem resilience.

Between 2016 and 2024, significant progress was made in curbing illegal deforestation, positively impacting the conservation of Mato Grosso do Sul's Cerrado, Pantanal, and Atlantic Forest biomes. Beyond reducing emissions and protecting the environment, the program's actions foster offender accountability and damage remediation, ensuring that climate change costs and responsibilities are fairly distributed. Restoring degraded areas benefits society broadly, especially communities dependent on ecosystem services and directly affected by environmental degradation.

In summary, the Environmental DNA Program offers a strategic and effective response to illegal deforestation in Mato Grosso do Sul, with consequences extending beyond local borders to global climate stability. By combining high-precision geospatial monitoring, robust legal enforcement, and innovative environmental damage valuation—including carbon pricing—the initiative not only monitors and sanctions offenders but also promotes full damage remediation and deters future violations. Identification of over 71,000 hectares of illegal deforestation and the imposition of multi-million-dollar fines between 2016 and 2024 demonstrate the program's effectiveness, which has reversed historical trends by making legal deforestation exceed illegal, consolidating significant advances in environmental governance and territorial regularization.

REFERENCES

BEECH, E.; RIVERS, M.; OLDFIELD, S.; SMITH, P. GlobalTreeSearch: the first complete global database of tree species and country distributions. **Journal of Sustainable Forestry**, vol. 36, no. 5, pp. 454–489, 2017.

GONÇALVES, Ariadne Barbosa et al. The Role of the Public Prosecutor's Office of Mato Grosso do Sul in Monitoring Deforestation through Geotechnologies: The Environmental DNA Program. In: PARANHOS FILHO, Antonio Conceição et al. (eds.). **Geotechnologies for Environmental Applications** [electronic resource]. Maringá, PR: Uniedusul, 2021, pp. 337–350.

KLOTZ, A. O. Valuation of Damage to Natural Forest Ecosystems in Environmental Criminal Expert Reports in the State of Bahia. 2016. 120 p. Master's Thesis (Professional) – Graduate Program in Environmental Criminal Expertise, Federal University of Santa Catarina, Florianópolis, 2016.

MATO GROSSO DO SUL. Public Prosecutor's Office of the State. Technical Note: Guidelines for Environmental Damage Valuation in Public Prosecutor Procedures in Mato Grosso do Sul. Compilation (vols. I, II, III). Campo Grande, MS, 2022.

SOS RIOS PROGRAM: A CLIMATE ADAPTATION AND MITIGATION STRATEGY THROUGH WATER PROTECTION AND RIPARIAN FOREST RESTORATION IN MATO GROSSO DO SUL

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Abstract: Established in 2008 by the Public Prosecutor's Office of the State of Mato Grosso do Sul (MPMS), the **SOS Rivers Program** aims to promote the environmental compliance of properties located along rivers and streams through technical assessments, legal measures, and interinstitutional cooperation. Present in 46 municipalities and covering over 4,000 kilometers of inspected waterways, the initiative involves MPMS, the State University of Mato Grosso do Sul (UEMS), the Environmental Military Police, and civil society.

Since 2019, with the creation of the Integrated Center for Environmental Protection and Research (CEIPPAM), the program has incorporated methodological innovations based on geoprocessing and on-site inspections. Beyond protecting and restoring water resources, SOS Rivers has progressively incorporated approaches related to climate change, the economic valuation of environmental damage, and the potential development of carbon credit mechanisms. Although these strategies are not yet fully implemented, the program is advancing toward becoming a strategic tool for climate mitigation and the promotion of regional sustainability.

This article presents the program's methodological foundations, achieved results, and main challenges, highlighting its role in water resource protection, socio-environmental valuation, and in strengthening the Public Prosecutor's problem-solving function.

Keywords: environmental restoration; environmental assessment; land regularization; geoprocessing; climate change; environmental damage valuation; carbon credits; river basins; Public Prosecutor's Office.

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1. INTRODUCTION

The river basins of Mato Grosso do Sul have undergone significant degradation caused by deforestation, sedimentation, irregular land occupation, and climate change. In response, the SOS Rivers Program was created in 2008 by the State Public Prosecutor's Office (MPMS) as an integrated strategy to mitigate impacts on Permanent Preservation Areas (APPs) and legal reserves, combining technical, scientific, and legal expertise.

The program's central objective is to generate accurate environmental and legal data on properties along watercourses, supporting their environmental compliance and the restoration of native vegetation. In 2019, through an agreement with the State University of Mato Grosso do Sul (UEMS), the program established the Integrated Center for Environmental Protection and Research (CEIPPAM), responsible for producing detailed environmental assessments.

Over time, the program expanded to address climate change, recognizing that riparian forest conservation is essential for both environmental protection and climate regulation. These areas naturally contribute to carbon sequestration, hydrological cycle regulation, and erosion control. Consequently, SOS Rivers adopted the economic valuation of environmental damage, enabling the estimation of losses caused by ecosystem degradation and supporting more effective reparation measures. This approach also opens the door to the future integration of economic instruments, such as carbon markets, where the restoration of native vegetation may generate certified environmental credits—carbon or biodiversity credits—particularly in APPs.

Although these mechanisms are not yet fully implemented, they represent a strategic opportunity to align local actions with global climate policies, while strengthening the region's environmental and socio-economic sustainability.

2. METHODOLOGY

The actions of the SOS Rivers Program are structured around three complementary and interdependent methodological axes:

2.1. ENVIRONMENTAL ASSESSMENT THROUGH GEOPROCESSING

The program applies geotechnologies to identify and analyze Permanent Preservation Areas (APPs), legal reserves, native vegetation fragments, and anthropized areas. Satellite imagery (Landsat, Sentinel, WorldView) is processed using Geographic Information Systems (GIS), such as QGIS. Property boundaries, provided by MPMS, are overlaid with environmental and land-use data, generating thematic maps that support technical, legal, and economic analyses.

2.2. FIELD INSPECTIONS AND DATA VALIDATION

A UEMS technical team conducts on-site inspections, prioritizing properties that lack proper registration in official systems (CAR, INCRA, IMASUL). Environmental data are collected in situ using GPS devices, drones, photographic records, and interviews with landowners, alongside the collection of complementary documentation. This stage validates and refines remote-sensing data, ensuring greater accuracy and reliability in environmental diagnoses.

2.3. TECHNICAL REPORTS AND ENVIRONMENTAL DAMAGE VALUATION

For each inspected property, detailed technical reports are prepared, consolidating environmental, land, and economic information. These reports provide the basis for MPMS actions, which may include initiating Civil Inquiries, signing Terms of Conduct Adjustment (TACs), filing Public Civil Actions (ACP), and proposing measures for environmental compliance and restoration.

The economic valuation of environmental damage follows the methodology outlined in the Technical Note on Environmental Damage Valuation (MPMS, 2022), which considers:

- Direct restoration costs, based on market prices for ecological recovery;

- Loss of ecosystem services, including hydrological regulation, erosion control, and biodiversity conservation;

- Estimated avoided carbon, in accordance with ABNT NBR 14653-6:2008 and established carbon pricing methodologies;

- Time-based damages, corresponding to the period between environmental destruction and full restoration of ecosystem functions, consistent with the Superior Court of Justice (STJ) interpretation that environmental damages require full reparation.

This approach allows for the quantification of environmental liabilities and the identification of opportunities to implement, even preliminarily, compensation mechanisms and carbon credit generation. Although these instruments are not yet fully applied, they reinforce the program's role as a tool for tackling climate change and enhancing the economic valuation of environmental assets at the regional level.

3. RESULTADOS E DISCUSSÕES

The **SOS Rios** Program, coordinated by the Environmental Protection Support Center of the Public Prosecutor's Office of Mato Grosso do Sul (CAOMA/MPMS), is supported by the Environmental Military Police and the Mato Grosso do Sul State University (UEMS). The partnership with UEMS began with a pilot project along the Curupaí and Engano streams, covering three municipalities and more than 200 km of riparian zones (Figures 1, 2, and 3).

During this phase, 75 technical reports were produced — 64 based on geoprocessing and 11 from field inspections — with the support of professors, scholarship holders, geoprocessing laboratories, and technology resources. The project's total cost was R\$ 799,596.95, funded through Conduct Adjustment Agreements and Preliminary Hearing Terms, with financial management by UEMS and technical and institutional oversight by MPMS.

Figure 1. Location of Fazenda Nossa Senhora Aparecida, registered under CARMS No. 0004150, within the Engano Stream Watershed. (Source: Lasange/UEMS)

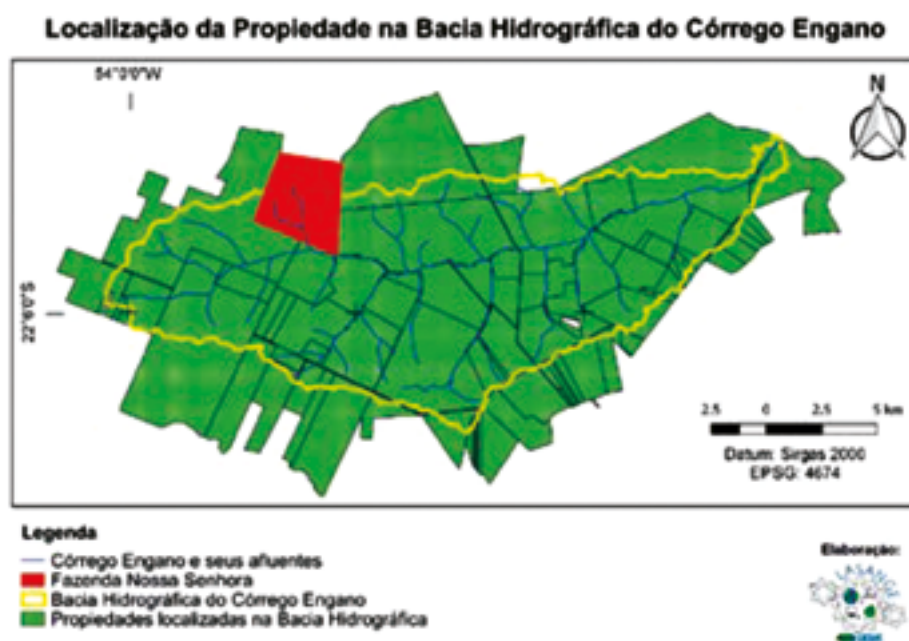


Figure 2. Map of Fazenda Nossa Senhora Aparecida, registered under CARMS No. 0004150, based on data from SICAR. (Source: Lasange/UEMS)

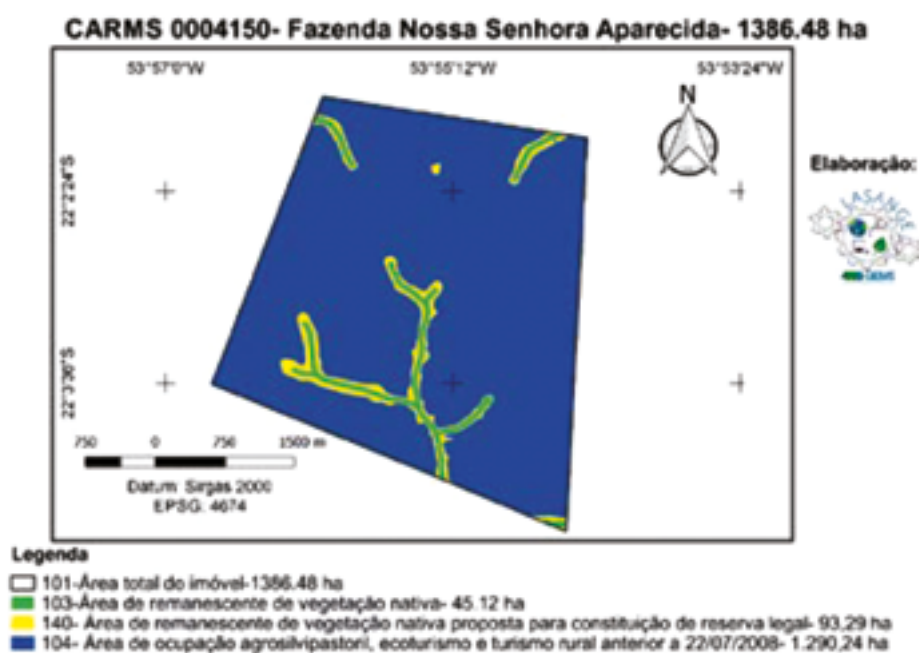
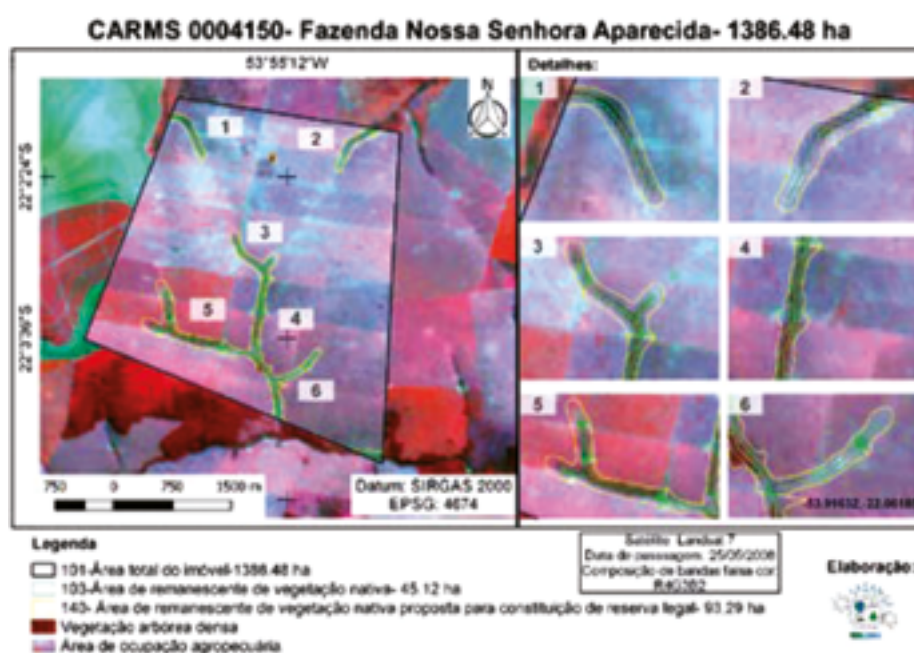


Figure 3. Map of Fazenda Nossa Senhora Aparecida, registered under CARMS No. 0004150. (Source: Lasange/UEMS)



The program has progressively expanded its scope to include the economic valuation of environmental damages, particularly those arising from the suppression of native vegetation and the degradation of Permanent Preservation Areas (APPs) and legal reserves. This valuation enables the quantification of environmental impacts in monetary terms, supporting more effective restorative measures and contributing to climate change mitigation through carbon sequestration.

Given the potentially significant financial implications of such valuations, their application is primarily recommended within judicial proceedings, especially for enforcing Conduct Adjustment Agreements (TACs) or filing Public Civil Actions (ACPs), thereby enhancing accountability and environmental damage remediation.

The adopted methods align with the guidelines of the **Technical Note on Environmental Damage Valuation** (MPMS, 2022), with an emphasis on full in situ restoration. In cases of irreversible damage, environmental compensation or monetary indemnification is applied. Decision-making criteria include land cover type, degree of anthropogenic impact, natural regeneration potential, and carbon storage capacity.

The valuation methodologies are grounded in the Brazilian standard ABNT NBR 14653-6:2008, taking into account direct and indirect use values, as well as option and existence values of environmental goods. These parameters underpin the obligations defined in TACs and public civil actions.

Economic valuation has also driven integration with market-based conservation instruments, particularly carbon credit generation. Pricing is based on restored biomass and the volume of sequestered CO₂ equivalent, linking the program to both regulated and voluntary carbon markets and expanding avenues for sustainable financing.

To date, the **SOS Rios** Program has consolidated 28 environmental projects across 46 municipalities in Mato Grosso do Sul. In total, 2,736 rural properties have been inspected, and over 4,100 km of rivers and streams have been mapped. As a result of 1,432 Civil Inquiries, several outcomes

have been recorded: 838 were archived following corrective actions, 498 led to the filing of Public Civil Actions, 13 resulted in the enforcement of Conduct Adjustment Agreements, and 83 are still in progress.

These actions support offender accountability, regularization of Permanent Preservation Areas, and the development of public policies aimed at environmental protection. Moreover, they play a strategic role in addressing climate change by promoting the conservation of ecosystems critical to climate balance and greenhouse gas emission mitigation.

The integration of technical knowledge with legal action enhances the problem-solving capacity of MPMS, particularly in mediating socio-environmental conflicts and promoting land tenure regularization — a key factor in ensuring legal certainty for rural landowners and enabling the effective implementation of environmental measures. The use of open-source technologies and data from the **Rural Environmental Registry** (SICAR) ensures accurate diagnostics, fosters institutional transparency, and strengthens public participation.

Despite significant progress, the program still faces budgetary constraints that limit its operations across the full extent of watershed areas, concentrating efforts primarily along watercourse margins. This limitation hinders the full realization of anticipated environmental and climate benefits. To overcome this challenge, the program must be institutionalized as a permanent public policy. This requires securing stable funding sources and integrating the initiative into broader public policies related to environmental protection, basic sanitation, and climate change adaptation.

4. ECONOMIC VALUATION AND ACCOUNTABILITY

The program underscores the importance of economic valuation in addressing the illegal clearing of native vegetation and unauthorized construction within Permanent Preservation Areas (APPs), both of which increase environmental risks and constitute legal infractions.

The systematic application of valuation enables the estimation of vegetation restoration costs, losses in ecosystem services, and the recovery of the environmental functions of impacted areas. In line with the Technical Note on Environmental Damage Valuation (MPMS, 2022), the approach prioritizes the removal of illegal constructions and on-site restoration, in accordance with the jurisprudence of Brazil's Superior Court of Justice (STJ) and the provisions of the Forest Code (Law No. 12.651/2012).

The technical criteria adopted include the degree of anthropogenic disturbance, time elapsed since suppression, regeneration capacity, ecological significance, and carbon sequestration potential, all in compliance with the ABNT NBR 14653-6:2008 standard.

This information underpins the obligations stipulated in Conduct Adjustment Agreements (TACs) and Public Civil Actions, with specific clauses regarding demolition, fencing, reforestation, and ongoing monitoring.

The program reinforces the legal principle that APPs are inalienable public assets protected for their ecological functions. It also emphasizes that environmental damage—whether resulting from omission or committed in good faith—is subject to objective liability.

Accountability encompasses not only direct perpetrators and beneficiaries but also public entities that fail to act, as established by Article 225, § 3 of the Brazilian Federal Constitution. This provision states that actions harmful to the environment may subject offenders—whether individuals or legal entities—to criminal and administrative penalties, independently of their obligation to remedy the damage caused.

In other words, § 3 of Article 225 establishes both criminal and administrative liability for polluters and environmental offenders, reinforcing the notion that the environment is a common good of the people and essential to a healthy quality of life.

Thus, the Federal Constitution ensures not only the right to an ecologically balanced environment but also establishes legal consequences for those who harm it, thereby strengthening the enforceability of environmental protection.

5. SOS RIOS PROGRAM: A MULTIFACETED CLIMATE STRATEGY

The **SOS Rios** Program, developed by the Public Prosecutor's Office of Mato Grosso do Sul, stands out as an innovative initiative—not only for the environmental regularization of rural properties but also as a strategic response to the challenges posed by climate change. The program focuses on protecting and restoring Permanent Preservation Areas (APPs), especially riparian forests, which play a crucial role in both climate mitigation—through carbon sequestration and biodiversity conservation—and adaptation, by regulating hydrological cycles, controlling erosion, and safeguarding water quality and availability.

This integrated approach directly contributes to increasing the resilience of rural ecosystems in the face of extreme weather events such as prolonged droughts and floods.

A significant step in consolidating the program's climate dimension was the adoption of environmental damage valuation, as outlined in the **Technical Note on Environmental Damage Valuation** (MPMS, 2022). Monetizing environmental losses strengthens the legal basis for demanding full remediation and opens the door to the future application of economic instruments such as carbon credits. Although these mechanisms are still being structured within the program, they present promising opportunities to link local conservation efforts to global climate policies, facilitating access to sustainable funding and generating broader socio-environmental benefits.

However, for **SOS Rios** to fully realize its potential as a public policy for climate adaptation and mitigation, two major challenges must be addressed: budget limitations and the restricted territorial scope, currently focused mainly on riverbanks. Institutionalizing the program as a permanent public policy, with stable funding sources and expanded coverage across entire watershed areas, is essential to enhancing its effectiveness and reach.

With these advancements, the program could become one of the leading state-level strategies for addressing climate change, promoting water security, ecological resilience, and the development of a green economy. In this context, the Public Prosecutor's Office plays a proactive role in shaping a more environmentally balanced and socially just future.

6. CONCLUSION

The **SOS Rios** Program has established itself as a significant and multifaceted initiative in the protection of water resources and the promotion of environmental regularization in the state of Mato Grosso do Sul. By integrating technical diagnostics, legal action, institutional cooperation, and environmental valuation strategies, the program is making strides in addressing regional socio-environmental and climate challenges.

Its science-based, technology-driven, and interinstitutional approach has contributed meaningfully to the restoration of riparian forests and Permanent Preservation Areas, reinforcing the importance of these zones for water security, biodiversity, and climate change mitigation. The adoption of economic valuation of environmental damage, though still in its early stages, strengthens the legal foundation of the Public Prosecutor's actions and paves the way for promising tools such as conservation finance and carbon credits.

Despite these advances, financial constraints and the program's limited geographic scope highlight the need for its definitive institutionalization as a permanent public policy, supported by stable funding and expanded jurisdiction across all watershed territories. By doing so, **SOS Rios** can emerge as a national benchmark in the development of sustainable and effective solutions for environmental protection, climate adaptation, and the advancement of environmental justice.

REFERENCES

Rural Environmental Registry – SICAR. Ministry of the Environment, 2020.

National Council of Public Prosecutors. The Role of the Public Prosecutor's Office in Environmental Protection. Brasília: CNMP, 2021.

Public Prosecutor's Office of the State of Mato Grosso do Sul. **SOS Rios Program – Technical Reports**, 2015–2021.

Mato Grosso do Sul. Public Prosecution Service. **Technical note**: guidelines for environmental damage valuation in procedures of the Public Prosecution Service of Mato Grosso do Sul. Compilation (volumes I, II and III). Campo Grande, MS, 2022.

Mato Grosso do Sul State University and MPMS. **CEIPPAM Project – Technical-Scientific Agreement**, Annexes I and II, 2018–2020.

THE RENEWABLE ENERGY PROJECT OF THE PUBLIC PROSECUTOR'S OFFICE OF RIO GRANDE DO NORTE: STRATEGIC ACTION FOR SUSTAINABILITY AND SOCIAL JUSTICE

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Abstract: The state of Rio Grande do Norte is experiencing an accelerated and massive expansion of energy generation from renewable sources, notably wind and solar, positioning itself as a national leader in this sector. Although this represents a fundamental advancement in the transition of the Brazilian energy matrix, this process has been accompanied by significant socio-environmental conflicts and impacts, disproportionately affecting traditional communities, family farmers, and agrarian reform settlers. A paradox is observed where the implementation of “clean” energy generates negative externalities, such as the forced displacement of populations, the degradation of sensitive ecosystems, and the accentuation of social inequalities. In response to this complex scenario, the Public Prosecutor's Office of Rio Grande do Norte (MPRN), through its Center for Operational Support to the Environmental Defense Prosecutor's Offices (CAOP Meio Ambiente), has structured the strategic project “Renewable Energies.” The initiative aims to induce the implementation of sustainable and socially just practices in the installation and operation of these enterprises. This article analyzes the conception, foundations, and methodology of the said project, which is based on interdependent lines of action, such as participatory territorial planning, the enforcement of socio-environmental compensation, the promotion of qualified social participation, and the training of the actors involved. The initiative ultimately seeks to influence the formulation and execution of public policies to ensure that the energy transition in the state occurs in full harmony with the protection of the environment and the promotion of human dignity.

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1. INTRODUCTION

The global energy transition imposes an undeniable leading role on Brazil, and particularly on the state of Rio Grande do Norte. Possessing extraordinary wind and solar potential, the state has become a hub for investments in renewable energies, positioning itself at the forefront of clean energy generation in the country. However, the rapid and massive expansion of these enterprises has revealed a crucial paradox: the advancement of a “green” agenda does not always translate into socially just and environmentally balanced development.

It is in this complex scenario that the Public Prosecutor’s Office of Rio Grande do Norte (MPRN), through its Center for Operational Support to the Environmental Defense Prosecutor’s Offices (CAOP Meio Ambiente), structures the “Renewable Energies” project. The initiative represents a strategic institutional response to the growing demand for governance that transcends the mere accounting of generated megawatts, seeking to induce the Public Power and the private sector to adopt policies that guarantee sustainability and social justice as pillars of the energy transition.

This document aims to analyze the structure, objectives, and methodologies of the said project, demonstrating its relevance as an instrument of proactive prosecutorial action in the defense of fundamental and intergenerational rights to an ecologically balanced environment, as advocated by article 225 of the Federal Constitution.

2. DEVELOPMENT

2.1. CONTEXTUALIZATION: THE PARADOX OF THE ENERGY TRANSITION IN RIO GRANDE DO NORTE

The transition to a low-carbon energy matrix is a global imperative and a strategic opportunity for Brazil. In this landscape, Rio Grande do Norte, due to its natural conditions—such as the constancy of winds and high solar incidence—has assumed a vanguard position, attracting large investments and becoming one of the largest producers of wind and solar energy in the country. This progress, however, has not been without profound contradictions. The rapid and, at times, disorderly occupation of the territory for the installation of large energy complexes has revealed a complex paradox: the development of a conceptually “clean” energy has generated what can be considered a social and environmental “mess,” whose costs are not properly internalized by the entrepreneurs.

The justification for the prosecutorial action, consolidated in the “Renewable Energies” project, stems from the factual observation of profound and asymmetric socio-environmental impacts that fall, for the most part, on the most vulnerable populations. The implementation model, often lacking integrated territorial planning and effective and transparent dialogue with local communities, results in a list of adverse consequences: forced displacement of families from their lands; suppression of native vegetation of the Caatinga biome; soil compaction; alteration of the water dynamics; damage to the health of the surrounding population, resulting from the continuous noise pollution emitted by wind turbines and the dust during the installation phases; and the accentuation of inequalities through the concentration of economic benefits, such as the negligible amounts paid in lease agreements.

As pointed out in the critical analysis by Scalabrini (2021), sectoral reports and developmentalist discourses tend to overestimate positive economic indicators (such as the increase in municipal Gross Domestic Product and the generation of jobs, which are largely temporary) to the detriment of long-term social and environmental liabilities. It is precisely this analytical and governance gap that the MPRN seeks to fill, acting to ensure that development is synonymous with improving the quality of life for the entire community, in accordance with the principle of sustainable development.

The legitimacy of the prosecutorial action is solidly anchored in article 225 of the Federal Constitution, which enshrines the fundamental and intergenerational right to an ecologically balanced environment. Furthermore, the action is supported by infra-constitutional legal frameworks, such as the National Environmental Policy (Law No. 6,938/81), which establishes the principles of prevention, precaution, and public participation, and, at the state level, the State Environmental Policy and System (Complementary Law/RN No. 272/2004), which provides for crucial instruments such as socio-environmental compensation.

2.2. OBJECTIVES AND STRATEGIC PILLARS OF THE PROJECT

The general objective of the project is “to foster the implementation of sustainable and inclusive socio-environmental practices in the installation and operation of renewable energy enterprises in Rio Grande do Norte.” To achieve this goal, the action was structured into four complementary and interdependent strategic pillars, which address the multiple dimensions of the problem.

1. **Territorial Planning and Protection of Sensitive Areas:** In an approach that seeks to overcome the purely reactive logic of case-by-case environmental licensing, the project advocates that planning and territorial ordering must precede the installation of the enterprises. The central proposal is the identification and establishment of exclusion and restriction zones for energy projects, based on criteria of environmental relevance (protection of biomes, ecological corridors), cultural relevance (archaeological sites, territories of traditional communities), and socio-economic relevance (priority areas for family farming and food security).

The main tool for this action is the incorporation of Social Cartographies as a technical-legal instrument in the environmental licensing process. Produced by the extension project “Achados Territoriais” of the Federal University of Rio Grande do Norte (UFRN) in collaboration with social movements (NGO Seridó Vivo and Coletivo Cirandas), these cartographies are a method of participatory mapping that translates the knowledge, experiences, and perceptions of the communities themselves about their territories. By giving visibility to uses, customs, and relationships that do not appear on official maps, social cartography becomes a powerful tool for the defense of rights and for the construction of more democratic and just planning, giving local knowledge a central status in state planning.

- 2. Socio-environmental Justice and Enforcement of Compensation:** This pillar aims to ensure the effective application of environmental legislation to mitigate unavoidable damages and to ensure that the benefits of the energy transition are distributed more equitably. The central action is the demand for socio-environmental compensation, provided for in article 11, item II, of State Complementary Law No. 272/2004. This legal instrument determines that enterprises causing significant environmental impact must support the implementation and maintenance of conservation units.

The project works to ensure that this instrument is duly regulated and incorporated into the licensing process, ensuring that the resources are allocated not only to the protection of natural areas but also to the sustainable development of the directly impacted communities, in observance of the polluter-pays principle. The prosecutorial action also seeks to discuss the adequate valuation of these damages and the governance of the resulting funds, so that compensation is not a mere formal requirement, but an effective mechanism of environmental justice.

- 3. Qualified Social Participation and Transparency:** The project is based on the assumption that legitimate and sustainable environmental decisions require broad, informed, and effective social participation. To this end, it seeks to overcome the often-perfunctory nature of participatory mechanisms. The strategies include:

- **Holding regional seminars:** Events organized in hub cities (Caicó, Macau, Natal) to create a space for dialogue and information leveling among the public sector, the productive sector, academia, and civil society, debating the multiple aspects (environmental, social, technical, and legal) of the enterprises.
- **Promoting decentralized public hearings:** Pleading with the environmental licensing body (IDEMA) that the public hearings of large energy complexes, which often span multiple municipalities, take place in all directly affected locations. The current practice of holding a single, concentrated event in just one city makes it impossible for a large part of the impacted population to participate, violating the spirit of CONAMA Resolution No. 09/1987.
- **Giving visibility to the theme:** Using institutional communication channels to promote the inclusion of the debate in the public sphere, qualifying society's perception of the complexity of the energy transition.

4. **Training and Institutional Strengthening:** The marked asymmetry of information and technical capacity among the different actors involved in the licensing process is recognized. To mitigate this imbalance, the project provides for the training of members and staff of the Public Prosecutor's Office itself, public managers, technicians from environmental agencies, and, fundamentally, representatives and leaders of local communities. The training topics range from the interpretation of environmental impact studies (EIA/RIMA) and applicable legislation, to the rights of affected populations and the mechanisms of negotiation and social control. This pillar is crucial for strengthening environmental governance and empowering communities so that they can participate in a more qualified and incisive way in the defense of their rights.

3. EXPECTED RESULTS AND FUTURE PERSPECTIVES

The “Renewable Energies” project transcends judicializing and reactive action, configuring itself as a strategic initiative that aims for structural and long-term results. The successful implementation of its lines of action has the potential to generate significant impacts on the socio-environmental governance of the state of Rio Grande do Norte.

It is expected, firstly, to directly influence the formulation and execution of public policies, promoting a paradigm shift in environmental licensing. The objective is for licensing to cease being a mere bureaucratic process and to systematically incorporate the evaluation of locational alternatives, participatory territorial planning, and the analysis of the cumulative and synergistic impacts of the enterprises. The consolidation of the use of social cartographies as an official instrument may represent an unprecedented advance in the recognition of the territorial rights of communities and in the application of environmental justice.

Furthermore, the initiative seeks to improve reparation mechanisms, ensuring that socio-environmental compensation becomes an effective instrument of local development. The strengthening of social participation, through more accessible public hearings and a more qualified public debate, tends to generate more legitimate and transparent decisions and to reduce the asymmetry of power between entrepreneurs, the public sector, and affected communities.

Ultimately, the success of the project has the potential not only to transform the reality of the energy transition in Rio Grande do Norte, making it more just and sustainable, but also to establish a model of proactive prosecutorial action that can be replicated in other states facing similar challenges. It reaffirms the constitutional role of the Public Prosecutor's Office as an inducer of public policies and a defender of the legal order, the democratic regime, and unavailable social and individual interests, working to ensure that the path to a future of clean energy is also a path of social justice and unconditional respect for the environment for present and future generations.

BIBLIOGRAPHICAL REFERENCES

ASSOCIAÇÃO BRASILEIRA DE ENERGIA EÓLICA (ABEEólica). **Guia de Boas Práticas Socioambientais para o Setor Eólico** [Guide of Good Socio-environmental Practices for the Wind Sector]. São Paulo: ABEEólica, 2024.

BRASIL. **Constituição da República Federativa do Brasil de 1988** [Constitution of the Federative Republic of Brazil of 1988]. Brasília, DF: Presidência da República. Available at: http://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Accessed on: Aug. 05, 2025.

BRASIL. Lei nº 6.938, de 31 de agosto de 1981. Dispõe sobre a Política Nacional do Meio Ambiente, seus fins e mecanismos de formulação e aplicação, e dá outras providências [Law No. 6,938, of August 31, 1981. Provides for the National Environmental Policy, its purposes and mechanisms of formulation and application, and gives other provisions]. Brasília, DF: Presidência da República. Available at: http://www.planalto.gov.br/ccivil_03/leis/l6938.htm. Accessed on: Aug. 05, 2025.

CONSELHO NACIONAL DO MEIO AMBIENTE (CONAMA). Resolução nº 09, de 3 de dezembro de 1987. Dispõe sobre a realização de Audiências Públicas no processo de licenciamento ambiental [Resolution No. 09, of December 3, 1987. Provides for the holding of Public Hearings in the environmental licensing process]. Brasília, DF: MMA.

MINISTÉRIO DE MINAS E ENERGIA (MME). **Transição energética: a mudança de energia que o planeta precisa** [Energy transition: the energy change the planet needs]. Gov.br, 2023. Available at: <https://www.gov.br/mme/pt-br/assuntos/noticias/transicao-energetica-a-mudanca-de-energia-que-o-planeta-precisa>. Accessed on: Aug. 05, 2025.

RIO GRANDE DO NORTE (Estado). Lei Complementar nº 272, de 3 de março de 2004. Dispõe sobre a Política e o Sistema Estadual do Meio Ambiente e dá outras providências [Complementary Law No. 272, of March 3, 2004. Provides for the State Environmental Policy and System and gives other provisions]. Natal, RN: Assembleia Legislativa.

SCALAMBRINI COSTA, Heitor. **Geração Eólica e Práticas Socioambientais** [Wind Generation and Socio-environmental Practices]. Universidade Católica de Pernambuco, 2021. Available at: <https://portal.unicap.br/e/geracao-colica-e-praticas-socioambientais>. Accessed on: Aug. 05, 2025.

ACTIONS OF THE RIO GRANDE DO SUL PUBLIC PROSECUTION SERVICE IN COMBATING CLIMATE CHANGE

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The relentless advance and worsening effects of climate change is a challenging reality that prosecutorial agents are increasingly facing in their daily professional activities. Now more than ever, the current moment demands urgent investment in the improvement and qualification of all involved actors, so that they are equipped with all necessary tools and prepared to diligently adopt the measures needed to minimize the consequences arising from extreme climate events.

In this context, the Public Prosecution Service of the State of Rio Grande do Sul – which recently suffered the greatest climate tragedy in its history, with significant events initially centered in the Taquari Valley region (Sept/Nov 2023) and later spreading systemically to almost the entire territory of Rio Grande do Sul (Apr/May 2024) – took a pioneering step in November 2023 by establishing the Climate Studies Office (Gabinete de Estudos Climáticos), through Ordinance No. 90/2023-PGJ. The structuring of GabClima, directly linked to the Office of the Prosecutor General of Justice, was intentional, reinforcing the understanding that the issue is one of the Institution's priorities, without neglecting due attention to other fundamental rights, equally important and under the responsibility of the Public Prosecution Service.

Composed of the Coordinators of all Operational Support Centers, Prosecutors and Promoters of Justice with responsibilities in disaster-prone áreas and representatives of the Technical Advisory Office (GAT), GabClima's committee essentially acts in identifying vulnerabilities and highlighting the needs for addressing issues related to socio-environmental disasters and climate change, aiming to adapt the Public Prosecution Service to this new reality and reinforce the importance of interdisciplinary and multi-scalar action. Although recently created, the structure's brief history is detailed in a work available on the MPRS website², and has resulted in the production of significant technical-legal material regarding disasters, including guides, orientation booklets and basic protocols.

Based on the results of a survey conducted by GabClima, indicating the existence of 461 cases initiated (as of December 2024) solely in relation to the extreme climate event of 2024, and the consequent need to guide and standardize the actions of MPRS members in the context of socio-environmental disasters, the Operational Support Centers were prompted to develop action protocols. Accordingly, the Operational Support Center for Environmental Protection (CAOMA) produced a doc-

1 Prosecutor of Justice, Coordinator of CAOMA.

2 Available at: <https://www.mprs.mp.br/media/areas/gabclima/arquivos/ebookgabclima.pdf>. Accessed on: July 22, 2025.

ument listing the actions to be prioritized by Promoters of Justice in the numerous areas potentially affected in a climate disaster scenario, especially regarding animal welfare, solid waste, artesian wells and water resources, historical and cultural heritage, and dams.

Additionally, the Operational Support Center for Urban Planning and Land Issues, following the first disaster in the Taquari Valley region in September 2023, launched a project to produce technical studies on disaster-susceptible areas in the region's municipalities. The objective of the initiative is to support the actions of the Public Prosecution Service in monitoring and overseeing urban (re)planning policies. The technical studies, produced by architects and urban planners of the unit, present suggestions to be incorporated into the revision of Master Plans, especially concerning the delimitation of areas susceptible to hydrological and geological events in municipalities affected by the 2023 and 2024 climate disasters. The documents also contain guidelines for rebuilding structures in directly affected areas. Initially focused on the Taquari Valley municipalities, the project's scope was expanded due to demands from other Prosecutors' Offices facing similar risks and requiring technical support. The project is developed in coordination with other institutional actors, presenting the technical studies to municipal teams and the consultants responsible for revising the respective Master Plans.

To optimize the initial allocation of resources and focus attention, the Institution also selected four priority areas for action in 2024, all of which have already been completed. They are:

1. Greenhouse Gas (GHC) Inventory of the institutional carbon emissions:

Aiming to meet the goal of reducing carbon emissions from the institutional headquarters, a memorandum of understanding was signed with ILADES and SENAI/RS to inventory greenhouse gas emissions generated by the Public Prosecution Service's activities at its main office, covering Scopes 1, 2, and 3. During the inventory process, the MPRS launched the "MP Less Carbon" Action, consisting of a questionnaire for Members and Staff regarding commuting to work. Positive highlights included practices already promoted by MPRS, such as the Carpooling Project. The inventory results³, completed in July 2024, were presented at the 5th International Climate Change Forum. Currently, the Institution is working to actually reduce emissions based on the Inventory, implementing actions such as changing replace fossil fuel in its own fleet and expanding the sustainable carpooling project.

2. Purchase of sustainable energy in the free market: Reinforcing its commitment and leadership on the climate agenda, on May 16, 2025, the Public Prosecution Service of Rio Grande do Sul signed a contract with Mercatto Comercializadora de Energia Ltda., winner of the Electronic Auction No. 61/2024, for the supply of renewable energy to 26 consumer units of the Prosecutor General's Office for a period of five years⁴. This contract, which represented the Institution's first concrete step in implementing an internal sustainability

3 Available at: <https://storage2.me-qr.com/pdf/7f9de5c8-2c21-4d00-bd11-a03cbeb78ff4.pdf>. Accessed on: July 25, 2025.

4 Available at: <https://www.mprs.mp.br/noticias/ambiente/61851/>. Accessed on: July 07, 2025.

policy and climate planning, was already listed among the actions to help achieve the goals of the Sustainable Logistics Plan (PLS)⁵, particularly regarding the rationalization of energy consumption supplied by utility companies.

3. Diagnosis and report on the State's structure and situation in the face of climate disasters and MPRS action, resulting in the publication of an e-book available on the Institution's website⁶.
4. **Training Course in State and Municipal Civil Defense and Community Engagement:** The Public Prosecutor's Office of Rio Grande do Sul (MPRS), through an initiative of the Climate Studies Office (GABCLIMA MPRS), the Operational Support Center for Environmental Defense (CAOMA), in partnership with the Military House – via the Deputy Office for Protection and Civil Defense – and through the Center for Studies and Functional Improvement (CEAF), promoted the Basic Course on Protection and Civil Defense. The objective was to train and standardize the knowledge of operators within the State System for Protection and Civil Defense (SIEPDEC) who work directly or indirectly in civil defense activities, enabling them to improve the quality of their actions throughout the area covered by the state coordination⁷.

Moreover, on October 10, 2024, the Rio Grande do Sul Public Prosecution Service signed a technical cooperation agreement with AECOM, a provider of environmental services in Brazil and abroad, to afford technical assistance in formulating reconstruction and disaster prevention strategies for the State⁸.

Parallel to the actions led by GabClima and other intra and interinstitutional initiatives, MPRS filed a public civil action on March 31, 2025, seeking to hold the Municipality of Porto Alegre liable for compensation for collective moral damages and individual homogeneous material and moral damages resulting from the historic flood that affected the state capital from April 27 to the end of May 2024. In the petition (attached), the Public Prosecution Service substantiates the municipality's duty to compensate inhabitants or business owners affected by the hydrological disaster of April and May 2024 due to the deliberate and voluntary omission in taking adequate, efficient, and timely surveillance, monitoring, maintenance, and modernization actions regarding the structural solutions comprising the Flood Protection System.

Indeed, during the most critical period of the 2024 disaster, in early May, when a state of public calamity had already been declared in Rio Grande do Sul, the Specialized Prosecutor's Office of Caxias do Sul filed a public civil action (petition attached) against the municipality, aiming to ensure the effective operation of the National Civil Protection and Defense System, especially by

5 The Sustainable Logistics Plan of the Public Prosecutor's Office of Rio Grande do Sul is a governance instrument, linked to strategic planning, with defined objectives and responsibilities, actions, goals, execution deadlines, monitoring mechanisms, and result evaluation. It enables the establishment and tracking of sustainability practices, rationalization, and quality aimed at improving the efficiency of public spending and the management of work processes, considering the systemic vision of the institution. Available at: <https://www.mprs.mp.br/media/areas/verdemp/arquivos/plsmprs2024.pdf>. Accessed on: July 7, 2025.

6 Available at: <https://www.mprs.mp.br/media/areas/gabclima/arquivos/ebookgabclima.pdf>. Accessed on: July 25, 2025.

7 Available at: <https://www.mprs.mp.br/eventos/1275/>. Accessed on: July 22, 2025.

8 Available at: <https://www.mprs.mp.br/noticias/ambiente/60929/>. Accessed on: July 22, 2025.

municipalities and Civil Defense agencies, in rescue, relief, and assistance actions for people in risk areas, including compulsory evacuation of residents when necessary in cases of non-compliance with evacuation orders or imminent severe risk conditions. The Prosecutor's Office of Portão, in turn, entered into a Conduct Adjustment Agreement with the Municipality of Portão in Civil Inquiry No. 01816.000.389/2024 to relocate underprivileged/vulnerable families affected by the disaster. The Regional Prosecutor's Office of the Taquari-Antas River Basin, in Administrative Procedure No. 00953.001.280/2024, issued a Recommendation to the Municipality of Teutônia to take immediate measures to identify and notify all families and individuals in areas potentially affected by landslides.

From the tragic experience gained with last year's devastating event, the MPRS, through CAO-MA, is also working to build pre-disaster tools, such as developing an institutional project to create and implement Contingency Plans for disaster response in Historic Centers and Protected Urban Complexes in municipalities of Rio Grande do Sul. The project is nearing completion of its first product: a guide for action to be distributed to municipalities with listed historic centers and their corresponding Prosecutors' Offices. Additionally, due to the direct link with climate change, a guide with orientations and suggested action plans for dealing with wildfires (forest fires) was produced and published (attached).

Furthermore, given the recurrence – albeit on a smaller scale – of adverse climate events affecting the state of Rio Grande do Sul at the end of June 2025, further highlighting the urgency for structuring and continuous actions to address the environmental crisis, Promoters of Justice in the Prosecutors' Offices of Eldorado do Sul, Specialized Office of Canoas, and Environmental Protection of Porto Alegre issued a recommendation to the State Secretary for the Environment and Infrastructure as follows (attached):

1. The State's Wildlife Response Office should be immediately reactivated, continuing the implementation of the Action Plan for Response initiated during the 2024 flood, with SEMA taking measures to distribute donations and veterinary-medical supplies to animal shelters in cities affected by the 2025 flood;
2. The opportunity to register new animals rescued in the 2025 flood on the SIS-PET Platform by the affected municipalities should be immediately renewed, with the State of Rio Grande do Sul issuing new administrative acts to allow this if necessary, considering the Municipality of Eldorado do Sul has not yet signed an agreement with the State;
3. Existing agreements should be extended, and already partnered municipalities (Canoas and Porto Alegre) should be allowed to use all funds stipulated in the agreements, provided they accommodate new animals rescued in the 2025 flood and present new Work Plans adjusted to current needs;
4. "Animal support" should include, in accordance with State Decree 57.768/2024, the purchase of anti-rabies and polyvalent vaccines for dogs for the 2025 calendar, antiparasitic collars, and dewormers for dogs, in sufficient quantity to serve sheltered animals.

Due to the high number of abandoned animals as a result of recent disasters, the Specialized Prosecutor's Office of Canoas also issued a recommendation to the Municipal Mayor, aiming to ensure the protection and welfare of animals in areas affected by flooding from rains in June 2025.

In the same context, after indications of gravitational mass movement in a locality in the Municipality of Caxias do Sul following intense rainfall at the end of June 2025, and considering forecasts of recurrence, the competent Prosecutor's Office recommended (attached) that the municipality immediately take all necessary Civil Defense measures to safeguard the lives and health of residents of NUI São Pedro and neighboring areas, including the preventive evacuation of residents in areas classified as R3 – High Risk and R4 – Very High Risk, with possible relocation to temporary shelters.

In turn, the Civil Prosecutor's Office of Cachoeirinha filed a public civil action against the Municipality (attached), seeking to compel the Public Administration to take essential structural measures for the containment, stabilization, and physical recovery of the margins of the Passinhos Stream, given its advanced state of degradation, especially due to numerous irregular interventions since the 1980s, worsened by the intense rains of June 2025.

Although the 2024 flood was the main catalyst for concrete and effective measures to combat the consequences of climate change, the Public Prosecution Service's contact and involvement with the issue is not new. In fact, the creation of GabClima, as a specialized body, served to standardize and centralize data in a single sector and, above all, to consolidate prosecutorial action in the multiple facets of climate action, since the MPRS has long been making significant efforts to reduce the impacts of climate change.

In this sense, it is worth noting the filing of a public civil action by the Environmental Protection Prosecutor's Office of Porto Alegre as far back as 2011 – possibly the first judicial measure with a climate perspective taken by the MPRS – against the State of Rio Grande do Sul, essentially seeking to prohibit the use of fire as a practice to combat the infestation of “cascudo serrador” in Black Aca-cia trees, in order to comply with legislation aimed at reducing greenhouse gas emissions. The same office also filed Public Civil Action No. 5091523-82.2019.8.21.0001 against the State of Rio Grande do Sul and FEPAM, seeking to prevent the implementation of the State's Coal Chemical Complex and the State Coal Policy, based on State Law No. 13.594/2010, which establishes the Rio Grande do Sul Policy on Climate Change.

More recently, following this trend and aiming to require polluters to internalize the damages that aggravate the effects of climate change, the Prosecutor's Office of Herval, on December 15, 2023, filed a public civil action seeking, among other things, the condemnation of the defendant to pay compensation for climate damage resulting from deforestation.

All these measures demonstrate the commitment and due concern with which the prosecutorial agents of the Public Prosecution Service of Rio Grande do Sul approach issues related to the effects of climate change.

THE INSTITUTIONAL PERFORMANCE OF THE PUBLIC PROSECUTOR'S OFFICE OF SANTA CATARINA (MPSC)

Stephani Gaeta Sanches¹

In the face of the growing challenges imposed by climate change and socio-environmental disasters, it is essential to strengthen institutional action aimed at environmental protection, risk management, and the promotion of sustainability. This document presents strategic initiatives developed within the scope of the Public Prosecutor's Office of the State of Santa Catarina, focusing on the articulation between public agencies, private entities and civil society to address climate impacts and promote more resilient urban and environmental development.

The Special Group for the Defense of Rights Related to Socio-Environmental Disasters and Climate Change – GEDCLIMA, established by Act No. 17/2024/PGJ, is one of these initiatives. With actions focused on prevention, mitigation, and adaptation to extreme events, GEDCLIMA seeks to integrate inter-institutional efforts, foster studies and campaigns, and promote data sharing to support effective public policies.

The Environmental Legality and Sustainability Program, in turn, aims to improve the structure and performance of municipal environmental agencies, ensuring that the licensing and inspection of activities with local impact are aligned with legal and technical requirements. This action is essential for the preservation of natural ecosystems and for tackling climate change.

Finally, the Urban Order Program works in the preparation and updating of municipal Master Plans, according to the guidelines of the City Statute. The inclusion of specific measures to prevent geological and hydrological risks reinforces the importance of urban planning as a tool for climate adaptation and protection of the population.

The initiatives described here reflect the commitment of the Santa Catarina Public Prosecutor's Office to building a safer, more sustainable future prepared for the environmental challenges of now and tomorrow.

Among the projects already developed, the following stand out:

¹ Prosecutor. Coordinator of the Center for Operational Support of the Environment (CME)

1. PROJECT: SPECIAL GROUP FOR THE DEFENSE OF RIGHTS RELATED TO SOCIO-ENVIRONMENTAL DISASTERS AND CLIMATE CHANGE – GEDCLIMA

- **Abstract:** Through Act No. 17/2024/PGJ, the Special Group for the Defense of Rights Related to Socio-Environmental Disasters and Climate Change – GEDCLIMA was established. The group's purpose is to contribute to the effectiveness of the performance of the institutions that comprise it in the defense of rights related to socio-environmental disasters and climate change. Among its objectives are the debate on legislative changes and innovations, the improvement of response to disaster-related occurrences, and the promotion of studies, actions and campaigns aimed at prevention, recovery, mitigation and adaptation. In addition, GEDCLIMA shares data with public agencies and private institutions, in order to subsidize the implementation of public policies. It also seeks to establish partnerships with civil society organizations and research centers for the preparation of disaster management plans and other related initiatives.
- **Climate implication:** The impacts of climate change are increasingly evident, and the State of Santa Catarina has historically faced severe consequences resulting from extreme weather events. In view of this scenario, the State Group of Coordinated Actions on Climate Change (GEDCLIMA) has as its main mission to promote awareness, through the articulation between public agencies and private entities, about the importance of preventive actions that contribute to the mitigation of climate change. In addition, the group works to prepare and coordinate rapid and effective responses to climate disasters, strengthening the resilience of the state and its population.
- **Access link:** <https://www.mpsc.mp.br/grupos/gedclima>

2. PROJECT: ENVIRONMENTAL LEGALITY AND SUSTAINABILITY PROGRAM

- **Abstract:** The Program aims to seek the adaptation of municipal environmental agencies to the legal, technical and structural requirements for the proper development of environmental licensing and inspection activities with local impact, with a view to the effective protection of the environment.
- **Climate implication:** Climate impact is indirectly linked to the way in which the municipalities of Santa Catarina are structuring and executing the environmental licensing of local activities. This action has relevant implications for tackling climate change.

Environmental licensing is an essential tool to control potentially polluting activities, such as industrial enterprises, allotments, and infrastructure works. When well executed, it contributes to the preservation of natural ecosystems, which are fundamental for climate regulation, acting as carbon sinks and natural barriers against extreme weather events.

- **Access link:** <https://www.mpsc.mp.br/programas/legacidade-ambiental-e-sustentabilidade>

3. PROJECT: URBAN ORDER PROGRAM

- **Abstract:** Aims to act for the preparation and updating of Master Plans by the Municipalities of the State of Santa Catarina, following the guidelines of the Statute of Cities.
- **Climate implication:** Article 42-A of the City Statute, included by Law No. 12,608/2012, introduces a fundamental requirement for urban planning in municipalities that have areas susceptible to landslides of great impact, sudden floods or other related geological and hydrological processes. According to this provision, in addition to the content already provided for in article 42 of the City Statute, the master plan of these municipalities must contain specific guidelines aimed at the prevention and mitigation of risks associated with natural disasters.

This requirement has direct implications for tackling climate change, since extreme events, such as heavy rainfall and flooding, have become more frequent and severe. In this context, urban planning must be guided by a preventive approach, which includes the mapping of risk areas, the definition of land use and occupation standards compatible with the safety of the population, and the integration of public policies aimed at urban resilience.

The preparation and updating of Master Plans is essential to promote sustainable and safe urban development, which takes into account the environmental and social vulnerabilities of the territory. By requiring these plans to incorporate specific measures to address geological and hydrological risks, the legislation strengthens the ability of municipalities to protect human lives, minimize economic losses, and preserve the environment. This approach directly contributes to more effective adaptation to climate change, making cities more resilient and prepared for extreme events.

- **Access link:** <https://www.mpsc.mp.br/programas/programa-de-defesa-da-ordem-urbanistica>

TRANSFORMATION OF AGRICULTURE AND FOOD SYSTEMS, A NECESSARILY TRANSVERSAL ACTION

Fernanda Elias de Carvalho Lucci¹

Abstract: This article seeks to analyze the possibilities for the Brazilian Public Prosecutor's Office to promote and supervise the use of land and natural resources for the transformation of agriculture and food systems, making them more equitable, sustainable, and resilient. It seeks cross-cutting, joint, and coordinated action in various areas of law, encompassing the broad promotion and induction of public policies aimed at promoting healthy food systems for the population that are less harmful to the environment, attentive to climate and social justice for present and future generations.

Keywords: Food systems. Land use. Land Use Change and Forestry (LULUCF). Agriculture. Climate Justice. Brazilian Public Prosecutor's Office.

Food systems are currently responsible for 1/3 of global greenhouse gas emissions. This means that food production and the methods of agriculture and land use adopted are the main source of these emissions.

A study conducted by SEEG², specifically designed to analyze emissions from food systems in Brazil in 2021, found that these emissions “corresponded to 1.8 billion tons of carbon dioxide equivalent (GtCO₂e), or 73.7% of the country's total gross emissions for the same year, when 2.4 GtCO₂ were emitted”. It also highlights that “the largest share of emissions comes from the Land Use Change and Forestry sector, which accounts for deforestation, representing 56.3% (1GtCO₂) of national emissions from food systems.” Next, with a 33.7% share, the Agriculture sector appears as the second largest emitter (600.8 MtCO₂). It therefore concluded that these two sectors alone accounted for 90% of emissions from food systems and that, “in 2021, around 49% of national emissions were linked to land use change (LUC).³”

1 Public Prosecutor of the Public Ministry of the State of São Paulo.

2 Greenhouse Gas Emissions and Removals Estimation System.

3 SEEG. Greenhouse gas estimates from food systems in Brazil. October 2023. Available at <<https://www.oc.eco.br/wp-content/uploads/2023/10/SEEG-Sistemas-Alimentares.pdf>>, accessed on August 8, 2025.

During the period analyzed (1990-2021), Land Use Change and Forestry (LUCF) in food systems were responsible for the emission of 33.7 billion tons of CO₂ and net emissions in Brazil. In the last year of the series, in 2021, 1 billion tons of CO₂ were emitted, representing a 23% increase since 2020.

The process responsible for most of the gross emissions in the period refers to Land Use Changes, with 32 billion tons of CO₂, and almost all of this (97%) is deforestation, or conversion of native vegetation to pastures and agricultural crops. The burning of forest residues after deforestation accounts for an average of 5% of gross emissions, and an increase in this share of burning was observed last year, to 12% of gross emissions.

With regard to the use of water resources in food systems, a report released by the UN in 2021, entitled “The Value of Water,”⁴ shows that 69% of global freshwater resources are used for food production. The increase in the use of water resources in the agricultural sector was due to management practices, such as the increase in irrigated crops, mainly in large areas of monoculture.

As if this statistic weren’t impressive, an article published by Cátedra Josué de Castro estimated that:

The indirect costs of the current organization of the global agri-food system amount to approximately US\$12 trillion annually. Equivalent to 10% of global GDP, this figure includes losses from environmental degradation, depletion of water resources, and impacts on public health due to inadequate diets and loss of biodiversity. In a report published by the Food System Economics Commission, Johan Rockstrom, currently one of the world’s leading environmental scientists, states that these direct and indirect costs of the agri-food system already exceed the value of everything produced by the system itself on a global scale. This is an indication that, in addition to socio-environmental problems, there is economic irrationality in the way food is produced and consumed in the world today. This is something that only persists because these costs remain hidden, that is, they aren’t clearly expressed in food prices, but rather in indirect expenses, transferred to people and governments that need to invest in addressing the environmental crisis or health care. In one way or another, these costs, even diluted, are paid for by society as a Whole.⁵

The analytical data therefore confirms the necessary transition of food systems to more equitable and resilient ones in order to ensure biodiversity, soil, and water, as well as adequate food for the population now and in the future. Hence the importance of the COP 30 Presidency including the transformation of agriculture and food systems as one of its pillars, since it is not food production itself that causes environmental damage and climate crisis, but the way in which it is carried out.

It should also be considered that food systems not only impact the climate, but are also significantly impacted by climate change, which reinforces the need for them to be resilient.

4 UNESCO. The value of water. United Nations World Water Development Report 2021. Colombella, Perugia, Italy, 2021.

5 FAVARETO, Arilson et al. COP30 in Brazil – For a just and sustainable transition of the agri-food system. Available at <https://catedrajc.fsp.usp.br/publicacao/cop30-no-brasil-por-uma-transicao-justa-e-sustentavel-do-sistema-agroalimentar/>. Accessed on 08.08.2025.

The year 2024 was marked by extreme weather events in Brazil. In the case of forest fires, the damage is estimated at R\$ 14.7 billion, according to the National Confederation of Agriculture. Agricultural areas were burned, resulting in the loss of soil quality in a total area of 2.8 million hectares.

The instability of production due to extreme weather events causes food prices to rise and already vulnerable populations to experience difficulties in acquiring fresh food. As a result, natural foods are replaced by cheaper ultra-processed food products, putting the food and nutritional security of the population and their health at increasing risk, especially when criteria such as race, gender, and class are taken into account.

In this context, it is urgent to change the food systems currently in place in the country. There is already a situation of insecurity for food production, considering that extreme events, increased rainfall and droughts, as well as the loss of biodiversity, directly affect production and the soil's capacity for regeneration, in addition to influencing prices and access for the most vulnerable populations.

The discussion on food security and food systems is, therefore, a problem that impacts the entire population, especially the most vulnerable, but everyone without distinction, insofar as there is proven damage to a fair and healthy environment. It therefore requires the adoption of effective public policies for its control and the achievement of environmentally appropriate results, in order to guarantee present and future generations the right to soil and water, biodiversity, as well as nutritionally adequate food, with permanent and regular access to fresh and minimally processed foods that respect the culture and identity of communities. The food system must therefore be sustainable and resilient.

According to USP's research and extension center on sustainable food

Food systems refer to the set of activities and processes involved in the production, processing, distribution, access, and consumption of food, including the management of losses and waste. These systems are complex and influenced by factors such as public policy, economics, social and environmental aspects, affecting food security, health, and Sustainability.⁶

Initially, therefore, land, soil, and water use must be adjusted, but without forgetting the subsequent stages of food production, processing, distribution, consumption, and access. The current monoculture and form of agricultural and livestock production are responsible for extensive environmental and climate damage. Deforestation, especially for agriculture and livestock, must be continuously combated, as it has destroyed ecosystems and forests in our territory, leading to the extinction of flora and fauna, including those not yet discovered and studied, deteriorating biodiversity and hindering progress in the study of species and the maintenance of life.

Also, monoculture degrades soil and water, rendering the former infertile and contaminating and depleting water resources. With the inadequate soil management caused by monoculture, maintaining production becomes increasingly difficult, requiring greater water consumption and the application of larger quantities of pesticides to sustain productions.

⁶ Sustentarea. USP. Available at <https://www.fsp.usp.br/sustentarea/2023/02/15/o-que-sao-sistemas-alimentares/#:~:text=Os%20sistemas%20alimentares%20envolvem%20todos,acessam%20e%20consomem%20os%20alimentos>. Accessed on August 8, 2025

The loss of biodiversity is another worrying factor. According to the FAO, of the 6,000 species of plants cultivated for food, less than 200 contribute substantially to global food production, and only nine account for 66% of total agricultural production. As if the proven decline in biodiversity were not enough, a significant portion of endangered species are pollinators, which makes the prognosis even worse. The loss of biodiversity makes plants and animals more susceptible to pests and diseases and jeopardizes food and nutritional security.⁷

In addition to all the environmental damage caused by food production methods, according to data from the Ministry of Agriculture and Livestock and the FAO, 30% of food produced is wasted or lost, as detailed below: 28% is lost at the end of the production process; 22% during handling and storage; 17% in the distribution market; and 28% wasted by end consumers (MAPA, 2022). It is estimated that Brazilian families waste around 129 kg of food per year. This means that 1/3 of all natural resources spent on food production is wasted worldwide.

Therefore, structured and structuring public policies are needed to enable the transition of food systems to more equitable and resilient ones, in order to maintain ecosystems and biodiversity, while also ensuring food and nutritional security for populations at all levels, with regular access for family farming to land and control of food systems.

In our legal system, in addition to the provisions contained in international norms and treaties to which Brazil is a signatory, we have in the Constitution of the Republic, recognized as a social right provided for in Article 6, the right to adequate food. In this context, legal action should be taken not only to guarantee non-violation, but also and above all to demand affirmative action to ensure the full, unrestricted, and permanent exercise of this right, which is indispensable for survival and human dignity.

Within the scope of the Public Prosecutor's Office, the work is cross-cutting and quite broad. Considering the various areas of legal practice, I will discuss a few selected topics on how to ensure the transition to fair, sustainable, and resilient food systems in Brazil, as only decentralized and coordinated action will enable this transition to be truly effective.

In the Brazilian legal system, in addition to international treaties and conventions and constitutional provisions, the human right to adequate food and nutrition is provided for by LOSAN, Law n. 11,346/06, which established the National Food and Nutrition Security System and brings together government agencies and civil society organizations to promote food and nutrition security throughout the country. It seeks to ensure that all people have access to safe, nutritious food in sufficient quantity and permanence to fulfill the Human Right to Adequate Food (DHAA).

SISAN is thus structured in Brazil and, in order to guarantee the right to adequate food and nutrition, it provides for the protection and implementation of cross-cutting and coordinated public policies. Within the scope of the food systems discussed here, it is noted that Article 4^o provides for efficient measures to defend sustainable food systems.

By providing for ordinary legislation that food and nutritional security encompasses expanding access to food through production, particularly traditional and family farming, the preservation of biodiversity and the sustainable use of resources, the biological and nutritional quality of food, its

7 FAO warns that biodiversity loss threatens food production. Published on February 22, 2019. Available at <https://brasil.un.org/pt-br/82489-fao-alerta-que-desaparecimento-da-biodiversidade-amea%C3%A7a-produ%C3%A7%C3%A3o-de-alimentos#:~:text=E2%80%9CMenos%20biodiversidade%20significa%20que%20plantas,e%20a%20nutri%C3%A7%C3%A3o%20em%20risco.%22>

use, the promotion of healthy eating habits, respect for ethnic and racial diversity and culture, and the creation of regulatory and strategic food stocks, it provides for and determines, as affirmative action, the commitment of entities to the sustainable and resilient transition of food systems. It should be noted, therefore, that the transition is expressly provided for in our ordinary legislation, which should be promoted and supervised by the Public Prosecutor's Office.

Thus, in the context of human rights, the Administrative Monitoring Procedure is initially an appropriate measure for monitoring municipal public policies to promote adherence to SISAN and structuring its components in each territory, identifying cases of food insecurity and food deserts (where there is a lack of regular access to fresh food at affordable prices for the population). In addition, food banks, community kitchens, and solidarity kitchens should be promoted in order to prevent and reduce food waste, ensure that food is used in its entirety, and provide fresh food to the entire population of the territory on a permanent and regular basis. By joining SISAN, it is possible to obtain government incentive programs, such as the PAA (food acquisition program). The program buys food directly from family farmers, giving priority to those who live in situations of greater social vulnerability, and donates it to people in situations of food and nutritional insecurity. It also promotes local development, diversified production, and the consumption of healthy foods.

Still in the context of human rights, it is imperative to monitor public policies for the recognition of food as the intangible and cultural heritage of peoples, in order to ensure that, in each territory, traditional foods are preserved and maintained, maintaining local biodiversity and food culture, including genders and recipes in menus, and related food education, in line with the Food Guide for the Brazilian Population.

In the field of education, the same type of procedure can be used to promote and monitor the PNAE (National School Feeding Program) and ensure that the minimum number of nutritionists is met, in accordance with Federal Nutrition Council Resolution No. 788/24, which is an important means of ensuring the transition of food systems. This is because the PNAE is also a federal revenue transfer program for the purchase of school meals, which prioritizes fresh food and the removal of ultra-processed foods from schools, with the purchase of items from family farmers in the municipality or region. This measure is further improved by the increased possibility of higher payments to organic farmers, promoting family agroecology in the territory and ensuring safe food for children and adolescents served by the public school system. The Resolution of the Federal Nutrition Council is important as a follow-up measure, as it is up to nutritionists, in minimum numbers, to assist in identifying family farmers close to schools and in preparing menus, as well as in food education, in addition to assisting in monitoring compliance with the PNAE.

The proximity of family farmers to the schools they supply is environmentally important, as it is part of short production chains, reducing transport distances and pollutant emissions, but also significantly reducing food waste along the way. There is also the promotion of school gardens, with food production and education in schools about food, cultivation, and healthy, fair, and resilient food systems.

In relation to public health, it is important to monitor programs that track the population and rates of malnutrition, undernutrition, and, in particular, overweight and short stature—the latter indicating poor diet among the population, with high consumption of ultra-processed foods and indicative of food deserts, which requires public policies on urban gardens, family farming, markets, and community kitchens. In particular, efforts should be made to regularly enter data into SISVAN through the primary care network, as well as indices of the progression of chronic noncommunicable diseases, such as obesity and diabetes, especially in children and adolescents.

Also in the field of public health, it is important to promote the expansion of knowledge and use of herbs and natural and herbal medicines, which originate from popular tradition and, in addition to promoting health, also promote biodiversity and the preservation of important species through sustainable cultivation (a national policy established by the SUS in 2006).

In the consumer sphere, in addition to regulating the marketing and advertising of ultra-processed foods, which are responsible for dietary monotony and degrading monoculture farming, there is also oversight of food labeling regulations. Furthermore, through health surveillance, it is possible to monitor the levels of pesticides in products found in markets, which also makes it possible to identify the producer and the land where pesticides are being used abusively, with the imposition of appropriate measures to curb practices that endanger the health of workers and end consumers and cause damage to the environment, with the contamination of water and soil and the destruction of biodiversity. In 2025, Federal Decree N. 2.538/2025 established PRONARA - the National Program for the Reduction of Pesticides. It is a Brazilian government program that aims to reduce the use of pesticides in agriculture, promoting the transition to more sustainable and healthy agricultural practices, with the strengthening of family agroecology.

Finally, in the field of the environment, housing, and urban planning, administrative procedures are also an important tool for promoting and supervising the implementation of agroecological urban and peri-urban gardens and agroforestry, as well as the regular and orderly occupation of urban space, which allows for socialization, the promotion of traditional and family farming, and the occupation of community spaces. They also ensure improved air quality in urban areas, reduce heat islands, and decrease the chances of flooding. In addition, they are part of short production chains, eliminate food deserts, with the regional supply of healthy food throughout the municipality, combat food waste and shorten distances and use of transportation, and promote open-air markets and community kitchens. Furthermore, the proper use of water and soil, with the construction of cisterns, drip irrigation systems, and proper management of natural resources, saves water and, when combined with agroforestry practices in vegetable gardens, shading also leads to an ever-decreasing use of water resources.

Agroecology eliminates monotony in food systems, preserves biodiversity and food culture, and enables system resilience by preserving soil and water quality. It allows for agriculture that is increasingly less dependent on pesticides and inputs, through the transmission of ancestral knowledge of sustainable management and cultivation.

At this point, the preservation and expansion of knowledge through native seed banks, which are those in which farmers, through observation and selection, adapt different types of grains to the climate of a given location and store them for future plantings and pass them on from generation to generation, bringing to the population the knowledge acquired by traditional and family farmers in the natural management of seeds, in order to find the seeds most resilient to climate change or pests, but always in a natural way and without genetic modification (transgenics). They are also very resistant to water stress.⁸

8 SALATI, Paula. Seed guardians adapt grains to face drought and guarantee food in the backlands of PE Available at <https://g1.globo.com/economia/agronegocios/agro-de-gente-pra-gente/noticia/2025/07/05/guardioes-de-sementes-adaptam-graos-para-enfrentar-seca-e-garantir-alimentos-no-sertao-de-pe.ghml>. Accessed on 08.08.25

The introduction of agroforestry and urban gardens, and the promotion of family farming in municipalities, is an effective means of reducing deforestation and food deserts, ensuring food sovereignty for the population and direct, permanent, and regular access to healthy and safe food. It is, therefore, a measure of great value, which can even be included in the discussions of the PDUI's (Integrated Urban Development Plan) to assist regional transactions and, above all, the most sensitive and least structured territories in terms of food and nutritional security.

Finally, it is up to the Brazilian Public Prosecutor's Office, once the administrative attempt has been frustrated, to seek judicial condemnation and the imposition of environmental compensation by large producers and financiers of monotonous, polluting, and environmentally degrading food systems. In particular, this will be necessary in cases of deforestation and monocultures with heavy use of water resources and abusive use of pesticides.

It is up to companies to adopt practices that reduce the environmental impact of their activities, use clean technologies, manage waste properly, and reduce the consumption of natural resources. Taking into account the theory of risk and the polluter pays principle, they must assume the risks inherent in their operations, including repairing the damage caused by their individually profitable activities, the losses of which are borne by society as a whole, across generations.

It is also understood that in the case of highly degraded biomes threatened by predatory livestock and monotonous agricultural activities, judicial relief should be sought to inhibit and limit the exercise of these activities in certain areas already considered saturated and at serious environmental and climatic risk, as a way of guaranteeing the regular and permanent exercise of the right to an ecologically balanced environment and, consequently, access to safe, fair, and resilient food systems.

CONCLUSION

The transformation of agriculture and food systems presents a moment of significant relevance, especially given the recognition of their significant influence on the climate and the need for resilience to face climate crises.

Recognition of the right to regular and nutritionally adequate food shows that monotonous food systems do not serve the general population, considering that almost 80% of the food produced by family farms is what reaches Brazilians' tables in a healthy and diverse way. The monotony of food in large areas has led to environmental degradation, contributing to climate crises and the loss of biodiversity and nutritionally adequate food. In this context, however, shows that agriculture, as an ancient science of the peoples, must seek its origins, the traditions passed down from generation to generation, the accumulated knowledge, the inclusion of peoples, and access to land in a symbiotic manner, integrated with nature and knowledge, with respect and appreciation for natural resources.

This food system model is already recognized in our national legislation, and it is therefore up to legal practitioners to seek to understand and implement it, since the mechanisms provided for, if properly applied in a conscious and integrated manner, will serve, at least in the national context, as an effective means of initiating the transition of food systems and agriculture in Brazil. Therefore, in addition to preserving our forests, biomes, and biodiversity, we will be preserving our culture, the traditions of our peoples, and the natural and cultural riches of Brazil in an inclusive manner, with the distribution of agricultural domains and the combination of knowledge, ensuring that climate justice is truly achieved by inseparably embracing social justice.

REFERENCES

FAO warns that biodiversity loss threatens food production. Available at <https://brasil.un.org/pt-br/82489-fao-alerta-que-desaparecimento-da-biodiversidade-amea%C3%A7a-produ%C3%A7%C3%A3o-de-alimentos#:~:text=%E2%80%9CMenos%20biodiversidade%20significa%20que%20plantas,e%20a%20nutri%C3%A7%C3%A3o%20em%20risco.%22>). Published on February 22, 2019. Accessed on August 8, 2025.

SUSTENTAREA – USP. What are food systems? <https://www.fsp.usp.br/sustentarea/2023/02/15/o-que-sao-sistemas-alimentares/#:~:text=Os%20sistemas%20alimentares%20envolvem%20todos,acessam%20e%20consomem%20os%20alimentos>. Published on February 15, 2023. Accessed on August 8, 2025.

FAVARETO, Arilson et al. COP30 in Brazil – For a just and sustainable transition of the agri-food system. Available at <https://catedrajc.fsp.usp.br/publicacao/cop30-no-brasil-por-uma-transicao-justa-e-sustentavel-do-sistema-agroalimentar/>. Published on May 23, 2025. Accessed on August 8, 2025.

MAPA, 2023

SALATI, Paula. Seed guardians adapt grains to face drought and guarantee food in the sertão of Pernambuco. Available at <https://g1.globo.com/economia/agronegocios/agro-de-gente-para-gentia/noticia/2025/07/05/guardioes-de-sementes-adaptam-graos-para-enfrentar-seca-e-garantir-alimentos-no-sertao-de-pe.ghtml>. Published on July 5, 2025. Accessed on August 8, 2025.

SEEG. Greenhouse gas estimates of food systems in Brazil. Available at <<https://www.oc.eco.br/wp-content/uploads/2023/10/SEEG-Sistemas-Alimentares.pdf>>. Published in October 2023. Accessed on August 8, 2025

SCHNEIDER and DONINI. More and more people are at risk of hunger due to climate change. Available at <https://diplomatie.org.br/como-as-mudancas-climaticas-afetam-os-sistemas-alimentares/>. Published on December 4, 2024. Accessed on August 8, 2025

UNESCO. The Value of Water. United Nations World Water Development Report 2021. Colombella, Perugia, Italy, 2021

ABRAMPA PROJECT FOR THE RIGHT TO A STABLE CLIMATE – PRE-SALT AXIS

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1. PROJECT PRESENTATION

The **ABRAMPA Project for the Right to a Stable Climate – Pre-Salt Axis**, currently under development, was conceived with the general objective of promoting the improvement and deepening of environmental licensing as a tool to drive the National Climate Change Policy (Law 12.187/09); to this end, it is based on the monitoring of a paradigmatic licensing procedure aimed at addressing the climate crisis, linked to the oil and gas sector.

The initiative arises from institutional reflections on the insufficiency of the development of Brazilian climate policy and the need for better coordination, organization, and structuring of the Public Prosecutor's Office to fulfill its role of representing Brazilian society in a context of unprecedented humanitarian and environmental crisis.

The inadequacy of Brazilian climate policy is evident. Despite some isolated advances, successive setbacks have been experienced in environmental policies in recent years, revealing a mismatch between the inconsistency and slowness of climate policy development in the country and the sense of gravity and urgency the issue demands.

In response, the Public Prosecutor's Office and ABRAMPA have organized themselves to develop specific projects aimed at fostering the national climate change policy. From this effort, among others, this project has emerged.

Resulting from coordination between MPSP (GAEMA-LN), MPF (PRM in Caraguatatuba) and ABRAMPA, the work is based on two fundamental premises:

1 Public Prosecutor's Office of the State of São Paulo - Special Action Group for Environmental Defense of the Public Prosecutor's Office of the State of São Paulo, North Coast Unit - GAEMA-LN

2 Federal Public Prosecutor's Office - Attorney General's Office of the Republic in Caraguatatuba

3 Brazilian Association of Members of the Public Prosecutor's Office for the Environment - ABRAMPA

1. Environmental licensing as a key instrument for an effective climate policy;
2. The extraction, production, and burning of fossil fuels as activities that most decisively contribute to the worsening of the climate crisis.

Regarding licensing, it is undeniable that it is a key instrument of environmental policy. It is the environmental licensing process that ensures human interventions in the environment, especially those with a high potential to generate significant impacts, are carried out responsibly.

By occurring at a stage prior to the implementation of potentially harmful actions, it allows society, represented by the licensing authority, to require the necessary studies and assessments to understand the consequences, analyze them, and decide: (a) **if** the environment has the capacity to withstand the impacts without severe or irreversible socio-environmental risk, making the activity eligible for licensing; (b) **under what conditions** the activity should be carried out so that its impacts are minimized, externalities are internalized, and society receives the appropriate compensations (prevention, mitigation, and compensation measures).

Thus, environmental licensing is an instrument of environmental prevention and rationalization of human intervention on natural resources, precisely what the current climate emergency demands.

Given its central role in climate policy, the Public Prosecutor's Office and ABRAMPA consider it essential to assess whether licensing is adequately responding to the challenges posed by the crisis and to promote its improvement as a tool in service of society.

It is essentially a matter of assessing whether the licensing process is capable of inventorying the most relevant climate impacts and, based on this diagnosis, fostering the deepening of climate impact assessments and demanding greater rigor in defining the compensations owed by major GHG emitters.

To better achieve these objectives, it was deemed necessary to give concreteness to this scope. Accordingly, it was decided to select a paradigmatic case for study and intervention, to be determined based on the relevance of the licensed activity to the overall context of the climate crisis.

Regarding its contributory relevance, there is no doubt: no other activity contributes as decisively to global GHG emissions as the extraction, production, and burning of fossil fuels⁴. More than that: any effort to mitigate the climate emergency and prevent global warming from reaching the point of no return will be in vain without a significant reduction in emissions from the burning of fossil fuels, driven by an energy transition policy.

This led to the choice of licensing for oil and gas extraction and production activities as the focus of study and intervention. More specifically, the licensing of the Pre-Salt project, the largest oil and gas licensing process currently underway in the world.

4 **Available at:** <https://brasil.un.org/pt-br/175180-o-que-s%C3%A3o-mudan%C3%A7as-clim%C3%A1ticas#:~:text=Essas%20mudan%C3%A7as%20podem%20ser%20naturais,como%20carv%C3%A3o%2C%20petr%C3%B3leo%20e%20g%C3%A1s;>

Available at: <https://www.bbc.com/portuguese/internacional-59148373#:~:text=H%C3%A1%20uma%20forma%20de%20demonstrar,f%C3%B3sseis%20E2%80%94%20aumentou%20significativamente%20desde%201850.&text=As%20an%C3%A1lises%20demonstram%2C%20que%20durante,das%20temperaturas%20registrado%20at%C3%A9%20hoje;>

Thus, the work was structured as follows: starting from the understanding of licensing as a central tool of climate policy, the licensing of oil and gas extraction and production activities (specifically of the Pre-Salt Stage IV) was defined as a paradigmatic and priority case for the purposes of study and concrete intervention, aiming, through submissions addressed to the licensing authority, to promote the production of more complete and comprehensive diagnoses of its climate impacts, linked to the establishment of stricter responsibilities for its developers, consistent with the challenges imposed by the climate crisis.

The details of the objectives, methodology, and results already achieved in this work (as well as those still expected) will be presented below.

2. PROJECT OBJECTIVES

2.1. GENERAL OBJECTIVE

To act in defense of environmental licensing as an essential legal instrument to ensure the effectiveness of public policies that safeguard the right to a stable climate.

2.2. SPECIFIC OBJECTIVES

- To demand that the environmental licensing procedure require a more rigorous assessment of climate impacts, taking into account GHG emissions across all scopes (1, 2, and 3), as defined in the technical study commissioned, produced, and published by ABRAMPA⁵;
- To encourage that the results of these more rigorous assessments of climate impacts be duly communicated to and debated with civil society;
- To require, based on this more rigorous and comprehensive inventory of emissions, that conditions be imposed which are more consistent with the degree of impact caused by the respective activities, as well as more appropriate to the challenges posed by the climate crisis;
- To promote, through the establishment of conditions more suited to the nature of the impact produced, actions aimed at the progressive reduction of GHG-emitting activities and their replacement with clean energy production sources (energy transition).

⁵ Available at <https://abrampa.org.br/file?url=/wp-content/uploads/2023/09/Diagnostico-climatico-no-licenciamento-ambiental-detalhamento-para-empresendimentos-de-energia-fossil.pdf>;

3. STAGES AND METHODOLOGY OF THE PROJECT

Once its scope was established, the project began with the results of multidisciplinary studies specifically designed to diagnose how climate impacts have been inventoried and addressed within environmental licensing processes, particularly in the licensing of oil and gas extraction activities under the Pre-Salt project.

These studies revealed a clear underestimation of GHG emissions in the inventories presented by oil and gas sector developers during the licensing of their activities; this occurs precisely because they disregard the impacts truly relevant to the balance of the climate system, namely, the indirect emissions from the activity, especially those resulting from the burning of fossil fuels throughout the production and consumption chain (Scope 3 emissions).

According to these studies, the emissions excluded from the inventories, and, hence, from the entire licensing process, correspond on average to 87% of the resulting emissions, which end up not being considered, prevented, mitigated, or compensated in any legal or institutional framework.

Based on this evidence, the next step was taken, consisting of issuing an Official Letter to IBAMA, scientifically and legally substantiated, requesting that the developer be required to supplement its emissions inventory so as to also account for its Scope 2 and Scope 3 emissions, in addition to the Scope 1 emissions already reported⁶.

Once the Public Prosecutor's Office's request was met by IBAMA and Petrobras through the submission of a more comprehensive inventory, the next stage began, consisting of promoting a broad discussion with civil society on the real implications of the proposed activity.

This took place through the participation of the Public Prosecutor's Office in the three public hearings organized by IBAMA within the licensing procedure, as well as virtual meetings with representatives of the scientific community and civil society; in addition, the Public Prosecutor's Office and ABRAMPA organized a public meeting specifically focused on debating the climate issue and the activity under licensing, which was attended by researchers, biologists, lawyers, judges, and energy specialists, followed by a public debate among representatives of the Public Prosecutor's Office, IBAMA, and Petrobras⁷.

In parallel, the Public Prosecutor's Office and ABRAMPA took part in several meetings with IBAMA's CGMAC/DILIC, its Presidency, the Minister of the Environment and Climate Change, the Ministry of the Economy, and Petrobras, in order to reinforce the technical and legal premises of their work and contribute to defining the most appropriate compensatory measures to be required from the developer as a consequence of the reassessment of its impacts based on the more comprehensive diagnoses produced.

6 **Attachment 1. Also available at:** https://wwwj.mpsp.mp.br/sei/controlador.php?acao=procedimento_trabalhar&acao_origem=protocolo_pesquisar&id_procedimento=4043086&id_documento=15234350&infra_sistema=100000100&infra_unidade_atual=110001499&infra_hash=0df9d83a680a248474276427df5851ddc5f406fa4b7be39f22c45107f75a1da9

7 **Media containing the recording of the public meeting available at:** <https://www.youtube.com/watch?v=D7SlednLVYg> e https://www.youtube.com/watch?v=d36aVle_pHI&t=13s

Article published on the MPSP website about the event available at: <https://www.mpsp.mp.br/w/sociedade-se-reune-em-caraguatatu-ba-para-discutir-impactos-climaticos-de-exploracao-do-pre-sal>;

Recently, drawing on all the contributions gathered from the Public Prosecutor's Office and civil society, IBAMA issued Technical Report no. 189/2024-Coprod/CGMac/Dilic, recognizing the need for better internalization of climate impacts within the licensing process; as a condition for granting the project's preliminary license, the developer was required to present a specific climate change program structured around 5 areas of action: (a) transparency; (b) monitoring; (c) mitigation; (d) adaptation; (e) compensation⁸.

To date, the company has not adequately met the requirements set by the licensing authority, which is why the LP (preliminary license) has not been issued⁹.

Thus, the project continues its course. At the current stage, the Public Prosecutor's Office continues to monitor and mediate ongoing discussions between the licensing agency and the entrepreneur. Mindful of the objectives of its project, the Public Prosecutor's Office aims to ensure, whether through extrajudicial means or, if necessary, through climate litigation, that the requirements set forth in Technical Report no. 189/2024-Coprod/CGMac/Dilic are fully met, as they represent a significant advancement in improving environmental licensing as a tool for driving climate policy and regulating oil and gas extraction and production activities.

Below is a brief summary of the stages already completed in this work and those still to be achieved.

Stages	Status
I – Commissioning and preparation of multidisciplinary studies to assess the licensing of oil and gas extraction and production activities in relation to the climate crisis, with a focus on the Pre-Salt project, Stage IV;	COMPLETED
II – Initiation of an Administrative Monitoring Procedure focused on the environmental licensing of Stage 4 of the Pre-Salt, Santos Basin;	COMPLETED
III – Issuance of an official letter to IBAMA, based on the commissioned multidisciplinary studies and the relevant legal premises for defending the right to a stable climate, requesting that the developer be required to provide more comprehensive GHG emissions inventories, particularly regarding Scope 3 indirect GHG emissions, with a view to establishing stricter conditions within the environmental licensing process of the project.	COMPLETED
IV – Public Discussion: facilitation of virtual meetings with civil society, participation in public hearings organized by IBAMA, and the promotion and organization of a public meeting to share information with civil society and conduct an in-depth debate on the climate crisis and its interface with the licensing of oil and gas extraction and production activities;	COMPLETED
V – Institutional Coordination: participation in institutional meetings (IBAMA/MMAMC/ME/Petrobras) to develop solutions within the scope of the licensing process under monitoring;	IN PROGRESS
VI – Adoption of the necessary measures, whether extrajudicial or judicial, to ensure that the compensations owed by the developer in view of the impacts already identified are fully complied with, thereby achieving a concrete and exemplary advancement of licensing as an instrument of climate policy;	IN PROGRESS

8 **Attachment 2. Also available at:** https://wwwj.mpsp.mp.br/sei/controlador.php?acao=procedimento_trabalhar&acao_origem=protocolo_pesquisar&id_procedimento=4043086&id_documento=15234350&infra_sistema=100000100&infra_unidade_atual=110001499&infra_hash=0df9d83a680a248474276427df5851ddc5f406fa4b7be39f22c45107f75a1da9

9 **Available at:** <https://www1.folha.uol.com.br/ambiente/2025/07/ibama-ve-resistencia-da-petrobras-em-plano-climatico-e-segura-licenca-de-r-1964-bilhoes.shtml>;

4. RESULTS OBTAINED

Although still ongoing, it is understood that the project has already achieved significant results.

The first regards the diagnosis produced by the commissioned multidisciplinary studies, which highlighted a fundamental deficiency in environmental licensing regarding climate impact assessments: the underestimation of emissions, particularly indirect emissions, Scope 2 and 3. Without incorporating and considering these emissions, whether in the licensing process under focal analysis or in any licensing with the potential to impact the climate system, the idea that major emitters internalize their impacts in the cost of their activities is destined to fail.

Another outcome achieved relates to the expansion of public debate on the climate impacts of the activity, observed in the three public hearings addressing the project and, especially, in the public meeting promoted by the Public Prosecutor's Office and ABRAMPA.

However, the most relevant result was the effective incorporation, by IBAMA's technical team, of the technical and legal grounds presented by the Public Prosecutor's Office and ABRAMPA throughout the licensing procedure, which allowed for a deeper analysis and consideration of the project's climate impacts within the monitored process.

This outcome can be verified through an analysis of the content of Technical Report no. 189/2024-Coprod/CGMac/Dilic, in which IBAMA's team acknowledged the validity of the arguments presented by the Public Prosecutor's Office in its submissions and studies, particularly regarding the urgency of the climate crisis and the extreme severity of its consequences, the central and decisive contribution of the oil and gas industry to total GHG emissions, the importance of licensing as a tool to regulate sector emissions at levels sustainable for the climate system, and the need to impose stricter responsibilities on the developer within the licensing of this activity.

It was precisely based on these premises that IBAMA requested Petrobras to revise the EIA-RIMA to comply with the new requirements, all of which are innovative and relevant to the challenges posed by the climate crisis.

The first requirement regards the presentation of more comprehensive inventories of GHG emissions, accounting for Scope 1, 2, and 3 emissions from all oil extraction and production activities carried out by the company in the country, including those already in operation and those planned, with the purpose of informing the public about the productive potential of the activity and, hence, its total potential, as well as establishing objective limits for the licensing of new projects, without compromising present and future generations.

The second requirement, linked to the first, regards the demonstration that the project's activities can occur without undermining the effective fulfillment of the main international targets on the matter, particularly those assumed by Brazil under the Paris Agreement, as well as those outlined in the Carbon Budget and the "Net-Zero Emissions" scenario by 2050 (IEA, 2021).

The third requirement regards the presentation of an assessment of climate impacts on ecosystem services at the local or regional level. This requirement aligns with the conclusions presented by ABRAMPA in the document "Climate Diagnosis in Environmental Licensing: Details for Fossil Energy Projects" (2022), which provides a detailed proposal for addressing climate impacts in the environmental licensing of projects related to fossil energy sources.

Finally, and most importantly, there is the requirement to incorporate a specific climate change program, structured around the following five areas of action: transparency, monitoring, mitigation, compensation, and adaptation.

Under the **transparency** axis, IBAMA requires that the climate change program include, at a minimum, estimates of future GHG emissions from activities related to Stage 4, as well as inventories of past emissions and estimates of future GHG emissions at regional and national levels.

Under the **monitoring** axis, IBAMA determined that an environmental monitoring plan for methane emissions from the production platforms in the Pre-Salt Cluster of the Santos Basin must be presented, in accordance with the basic guidelines established by the environmental authority.

Under the **mitigation** axis, an integrated GHG emissions mitigation program is required, which must also comply with a minimum content already established by the environmental authority, with the presentation of reports that must be used to evaluate the achievement of reduction targets (established, intermediate, and overall) and to define corrective or supplemental action plans, in order to ensure that the reduction trajectories are consistent with the established objectives.

Under the **compensation** axis, the program must include a plan for offsetting emissions, with ambition compatible with the urgency of the climate emergency, including consideration of the Public Prosecutor's Office's recommendations regarding the necessary accounting of indirect Scope 2 and 3 GHG emissions. It is important to note that the requirement for compensating indirect emissions does not necessarily imply an obligation to provide monetary compensation, as it may be addressed through commitments linked to the energy transition.

Finally, IBAMA required that the program include a **climate adaptation** project within the area of influence of the activities, which is absolutely fundamental given the strong scientific evidence regarding the contribution of the licensed activity to the increased frequency and intensity of extreme climate events.

Thus, it can be concluded that the ongoing project has already yielded highly positive results, allowing for the expansion of discussions on the climate impacts of Stage 4 of the Pre-Salt, Santos Basin, and ensuring the incorporation of stricter requirements within the environmental licensing process of the project, especially regarding indirect Scope 3 GHG emissions, thereby strengthening environmental licensing as an instrument of national climate policy.

It is worth emphasizing that, based on the debates and measures being established through this work and as an indirect effect of its development, the Public Prosecutor's Office and IBAMA have been discussing specific regulations to govern the environmental licensing of activities with the potential to cause significant impacts on the climate system, largely based on the premises and requirements established in this paradigmatic case.

5. CONCLUSION

The **ABRAMPA Project for the Right to a Stable Climate – Pre-Salt Axis** unequivocally demonstrates that environmental licensing is an indispensable tool for mitigating the climate crisis. Aware of the substantial contribution of the oil and gas sector to global GHG emissions, the initiative, strongly driven by the Public Prosecutor's Office and ABRAMPA, not only expanded the debate on the issue but also ensured the incorporation of stricter conditions within environmental licensing, which range from a thorough reassessment of the project's climate impacts to the implementation

of effective actions in transparency, monitoring, mitigation, compensation, and climate adaptation. These achievements represent a decisive milestone in environmental policy focused on sustainable development, as they ensure that operations in the oil and gas sector are aligned with global and national climate targets, whose attainment is essential to safeguarding the fundamental rights of present and future generations.

FORMOSO BASIN WATERS PROJECT PUBLIC MINISTRY IN THE PROTECTION OF WATER RESOURCES

Saulo Vinhal da Costa¹
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1. INTRODUCTION

The Formoso Basin Waters project represents a watershed moment in the actions of the Public Ministry of the State of Tocantins (MPTO) and in the defense of water resources in Brazil. Coordinated by the Operational Support Center for Urbanism, Housing, and Environment (CAOMA) in support of the Regional Environmental Prosecutor's Office of the Upper and Middle Araguaia Basin (PRMBAMA), the project was an institutional response to the chronic and alarmingly widespread environmental and social crisis affecting the Formoso River Hydrographic Basin. The uncontrolled expansion combined with ineffective inspection of large-scale irrigation projects installed in the hydrographic basin resulted in the recurrent drying up of rivers in the basin, massive mortality of aquatic fauna, ecosystem collapse, and severe damages to indigenous and riverside communities that depend on the river for their survival.

Given the ineffectiveness of previous agreements and administrative measures, the central strategy of the Formoso Basin Waters project, through the action of the MPTO, was to file a Public Civil Action (ACP) which, after years of technical instruction and judicial disputes, culminated in a structural judgment. This decision, a true legal landmark in the history of protection and conservation of the Formoso River hydrographic basin's waters, was fundamental to recognize the complex and systemic nature of public authority failures in environmental defense and protection, and determined the construction of a comprehensive action plan for the complete reorganization of water management in the basin. The MPTO's actions, based on numerous inspection reports and technical opinions produced by CAOMA, were recognized as an exemplary case of strategic litigation in defense of human rights and the environment.

Currently, the project is in the phase of monitoring the judgment's compliance. This process reveals a scenario of partial advances and persistent challenges in environmental protection in Tocantins. The State, although compelled to act, shows slowness and, in many cases, ineffectiveness in fulfilling the imposed obligations. The work of the Public Ministry continues to be indispensable to

1 Prosecutor of Justice and CAOMA Coordinator.

2 Prosecutor of Justice. Regional Environmental Prosecutor's Office of the Upper and Middle Araguaia Basin.

guarantee the implementation of essential measures, such as the technical review of water rights, the environmental regularization of properties, the operationalization of a high-level inspection system, and the guarantee of the structural safety of dams, transforming a scenario of structural failures and public authority omission into a new paradigm of water governance.

2. DIAGNOSIS

Far from being a hasty measure, the intervention of the Public Ministry resulted from an extensive period of monitoring, which pointed to the imminent environmental collapse. The serious risk stemmed from a context of administrative non-conformities and deficiencies in inspection by the Tocantins environmental agency. The verification of a complex and structural problem, involving multipolar interests, made the instrumentalization of a process of the same nature imperative for its confrontation.

2.1. THE WATER CRISIS AND THE SOCIO-ENVIRONMENTAL IMPACT IN THE FIELD

Since 2016, successive CAOMA Inspection Reports have documented with photographs, videos, and georeferenced data the seriousness of the situation. The inspections, carried out annually, especially during dry periods, revealed a desolate and recurring scenario:

- **River Sectioning:** Reports such as No. 067/2017 and No. 019/2021 recorded, through aerial and field images, entire stretches of the Formoso and Urubu rivers completely dry, with vast sandbanks where there was once a perennial riverbed. Inspection Report No. 019/2021 was emphatic in stating that the critical situation of the Formoso river extended “notably from the Terra Negra Pumping Station, with situations of river sectioning observed all the way to its mouth with the Javaés river.”
- **Impact on Ichthyofauna and Biodiversity:** The interruption of water flow caused the massive death of fish and turtles, trapped in rapidly drying puddles, an environmental damage difficult to repair that impacted the entire trophic chain and the food security of traditional communities.
- **Vulnerability of Communities:** The water crisis directly affected indigenous communities (Iny/Karajá people), riverside dwellers, and small producers, who saw their livelihoods, fishing, and flood recession agriculture destroyed by the lack of water.

2.2. THE ILLEGALITY OF STRUCTURES

Further investigation, consolidated in Technical Opinion No. 030/2022, revealed that the central irregularity was not just the excessive use of water, but the fact that the abstraction structures themselves operated in disagreement with environmental legislation, due to defects in their licensing processes. In this sense, CAOMA identified a series of failures in the licensing of the four large pumping stations on the Formoso River, namely:

- **Incorrect Size Classification:** The dams, which according to legislation (COE-MA Resolution 07/2005) should be classified as Large due to the vast flooded area, were licensed by Naturatins as “Medium” size and, subsequently, in the operation phase, reclassified even more leniently as “Small” size. This maneuver allowed for the requirement of simplified environmental studies (Environmental Project - PA) instead of more robust studies (Environmental Control Report - RCA and Environmental Control Plan - PCA), as would be legally required.
- **Licensing without Prior Water Rights:** Technical Opinion No. 030/2022 pointed out that the Preliminary and Installation Licenses were issued in May 2014, before the issuance of the respective Water Rights Ordinances, which only occurred in July 2014. This represents an illegal inversion of the process, since water rights, which define the available flow, are a prerequisite for the licensing of the structure that will use it.
- **Omitted and Deficient Environmental Studies:** The studies approved by Naturatins were considered by CAOMA as “omitted in essential points.” They did not assess the synergistic impacts of the dams, restricted the area of influence to a small strip along the riverbanks (ignoring the 63,000 hectares of irrigated crops benefited), did not estimate the volume of water to be impounded, did not present a consistent water balance, and, crucially, did not foresee a Dam Safety Plan (PSB) or an Emergency Action Plan (PAE), even with the evident risks.
- **Structural Insecurity:** Inspections found “hydraulic and safety non-conformities” and “various pathological manifestations” in the structures. Inspection Report No. 067/2017 had already reported the rupture of the Ilha Verde dam’s abutment and severe erosive processes in the Dois Rios dam, evidencing design and construction flaws that put the environment and downstream populations at risk.

2.3. LACK OF CONTROL IN INSPECTION AND WATER ALLOCATION

Due to the complete absence of governance and deficient inspection by the State regarding the water situation of the Formoso River hydrographic basin, the action of the MPTO became necessary to guarantee access to water for purposes other than only irrigated agriculture, as well as for environmental conservation purposes; therefore, the bottlenecks listed below were identified:

- **Uncontrolled Expansion:** Inspection Report No. 019/2021 showed that the planted area in the basin jumped from 33,057 hectares in 2008 to 78,349 hectares in 2021, an increase of 137%. This growth occurred without investments in water infrastructure (storage reservoirs) foreseen in the 2012 Basin Plan, far exceeding the carrying capacity of the rivers in the hydrographic basin.
- **Water Rights Exceeding Availability:** The diagnosis by the MPTO and partners such as the Institute for Attention to Cities (IAC/UFT) revealed that the flows granted by Naturatins far exceeded legal limits and the actual water availability in the rivers of the hydrographic basin, creating a water deficit that manifests itself with the drying up of riverbeds during the dry season.
- **Precarious and Ineffective Monitoring:** Although the High-Level Management (GAN) system was created to monitor water abstractions in the hydrographic basin, CAOMA's analyses demonstrated its persistent ineffectiveness: inoperative meters, lack of data transmission, absence of integration with Naturatins' inspection systems (SIGAM), and, most seriously, the non-use of data to curb illegal abstractions.

Given this state of water insecurity, the Public Civil Action and the consequent structural judgment became fundamental instruments, capable of forcing systemic change and restoring the legality of abstractions in the Formoso River hydrographic basin.

3. THE STRUCTURAL JUDGMENT AND ACTION PLAN 000107072-2016.8.27.2715/TO

The Public Civil Action filed by the MPTO culminated in a structural judgment, which established obligations for the state of Tocantins (Naturatins and Semarh). The objective was not only to punish, but to create a roadmap for correcting irregularities and building new environmental governance. In response, the State presented an Action Plan for the Sustainability of the Formoso River Hydrographic Basin, the compliance of which began to be rigorously monitored by the MPTO, through CAOMA's technical analyses. The measures imposed by the judgment and monitored by CAOMA cover all the critical points identified:

- **Review of Water Rights and Water Balance:** Requirement for a technical and transparent methodology to review all water rights, considering the actual volume of reservoirs and monitoring data, to adapt demand to water availability.

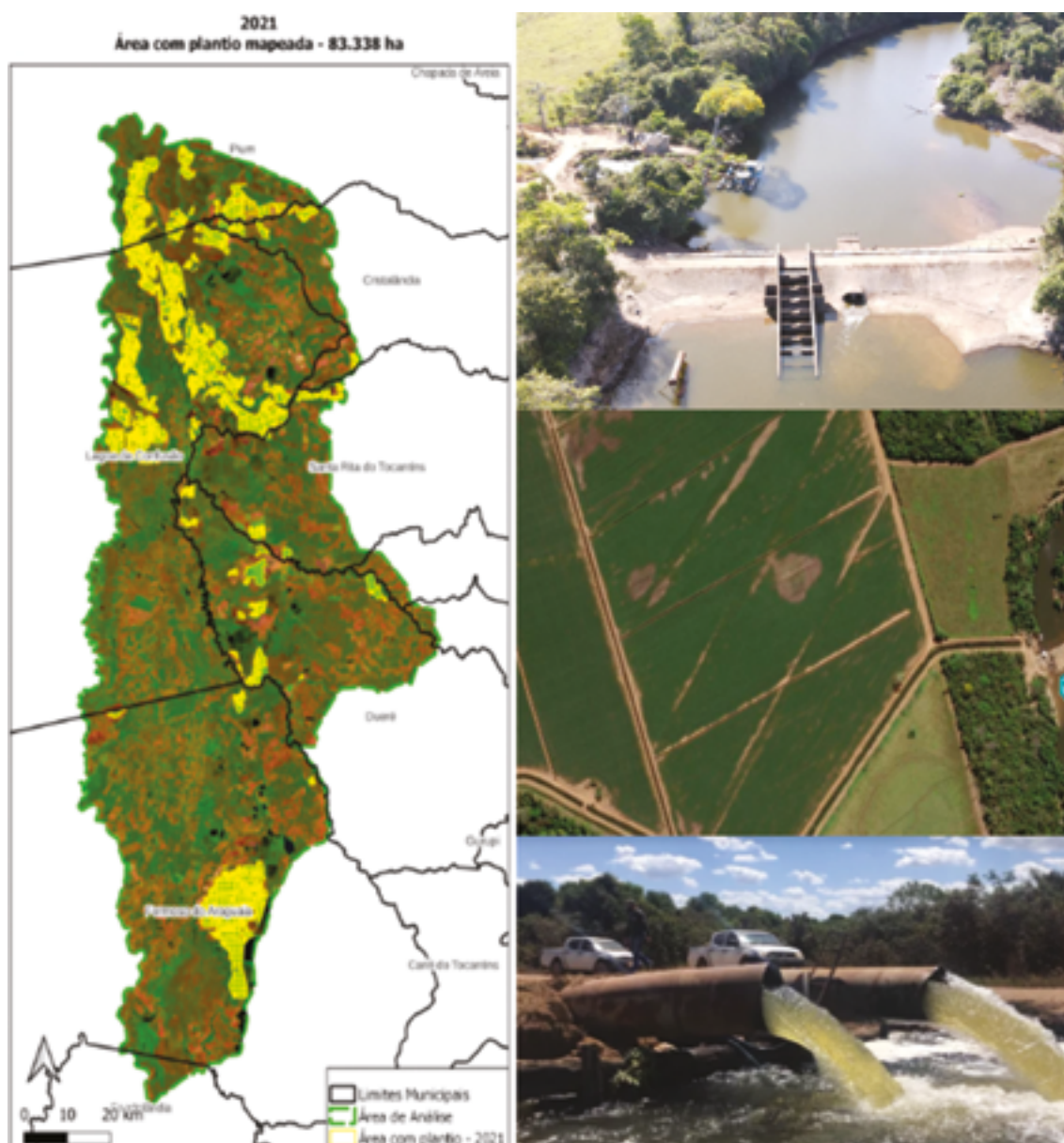
- **Monitoring and Inspection:** Installation of new fluviometric stations, telemetry of data, integration of the GAN system with inspection systems, and the creation of strict rules with punitive measures for infringers.
- **Dam Safety and Licensing:** Readaptation of the environmental licensing of dams, with the presentation of complete environmental studies (RCA/PCA) and Dam Safety Plans.
- **Environmental Regularization of Properties (CAR):** Conclusion of the analysis of all Rural Environmental Registries (CAR) of irrigators, with the signing of Terms of Adjustment of Conduct (TACs) for the recovery of environmental liabilities.
- **Management Instruments:** Updating of the Basin Plan (dated 2012 and completely outdated), implementation of water use charges, and a study for the creation of a Water Agency.

Furthermore, below is a list of actions and judgments of the Regional Environmental Prosecutor's Office of the Upper and Middle Araguaia Basin and other judgments regarding the regularization of legal reserves.

Actions		Sentences	
Main Public Civil Action		000107072-2016.8.27.2715/TO	
Enforcement of Judgment in the Main Action		000146605-2023.8.27.2715/TO	
Actions		Sentences	
Precautionary Measures – Suspension of Water Abstraction Permit – Irregularity	0001227-64.2024.8.27.2715/TO	0001018-03.2021.8.27.2715/TO	
	000143847-2017.8.27.2715/TO	0001019-85.2021.8.27.2715/TO	
	000275745-2020.8.27.2715/TO	0001020-70.2021.8.27.2715/TO	
	000087344-2021.8.27.2715/TO	0002152-36.2019.8.27.2715/TO	
	000275745-2020.8.27.2715/TO	0000817-79.2019.8.27.2715/TO	
	0001013-78.2021.8.27.2715/TO	0000299-89.2019.8.27.2715/TO	
	0001015-48.2021.8.27.2715/TO	0001466-05.2023.8.27.2715/TO	
	0001016-33.2021.8.27.2715/TO	0001227-64.2024.8.27.2715/TO	
	0001017-18.2021.8.27.2715/TO		
Public Civil Action – Illegal Relocations and Deforestation		000146605-2023.8.27.2715/TO	

4. RESULTS AND REAL IMPACTS OF MINISTERIAL ACTION

The MPTO's actions, from the initial inspections to the monitoring of the judgment's compliance, resulted in positive impacts and swift responses in favor of environmental protection in the Formoso River hydrographic basin.



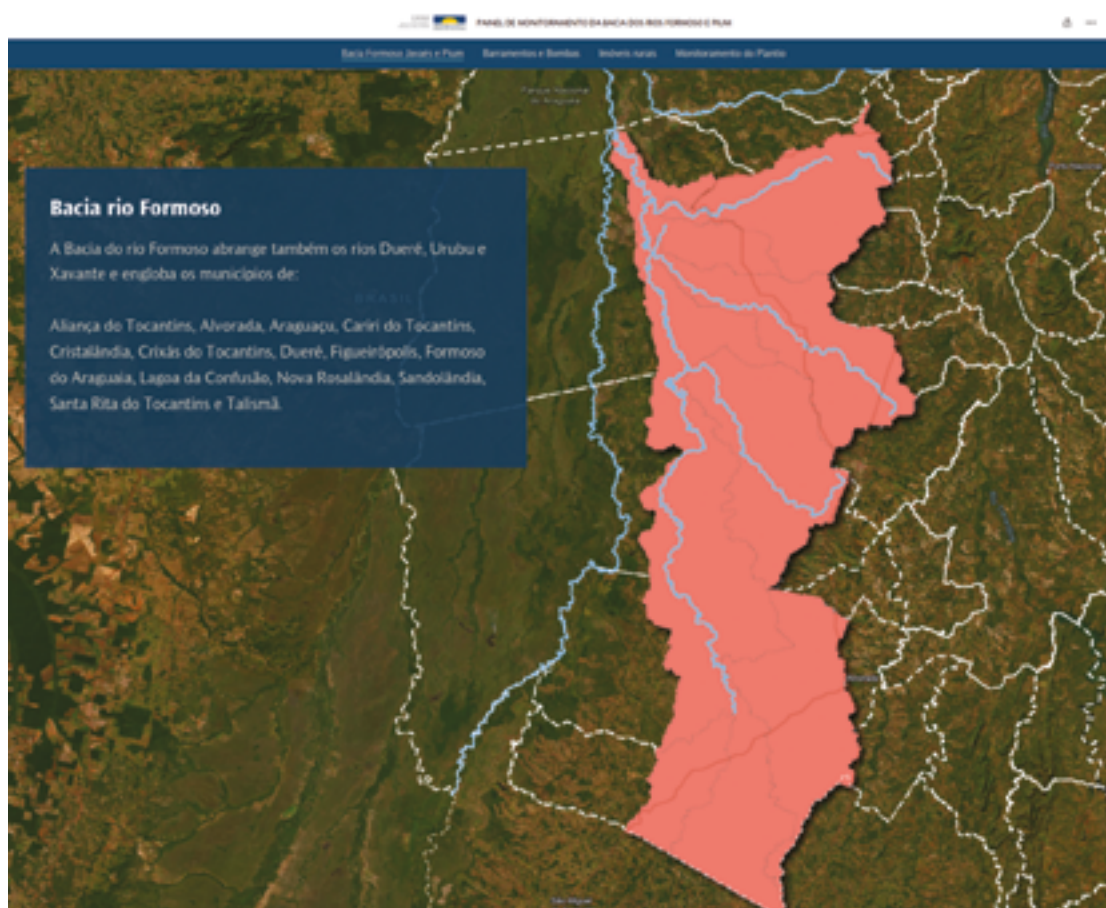
- **Halting Environmental Collapse:** The injunctions obtained by the MPTO to suspend pumping during critical periods were essential to prevent the total drying up of the rivers over the years, thus ensuring the survival of part of the ecosystem.

- **Exposure of Illegalities:** The project publicly exposed serious flaws in environmental licensing processes and water resource management in the basin, creating social and institutional pressure for change and leading the case to have national repercussions.
- **Initiation of Accountability:** Rural producers and associations, previously operating with little or no inspection, were fined and forced to negotiate agreements and comply with judicial and administrative determinations. Inspection Report No. 067/2017 states that infraction notices totaling R\$ 4.55 million in fines were applied against the association of producers and landowners in the basin.
- **Institutional Empowerment of the State:** The structural judgment compelled state agencies to modernize. Naturatins was forced to create a transparency portal for water rights, improve (albeit insufficiently) the monitoring of abstractions, and initiate the process of reviewing issued licenses and water rights.
- **Creation of a “Culture of Legality”:** The constant action of the Public Ministry and the Judiciary in the hydrographic basin began to change the perception of impunity, establishing a new standard of conduct expected from large water users.
- Through administrative procedures, the Public Ministry promoted Terms of Adjustment of Conduct (TACs) that ensure the recovery of more than 4,000 hectares in legal reserve and permanent preservation areas.

5. CURRENT CHALLENGES AND CAOMA MONITORING

Currently, the project is in the phase of monitoring the judgment’s compliance (000146605-2023.8.27.2715/TO), a process closely supervised by the Regional Environmental Prosecutor’s Office of the Upper and Middle Araguaia Basin, which analyzes the effectiveness of the actions proposed by the State. Although significant progress has been achieved in the last eight years, the full environmental regularization of all irrigators and compliance with authorized flows are still challenges. CAOMA has issued detailed technical recommendations to improve the Action Plan, addressing everything from the methodology for reviewing water rights and installing measurement systems to the inspection and environmental regularization of rural properties. The expectation is that the year 2025 will represent a milestone in the consolidation of “High-Level Management,” transforming the scenario of conflict into a paradigm of water sustainability for agricultural production.

Through the actions of the Regional Environmental Prosecutor’s Office of the Upper and Middle Araguaia Basin, every year the MPTO has acted to contain the water crisis in the region and the State’s inefficiency in managing and inspecting water use, as well as monitoring the irrigated planting area in the basin through satellite images via the Basin Monitoring Panel, which can be accessed through the link: [Monitoring Panel](#)



Despite the advances, the most recent CAOMA reports (Collaboration Analyses Nos. 051 and 103, from 2025) demonstrate that the battle for the sustainability of the Formoso Basin is far from over. The analysis of the Action Plan presented by the State reveals that many important judicial determinations have not been fulfilled or have been fulfilled superficially. CAOMA, in its role as guardian of the law and technical support body, continues to be the main driving force for the fulfillment of the judgment, pointing out gaps and recommending corrective actions. The main current challenges, as pointed out by the Support Center, are:

- **Ineffectiveness of Monitoring (GAN System):** The system still does not integrate the flow limits of the water rights, does not generate automated non-compliance reports, and lacks interoperability with inspection systems. CAOMA recommends the elaboration of a clear schedule for the evolution of the system and the guarantee that the State has access to and control over data and source codes, so as not to depend on third parties (consultants).
- **Pending Review of Water Rights and Licensing:** The review of water rights has not yet been concluded with the necessary technical rigor. CAOMA requires the presentation of the methodology, the correlation of the granted volumes with those actually abstracted, and the analysis of losses in irrigation channels, which have never been properly licensed. Furthermore, the licensing of **11 new pumping stations** proceeds without considering the cumulative impacts and lessons learned from the old dams.

- **Paralysis in Environmental Regularization:** The notification of producers to sign Terms of Adjustment of Conduct (TACs) in order to regularize their environmental liabilities (CAR) has not yet been effective, which prevents the suspension of water rights for irregular parties, as determined by the judgment.
- **Management Instruments on Paper:** The updating of the Basin Plan, the effective implementation of water use charges, and the creation of the Water Agency are crucial measures that have not materialized, keeping basin management in a precarious and passive state.

For 2025 and subsequent years, CAOMA has established a set of recommendations for the State, which include the cancellation of water rights for infringers, the embargo of areas with Legal Reserve liabilities, and the linking of license renewals to full environmental and water regularity, demonstrating that the Public Ministry's vigilance will be permanent as long as there is productive activity in the region.

6. CONCLUSION

The Formoso Basin Waters project is an emblematic case that illustrates both the capacity for environmental degradation through the unsustainable use of natural resources and the power of the Public Ministry as an agent of social and ecological transformation. The meticulous and continuous technical work of CAOMA, from the precise diagnosis of the crisis to the rigorous monitoring of the judgment's compliance, has been fundamental to reverse a history of illegalities and restore socio-environmental balance.

The path to the full sustainability of the basin is long and full of challenges, requiring political commitment from the State, responsibility from the productive sector, and the continuous engagement of society. The legacy of this project, however, is already consolidated: the demonstration that, with technical basis, legal rigor, and institutional determination, it is possible to confront hegemonic interests and guarantee the fundamental right to a balanced environment for present and future generations.

PERFORMANCE OF THE PUBLIC PROSECUTOR'S OFFICE THROUGH THE SPECIALIZED GROUP FOR THE ENVIRONMENT AND DEFORESTATION - GAEMA - D

Saulo Vinhal da Costa¹

1. INTRODUCTION

The growing concern with environmental issues, especially deforestation, has driven the creation of more effective mechanisms and strategies for environmental protection and the promotion of sustainable development. In the Brazilian scenario, the Legal Amazon and the Cerrado, biomes rich in biodiversity and of fundamental importance for global climate balance, constantly suffer from the pressure of illegal deforestation. Given this scenario, the Public Prosecutor's Office of the State of Tocantins, as an institution essential to the State's jurisdictional function, plays a primordial role in environmental protection, acting both in the preventive and repressive spheres.

This project aims to present the experience of the Public Prosecutor's Office of the State of Tocantins (MPTO), through its Specialized Group for the Environment and Deforestation (GAEMA D), in promoting a firm and effective action against deforestation. We will address the group's genesis, its pillars of action, the innovative tools employed, and the results achieved, highlighting how this initiative can serve as a model for other Public Prosecutor's units and contribute to the debate and solutions presented at COP 30.

2. THE CONTEXT OF GAEMA'S CREATION IN THE PUBLIC PROSECUTOR'S OFFICE OF TOCANTINS

The creation of the Specialized Group for the Environment in the MPTO occurred in response to the need to improve and specialize ministerial action in the face of increasing demands and the complexity of environmental issues affecting the region. Resolution No. 009/2022 of the College of Prosecutors of the Public Prosecutor's Office of the State of Tocantins was the legal framework that established the group, with the purpose of acting preventively and repressively in the protection of

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the environment and urbanism, in addition to identifying and investigating civil and criminal environmental violations in state or interstate and specialized cases of high degree of harmfulness, repercussion, gravity, or complexity that occur in the State of Tocantins.

The initiative for the creation of GAEMA came from the then Coordinator of the Operational Support Center for Urbanism, Housing and Environment (Caoma), Public Prosecutor José Maria da Silva Júnior. His vision was fundamental to recognize the need to expand specialized action in the environmental area, seeking to consolidate the principles of homogeneity, quality, and effectiveness in the ministerial response.

To optimize its performance, GAEMA was subdivided into priority thematic areas, reflecting the most pressing environmental challenges in Tocantins: (i) fires and burnings; (ii) deforestation; and, (iii) solid waste. From this segmentation emerged the specific groups: the Specialized Group for the Environment in Forest Fires and Burnings (Gaema IQ), the Specialized Group for the Environment in Urban Solid Waste (Gaema RSU), and, the focus of this project, the Specialized Group for the Environment in Deforestation (Gaema D).

3. THE STRATEGIC PERFORMANCE OF GAEMA DEFORESTATION (GAEMA D)

GAEMA D operates under a Work Plan approved by its members, with parameters defined in conjunction with the Operational Support Center, aiming to strategically combat large-scale deforestation in the State of Tocantins. GAEMA D's approach stands out for innovative and effective characteristics that ensure greater speed, precision, and effectiveness in responding to environmental infractions.

3.1. USE OF TECHNOLOGY AND GEOPROCESSING

One of the great differentials of GAEMA D's performance is the use of geospatial intelligence, based on information produced by the Caoma Geoprocessing Laboratory - Labgeo. This information is used to define GAEMA's ministerial action strategy with an emphasis on the main deforestation hotspots identified. The panel can be accessed via the link: [Deforestation Monitoring Panel in Tocantins](#).

Once the strategy is defined, Technical Information Pieces (PITs) are produced, prepared from satellite images, which allow for the agile and precise detection of deforestation, and are forwarded to GAEMA.

PITs directly support the ministerial procedures initiated in GAEMA, eliminating the dependence on environmental agencies sending infraction notices to support investigations. This streamlines the investigation and punishment process, allowing the Public Prosecutor's Office to act more strategically, precisely, and effectively.

Below is the report with the number of procedures initiated by GAEMA D, from 01/01/2023 to 12/31/2024, most of them initiated from the technical information pieces:

Tipo	Total
Inquérito Civil Público	141
Notícia de Fato	186
Procedimento Administrativo	10
Procedimento Administrativo de Acompanhamento de TAC	30
Procedimento de Gestão Administrativa	1
Procedimento Preparatório	178
Total	546
QUANTITATIVO - Procedimentos recebidos de outros Órgãos de Execução Departamentos	
Tipo	Total
INQUÉRITO CIVIL	39
NOTÍCIA DE FATO	19
PROCEDIMENTO ADMINISTRATIVO	1
PROCEDIMENTO PREPARATÓRIO	8
Total	67

They can also be seen on the Initiated Procedures Panel via the link: [GAEMA D Initiated Procedures Panel](#)

It is important to note that not all procedures initiated in GAEMA D remain there. After initiation, a screening is carried out and procedures that do not fall within the group's attributions are forwarded to the respective prosecutor's offices.

Thus, currently, GAEMA D has 165 ongoing procedures and is awaiting the submission of approximately 150 technical information pieces this year.

3.2. FLOWCHART FOR WORK OPTIMIZATION

GAEMA D's performance is guided by the use of a well-defined flowchart, utilizing standardized documents, which directs the work of its members and staff. This methodology optimizes time and increases the effectiveness of actions, ensuring that procedures follow a logical and efficient course, from the detection of deforestation to the formalization of appropriate measures.

3.3. PURSUIT OF CONSENSUALITY AND SELF-COMPOSITION

Although GAEMA D's actions are firm and effective, they are also guided by the pursuit of consensuality through the self-composition of conflicts. The use of Conduct Adjustment Agreements (TACs) for the environmental regularization of rural properties has proven to be a powerful instrument for reducing litigation. This approach seeks to promote the recovery of degraded areas more quickly and less costly for the public treasury and those involved.

In this regard, 44 (forty-four) conduct adjustment agreements have been signed so far, and several procedures with ongoing negotiations are underway. In addition, there are more than 100 procedures pending at the Judicial Center for Environmental and Land Conflict Resolution (CEJUS-CAF), with the objective of seeking agreements and consensual solutions. These are significant numbers, considering that GAEMA began its activities in 2023.

3.4. REGISTRATION OF MINISTERIAL PROCEDURES

Another relevant strategy employed by GAEMA D is the registration of ministerial procedures in the property records of real estate with environmental liabilities. This measure has boosted the conclusion of agreements for the environmental regularization of properties, as the registration provides publicity to the property's situation and encourages owners to seek regularization to avoid future sanctions or impediments in obtaining bank credit and real estate transactions.

4. RESULTS AND CONTRIBUTIONS TO ENVIRONMENTAL PROTECTION

GAEMA D's performance has demonstrated the viability and effectiveness of an approach that combines firmness in environmental protection with dialogue and balance between environmental protection and the development of economic activities. Instead of a merely punitive stance, GAEMA D seeks solutions that allow environmental recovery and legal compliance, without making production and socioeconomic development unfeasible in a sustainable way.

The use of geospatial intelligence to identify deforestation, the agility in initiating procedures, the pursuit of self-composition, and the use of mechanisms such as the registration of environmental liabilities in property records are examples of good practices that can be replicated in other contexts and that strengthen the Public Prosecutor's Office's performance in environmental defense.

5. CONCLUSION AND PROPOSALS FOR CNMP'S COP 30

The experience of GAEMA D in the Public Prosecutor's Office of the State of Tocantins represents a model of exemplary action in environmental protection, particularly in combating deforestation. The combination of technology, efficient methodology, and the pursuit of consensual solutions demonstrates that it is possible to reconcile the application of the law with the promotion of agreements that result in effective environmental recovery and environmental regularization of properties.

For COP 30, we propose that GAEMA D's experience be widely disseminated and discussed as a success story. We suggest the following topics for debate and potential implementation at a national level:

- **Dissemination and Incentive for the Creation of Specialized Groups:** Foster the creation of specialized environmental action groups, following the GAEMA model, in other state Public Prosecutor's Offices, adapting them to local realities.
- **Strengthening of Geoprocessing Laboratories:** Invest in the structuring and training of geoprocessing laboratories in all Public Prosecutor's units, ensuring access to satellite images and specialized software for the detection and monitoring of environmental illicit acts.

- **Standardization of Action Flowcharts:** Develop and disseminate action flowcharts for public prosecutors dealing with environmental issues, aiming to optimize time and increase the effectiveness of investigations.
- **Training in Self-Composition Methods:** Promote courses and training on negotiation techniques and self-composition of environmental conflicts, encouraging the signing of TACs as a tool for regularization and reduction of litigation.
- **Creation of a Best Practices Database:** Establish a national database of best practices and jurisprudence related to the Public Prosecutor's Office's performance in environmental issues, facilitating the exchange of knowledge and experiences among units.

We believe that the integration of these strategies, inspired by GAEMA D's actions, can significantly strengthen the capacity of the Brazilian Public Prosecutor's Office in environmental protection, contributing to a more sustainable future and to the fulfillment of its constitutional mission.

AGAINST FIRE PROJECT: DIGITAL PLATFORM FOR COMBATING WILDFIRES IN TOCANTINS

Saulo Vinhal da Costa¹

1. INTRODUCTION

Wildfires and forest fires represent one of the most serious contemporary environmental threats, with devastating impacts on biodiversity, air quality, human health, and the economy. In Brazil, this problem is particularly acute, especially in sensitive biomes such as the Cerrado, which is predominant in the state of Tocantins. Characterized by its vast biodiversity and intense dry periods, Tocantins is among the states with a high incidence of heat foci annually, resulting in incalculable losses of native vegetation, soil impoverishment, and massive emissions of greenhouse gases. The complexity of the wildfire phenomenon, which involves climatic, anthropogenic, and socioeconomic factors, demands a multifaceted and technologically advanced approach for its control and prevention.

Historically, monitoring and combating wildfires face significant challenges, including the geographical dispersion of foci, difficulty of access to remote areas, lack of integrated data, and slowness in the response of institutions involved in wildfire control and combat. These limitations compromise the effectiveness of inspection actions and the accountability of offenders. Given this scenario of urgency and complexity, the Public Prosecutor's Office of the State of Tocantins (MPTO), recognizing its fundamental role in environmental defense, undertook an innovative initiative: the development of the "Contra Fogo" digital platform.

The "Contra Fogo" system, developed by the Public Prosecutor's Office of Tocantins, is an intelligence center that revolutionizes the combat against wildfires and fires in Brazil. By integrating satellite data from NASA and INPE with information from the Rural Environmental Registry, conservation units, indigenous lands, and sensitive areas, the platform offers real-time monitoring, geolocation indicating the origin and trajectory of the fire, distinction between authorized foci and illegal burning, identification of recurrent areas, and generation of evidence for civil and criminal accountability. In addition to expanding the problem-solving capacity of ministerial action, the tool sends

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automatic alerts and connects firefighters, civil defense, municipal brigades, and rural landowners, enabling an immediate response capable of containing the spread of fire and protecting vegetation and fauna. It is an automated solution, highly effective and low-cost, ready to be replicated in other federative units, aligned with the ongoing discussions in the Supreme Federal Court, in ADPFs 743, 746, and 857. This conversion of technical knowledge into strategic action gives the Public Prosecutor's Office a leading role in confronting wildfires and fires, with concrete potential to achieve national scale.

2. THE “CONTRA FOGO” PROJECT: AN INNOVATIVE APPROACH

“Contra Fogo” transcends the concept of a simple monitoring tool; it stands as a central pillar in the digital environmental governance strategy of the Public Prosecutor's Office of Tocantins.

2.1. CONCEPTION AND STRATEGIC OBJECTIVES

Conceived and developed by the Public Prosecutor's Office of the State of Tocantins, through the Radar Ambiental project, “Contra Fogo” was born from the perception of the urgent need to modernize and optimize the agency's action in combating wildfires. Before its implementation, information on heat foci was dispersed, often outdated and unintegrated, hindering a quick and effective response. The main objective of the platform is, therefore, to fundamentally improve actions for prevention, monitoring, control, and inspection of wildfires and forest fires. This is achieved through a systemic approach that interconnects data and processes, providing a holistic and near real-time view of the wildfire scenario.

The “Contra Fogo” system has the following strategic objectives:

- **Data Centralization:** Create a unique and georeferenced repository for all relevant information on heat foci and wildfires in the State.
- **Monitoring Optimization:** Provide tools for continuous and precise monitoring of occurrences, allowing the identification of critical areas and risk projection.
- **Strengthening Inspection:** Equip Public Prosecutors and other control and inspection agencies to act in a more precise and strategic manner.
- **Support for Decision-Making:** Provide qualified information that enables the formulation and adjustment of more efficient public policies for environmental management in Tocantins.
- **Promotion of Transparency:** Make information available to the public and foster citizen participation in the prevention and reporting of wildfires through the use of the platform.



Figure 1. Initial screen of the platform showing the map with heat foci in the last day and a statistics panel with information on recently affected areas.

2.2. TECHNOLOGICAL ARCHITECTURE AND QUALIFIED DATA INTEGRATION

The operational capacity of “Contra Fogo” is supported by a robust technological architecture and the strategic integration of various data sources. The platform uses heat foci data captured from NASA and INPE service providers, ensuring continuous and high-precision monitoring. This raw data is processed and qualified to generate information on occurrences from the last 7 (seven) days, structuring a georeferenced database that serves as the basis for all analyses.

The platform’s intelligence is significantly enhanced by correlating these heat foci with a series of other critical geographic and cadastral information:

- **Rural Environmental Registry (CAR):** Integration with the CAR allows identifying whether heat foci occur within registered rural properties, assisting in accountability and verifying compliance with environmental regulations. The platform already includes the CAR history functionality.
- **Conservation Units (CUs):** Allows identifying heat foci in protected areas, essential for biodiversity conservation, directing more urgent inspection and protection actions.
- **Indigenous Lands (ILs):** Monitors the occurrence of burnings in traditionally occupied territories, aiming to protect vulnerable communities and ecosystems.
- **Municipal Boundaries:** Facilitates the identification of affected geographical areas and the coordination of actions with local authorities.

This data correlation not only locates the burnings but also contextualizes each occurrence, providing essential information about the type of area affected, ownership (when applicable), and potential environmental infringement. This ability to cross-reference technical and legal information is what makes “Contra Fogo” a strategic intelligence tool, especially for Public Prosecutors with environmental attribution.



Figure 2. Screenshot of the platform showing heat foci statistics over the last 7 days and detailing the occurrence in municipalities, Indigenous Lands, Conservation Units, and affected Rural Properties.

3. RELEVANCE AND IMPACT ON ENVIRONMENTAL PROTECTION AND COMBATING ENVIRONMENTAL CRIMES

The relevance of the “Contra Fogo” project for environmental protection in Tocantins is multifaceted and highly impactful. It represents a qualitative leap in the State’s environmental management, going beyond a monitoring tool to become a proactive instrument in combating burnings and environmental crimes.

3.1. SUPPORT FOR QUALIFIED MANAGEMENT AND DECISION MAKING

One of the main attributes of “Contra Fogo” is its ability to provide data and tools that support decision-making and environmental management in the State. Public Prosecutors, Environmental Managers, and Security Forces can access the platform (<https://contrafogo.mpto.mp.br/mapa>) and view an interactive map with heat foci, in addition to correlated information.



Figure 3. Screenshot of the platform showing heat foci over the last 7 days in a municipality with a color scale and the affected rural properties.

This spatial and temporal visualization allows identifying patterns, higher risk areas, and the recurrence of burnings on certain properties or regions.

The availability of this data in an accessible and user-friendly interface optimizes response time and resource allocation. Instead of acting only after receiving complaints or completing specific inspections, control agencies can direct their teams to priority areas based on precise and updated information. This not only increases operational efficiency but also strengthens prevention capacity, allowing for the implementation of anticipated measures in high-risk areas.

3.2. STRENGTHENING MINISTERIAL ACTION AND COMBATING ENVIRONMENTAL CRIME

“Contra Fogo” establishes itself as a valuable resource for the ministerial action of enforcement bodies with environmental attribution. By integrating technical (satellite data, geographic limits, CAR) and legal information, the platform provides the necessary basis for initiating civil inquiries, proposing legal actions, and applying consent decrees (TACs). The ability to monitor and analyze burnings more efficiently, as well as the integration with other databases, makes “Contra Fogo” an essential tool for combating environmental crimes and promoting more effective environmental management in Tocantins. The traceability of information and the possibility of cross-referencing data from different sources increase the robustness of evidence and the effectiveness of the Public Prosecutor’s Office’s actions.

Furthermore, the initiative seeks to provide greater execution capacity to environmental projects, connecting with public policies and seeking to optimize the MPTO’s actions on a topic of great environmental impact, such as burnings. This means that the platform is not just a data repository, but an instrument for the realization of strategic goals and objectives of environmental protection, transforming theory into practice and generating tangible results in reducing occurrences and holding those involved in infringing practices accountable.

4. STRATEGIC PARTNERSHIPS: EXPANDING THE REACH AND EFFECTIVENESS OF “CONTRA FOGO”

The dimension and complexity of the challenge of burnings demand a collaborative approach. The “Contra Fogo” project recognizes this premise and has actively invested in formalizing strategic partnerships that expand its reach and effectiveness. These collaborations are fundamental for the continuous development and improvement of the platform, as well as for the dissemination of its functionalities and benefits.

4.1. SYNERGY WITH RESPONSE AND PREVENTION AGENCIES

The “Contra Fogo” project has already formalized partnerships with institutions of great relevance in the public security and civil protection scenario in Tocantins:

- **Military Fire Department of Tocantins:** This partnership is crucial for field response. The georeferenced data from “Contra Fogo” can be used by fire fighting teams to plan routes, identify the extent of foci, and allocate resources more efficiently. The integration of near real-time information allows for a faster and more coordinated response, minimizing the damage caused by fires.
- **Civil Defense:** Collaboration with Civil Defense strengthens disaster prevention and mitigation capacity. The platform can assist in identifying risk areas and mobilizing resources for the protection of communities and infrastructures threatened by burnings. Civil Defense can use the platform’s alerts to issue communications to the population and coordinate evacuation actions, if necessary.

These partnerships are not limited to information exchange; they promote collaborative development of the platform, including the incorporation of functionalities requested by partners. For example, the WhatsApp alert functionality, which allows rapid sending of notifications about new heat foci to teams and stakeholders, demonstrates the platform’s adaptability to the operational needs of partners.

4.2. OPTIMIZATION OF MPTO ACTIONS AND CONNECTION WITH PUBLIC POLICIES

The partnerships are also a reflection of the MPTO’s search to optimize its own actions on the issue of burnings. By connecting with other actors and integrating their databases, “Contra Fogo” amplifies the impact of the Public Prosecutor’s Office’s actions, which now operates in a more coordinated and synergistic manner with other security and inspection forces. This integrated approach not only optimizes resources but also strengthens the environmental protection network in the state of Tocantins.

Furthermore, the initiative seeks to connect with existing and future public policies, providing greater execution capacity to environmental projects. This means that “Contra Fogo” is not an isolated project, but a tool that fits into a larger framework of governmental strategies for sustainability. It provides the data and intelligence necessary to support the creation of new laws, regulations, and programs for preventing and combating burnings, consolidating evidence-based environmental management.

5. FINAL CONSIDERATIONS: THE FUTURE OF DIGITAL ENVIRONMENTAL PROTECTION IN TOCANTINS

The “Contra Fogo” project of the Public Prosecutor’s Office of the State of Tocantins emerges as a paradigmatic example of how technological innovation can be strategically employed to face complex environmental challenges. By creating a robust digital platform for managing information on heat foci and burnings, the MPTO not only enhances its own inspection and action capabilities but also strengthens the entire environmental protection ecosystem in the State.

The platform’s ability to integrate NASA satellite data with information from the Rural Environmental Registry, Conservation Units, and Indigenous Lands provides unprecedented analytical depth. This integration allows for a more complete understanding of occurrences, facilitating the identification of infringers, the analysis of frauds (such as legal reserve fraud, for example), and the prioritization of combat and prevention actions. Facilitated access to the platform (<https://contra-fogo.mpto.mp.br/mapa>) democratizes information and strengthens transparency, allowing various actors, including civil society, to monitor the burning situation.

The strategic partnerships formalized with the Military Fire Department of Tocantins and Civil Defense are a testament to the project’s collaborative vision. These synergies not only enrich the platform with new functionalities, such as WhatsApp alerts and CAR history, but also ensure that the intelligence generated by “Contra Fogo” is effectively used by field teams in emergency response and risk prevention.

In summary, the “Against Fire” project goes beyond being a mere tool; it establishes itself as a catalyst for more effective, proactive, and evidence-based environmental management in the state of Tocantins. It demonstrates the capacity of public institutions to innovate for the common good by combating environmental crimes and promoting sustainability. By providing “execution capacity” to environmental projects and connecting directly with public policies, the MPTO, through “Against Fire,” paves the way for a future where the protection of the Cerrado and its valuable ecosystems is more resilient and effective, serving as an inspiring model for other regions and countries facing similar challenges. Continued investment and expansion of the platform’s functionalities are essential to consolidate these gains and ensure a lasting legacy of environmental conservation in Tocantins.

STATE ENVIRONMENTAL FUND - SERVING TOCANTINS' ENVIRONMENTAL AGENDA

Saulo Vinhal da Costa¹

1. ABSTRACT

This project highlights the work of the Public Prosecutor's Office of Tocantins (MPTO) in defending the state's environmental policy, specifically regarding the management of the State Environmental Fund (FUEMA). For years, FUEMA suffered from the illegal de-earmarking of resources, resulting in a loss of over R\$ 18.4 million for the environmental sector in the last 12 years and preventing investments in crucial areas such as the analysis of the Rural Environmental Registry (CAR) and the fight against deforestation. The MPTO's intervention, through its action in the State Environmental Council (COEMA/TO), culminated in the signing of a Conduct Adjustment Term (TAC) that redefined the bases for the application of FUEMA's resources. The agreement guaranteed an end to de-earmarking, the allocation of over R\$ 30 million for CAR analysis and validation, the creation of a Technical Chamber for Fund management, new models for project presentation, and the guarantee that 40% of the annual budget would be invested in priority projects. This initiative demonstrates the power of ministerial action as an inducer of effective and transparent public policies in the environmental agenda.

2. INTRODUCTION

The global climate agenda demands concrete and articulated actions at all levels of government and civil society. COP30, to be held in Belém, Brazil, in 2025, will be a milestone in demonstrating Brazil's commitment to sustainability and the fight against climate change. In this context, the performance of the Brazilian Public Prosecutor's Office is of paramount importance to ensure the implementation of the Paris Agreement and the promotion of sustainable development. This project presents a successful experience of the Public Prosecutor's Office of the State of Tocantins in recovering the functionality and transparency of one of the main financing mechanisms for the state's environmental policy: the State Environmental Fund (FUEMA). The current experience exemplifies how the incisive action of the Public Prosecutor's Office can catalyze significant changes in the management of public resources aimed at the environment, positively impacting the sustainable management of forests and the promotion of ecosystem resilience.

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3. CONTEXT: THE STATE ENVIRONMENTAL FUND OF TOCANTINS AND THE CHALLENGES FACED

The State Environmental Fund (FUEMA) of Tocantins was created with the purpose of financing the state's environmental policy, contributing to the protection and recovery of the environment. However, for years, FUEMA was marked by chronic mismanagement and the illegal de-earmarking of its financial balances. This practice, which contravened State Law No. 2,095/2009, diverted over R\$ 18.4 million from the environmental sector in the last 12 years.

The irregularities were not limited to de-earmarking; the failure to allocate 40% of resources to priority projects and the chronic underestimation of budget forecasts were also recurring problems. This scenario resulted in significant damage to the environment of Tocantins, leaving urgent demands, such as the analysis of the Rural Environmental Registry (CAR) and the fight against deforestation, without due investment. The absence of adequate resources for CAR analysis and validation, for example, directly impacts the environmental regularization of rural properties, hindering deforestation control and biodiversity conservation.

4. THE ROLE OF THE PUBLIC PROSECUTOR'S OFFICE OF TOCANTINS AS A CATALYST FOR CHANGE

Given the serious situation of FUEMA's mismanagement, the Public Prosecutor's Office of the State of Tocantins (MPTO) assumed a proactive and incisive role. The MPTO's action in the State Environmental Council (COEMA/TO) was fundamental in promoting a strategic change. For two years, the MPTO made recurring technical manifestations, refusing to approve the accountability reports and the proposals for FUEMA's application.

This persistence and the technical rigor of the MPTO triggered a negotiation process that involved the highest levels of the state government. The MPTO's articulation culminated in the signing of a Conduct Adjustment Term (TAC), which established a new pact for environmental management in Tocantins. This TAC not only ceased the irregularities but redefined the bases for the application of FUEMA's resources, highlighting ministerial leadership in conducting effective and transparent public policies.

The MPTO's action perfectly fits into Thematic Axis 6 of the COP30 Action Agenda, "Catalysts and Accelerators, including financing, technology, and capacity building." The MPTO operated as a fundamental catalyst, driving the restructuring of a crucial environmental financing mechanism and ensuring that resources were effectively allocated to environmental protection. The signing of the TAC represents an accelerator for the implementation of Tocantins' environmental agenda, by allocating idle resources to strategic actions.

5. RESULTS AND IMPACTS ON TOCANTINS' ENVIRONMENTAL AGENDA

The concrete results established in the TAC redefined the future of the environmental agenda in Tocantins, converting a liability into an asset for society. The agreement guaranteed the immediate end of resource de-earmarking, putting an end to an illegal practice that harmed the state's environment.

One of the most significant impacts of the TAC was the guarantee that an accumulated balance of over R\$30 million, previously idle, would be fully allocated to structural actions for the analysis and validation of Rural Environmental Registry (CAR) records. CAR analysis and validation are essential for the environmental regularization of rural properties, deforestation monitoring, and biodiversity conservation. This measure directly contributes to COP30's Thematic Axis 2, "Sustainable Management of Forests, Oceans, and Biodiversity," by strengthening environmental governance and land use management.

In addition, the agreement established other important measures to improve FUEMA's management:

- **Creation of a Specific Technical Chamber for Fund Management:** This measure aims to ensure greater transparency and participation in decision-making regarding the application of FUEMA's resources.
- **Implementation of New Models for Project Presentation with Tangible Outcome Indicators:** The requirement for tangible outcome indicators allows for a more accurate evaluation of the effectiveness of projects financed by FUEMA, ensuring that resources are applied strategically and generate positive environmental impacts.
- **Guarantee that 40% of the Annual Budget is Effectively Invested in Priority Projects, Including Via Public Calls for Municipalities and NGOs:** This measure ensures that a significant portion of FUEMA's resources is directed to essential projects, in addition to fostering the participation of municipalities and non-governmental organizations in the execution of environmental actions. This strengthens the building of resilience in communities and ecosystems, aligning with COP30's Thematic Axis 4, "Building Resilience in Cities, Infrastructure, and Water."

This MPTO initiative not only corrected a historical flaw in the management of Tocantins' environmental resources but also created a legacy of transparency and commitment, returning FUEMA to its essential purpose: the protection of the environment for present and future generations.

6. CONCLUSION

The experience of the Public Prosecutor's Office of the State of Tocantins in restructuring and recovering the functionality of the State Environmental Fund (FUEMA) is a forceful example of the importance of the action of the Brazilian Public Prosecutor's Office in concretizing the environmental and climate agenda. By intervening strategically and incisively, the MPTO transformed a scenario of mismanagement and resource diversion into a model of governance and effectiveness.

The results achieved, such as the allocation of millions of reais for the analysis of the Rural Environmental Registry (CAR) and the guarantee of investments in priority projects, demonstrate the direct impact of ministerial action on the sustainable management of forests and the construction of environmental resilience. This initiative perfectly aligns with the objectives of COP30 and the Paris Agreement Action Agenda, especially in the axes related to the sustainable management of ecosystems and the role of catalysts and accelerators in the implementation of climate policies.

The FUEMA case in Tocantins serves as a model for other states and countries, illustrating how rigorous oversight, strategic negotiation, and the pursuit of consensual solutions by the Public Prosecutor's Office can boost the financing and execution of essential environmental actions. The experience reiterates the commitment of the Brazilian Public Prosecutor's Office to act as a fundamental pillar in the defense of the environment and the promotion of a more sustainable future for all.

Deforestation Monitoring Panel in Tocantins

Panel developed by the MPTO with deforestation data in the State of Tocantins

Saulo Vinhal da Costa¹

1. INTRODUCTION

Brazil, holder of one of the planet's greatest biodiversities and vast extensions of tropical forests, plays a crucial role in the global climate agenda. However, the country also faces significant challenges related to deforestation and environmental degradation, which compromise its international commitments and the sustainability of its biomes. The Amazon and the Cerrado, in particular, are biodiversity hotspots that suffer from the pressure of illegal and unsustainable activities, resulting in irreversible ecosystem losses and substantial contributions to greenhouse gas emissions.

Inspection and combating deforestation require increasingly sophisticated and efficient tools. The traditional approach, often reactive and limited by territorial scale, has proven insufficient to contain the speed and complexity of environmental infractions. In this context, the use of remote sensing and geoprocessing technologies emerges as a powerful solution to improve the capacity for detection, analysis, and response to these threats.

The experience of the Public Prosecutor's Office of the State of Tocantins (MPTO), through the Geoprocessing Laboratory (LABGEO) of the Environmental Operational Support Center (CAOMA), in developing interactive deforestation monitoring panels, represents a significant advance in this direction. This initiative demonstrated the ability to transform satellite data into accessible and actionable information, essential for supporting investigations, strengthening the performance of Public Prosecutor's Offices, and engaging civil society.

This project proposes the expansion and improvement of this methodology, aiming not only to replicate Tocantins' success in other regions of Brazil but also to offer an innovative model for other countries facing similar challenges. We believe that democratizing access to environmental information, combined with the capacity for analysis and rapid response, is essential to boost climate governance and achieve sustainable development goals.

¹ Prosecutor of Justice and CAOMA Coordinator.

2. CONTEXT AND JUSTIFICATION

The state of Tocantins, located at the transition between the Amazon and the Cerrado, has rich biodiversity and fragile ecosystems. The advance of the agricultural frontier and other anthropogenic activities have imposed increasing pressure on its forests and native vegetation. The absence of efficient and accessible monitoring tools hinders the inspection and accountability of offenders.

The Deforestation Monitoring Panel in Tocantins emerges as a response to this gap, offering an interactive platform that democratizes access to information and strengthens social control. Data transparency allows civil society, inspection bodies, and researchers to have a comprehensive and updated view of vegetation suppression, aiding in the identification of critical areas and the direction of strategic actions.

3. OBJECTIVES

3.1. GENERAL OBJECTIVE

To develop and publicly make available an interactive deforestation monitoring panel in the state of Tocantins, using geotechnologies and satellite data, to support actions of inspection, prevention, and combat against environmental illicit acts, and to promote transparency and social control.

3.2. SPECIFIC OBJECTIVES

- Consolidate a georeferenced database of deforestation in Tocantins, including different typologies (authorized, alerts, legal/illegal, embargoed, and real-time).
- Integrate data from various sources (Naturatins, SIGAM, Mapbiomas, DETER, Plataforma Brasil Mais, Ibama, BPMA) for comprehensive analysis.
- Develop and maintain interactive and accessible panels, allowing filters by year, municipality, and type of deforestation.
- Train members of the Public Prosecutor's Office and partners for the effective use of the tool in investigations and in the construction of technical documents.
- Strengthen the MPTO's performance in environmental protection, driving strategic decision-making and accountability of offenders.
- Promote environmental education and public awareness about the importance of forest conservation.

4. METHODOLOGY

The development of the Deforestation Monitoring Panel in Tocantins involved the following stages:

4.1. DATA COLLECTION AND CONSOLIDATION

The Labgeo/Caoma has been consolidating a refined database on deforestation in Tocantins, from various sources:

- **Deforestation Authorized by Naturatins:** Since 2021, Labgeo/Caoma has analyzed and organized the files of Forest Exploration Authorizations (AEF) issued in the Integrated Environmental Management System (SIGAM). More than 3,000 AEFs were mapped, identifying about 2,800 rural properties. This geospatial data is consolidated into a database by the MPTO.

Figure 1. Dashboard with number of deforestation authorizations issued



Source: Tocantins deforestation monitoring panel

Figure 2. List of properties with identified AEFs



Source: Tocantins deforestation monitoring panel

- **Pasture Cleaning and Renovation Declaration (DLRP):** Analysis of pasture renovation and cleaning activities in converted areas at an initial stage of natural regeneration, which are exempt from Forest Exploration Authorization.

Figure 3. Dashboard with number of pasture cleaning declarations issued



- **Deforestation Detected by Alert Systems:** Survey and integration of information provided by the Mapbiomas, DETER, and Plataforma Brasil Mais platforms.

Figure 4. Dashboard comparing the deforested area issued by different alert systems (Mapbiomas, DETER, Brasil Mais and SAD Cerrado)

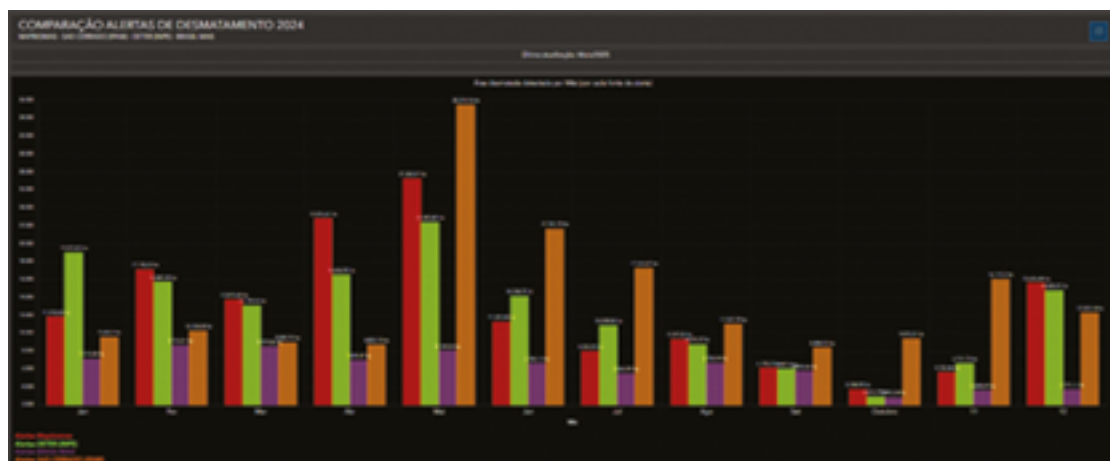
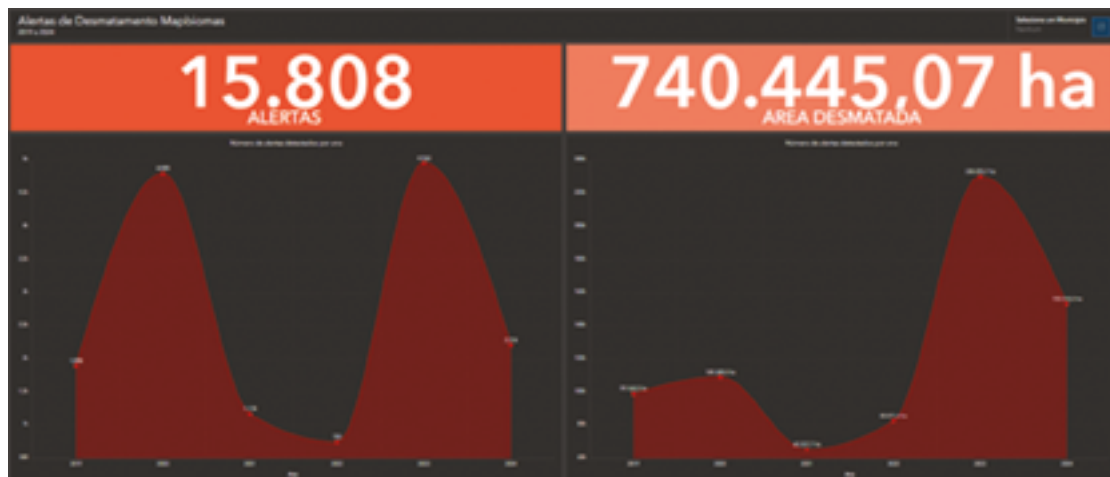


Figure 5. Dashboard with the number of alerts issued by Mapbiomas in Tocantins from 2019 to 2024.



- **Legal and Illegal Deforestation 2023 and 2024 - Mapbiomas:** Survey and qualification of deforested areas in the state of Tocantins in the years 2023 and 2024 regarding their legality.

Figure 6. Dashboard with properties with Legal and Illegal Deforestation alerts Mapbiomas 2023 and 2024



Source: Tocantins deforestation monitoring panel

- **Areas Embargoed by Environmental Agencies:** Survey of areas that were embargoed by Naturatins, Ibama, and the Environmental Police Battalion (BPMA).

Figure 7. Dashboard with areas embargoed in the state by Ibama, Naturatins and the Environmental Police Battalion - BPMA in 2023 and 2024



Source: Tocantins deforestation monitoring panel

- **Real-Time Deforestation - 2025:** Platform with deforestation data issued from the year 2025, updated weekly and with the qualification of areas regarding their legality.

Figure 8. Dashboard with Legal and Illegal Deforestation alerts 2025 (Plataforma Brasil Mais)



4.2. INTERACTIVE PLATFORM DEVELOPMENT

The platform was developed using geotechnologies and data visualization tools, allowing the creation of interactive panels. The panel can be accessed through the link: [Tocantins Deforestation Monitoring Panel](#).

The user interface was designed to be intuitive, with filtering functionalities by year and municipality, in addition to a ranking of municipalities with the largest authorized area for deforestation. Properties with AEFs issued and identified by Labgeo are available on the panel, allowing detailed analysis by rural property.

4.3. DATA ANALYSIS AND QUALIFICATION

The Labgeo/Caoma team constantly analyzes and qualifies the data, distinguishing between legal and illegal deforestation, and verifying compliance with environmental authorizations. This qualification is crucial to support the actions of the Public Prosecutor's Office.

5. EXPECTED RESULTS AND IMPACTS

The Tocantins Deforestation Monitoring Panel has already demonstrated significant results and projects even greater impacts. The tool allows the rapid identification of deforested areas and the qualification of their legality, optimizing the targeting of inspection actions by environmental agencies and the MPTO.

The consolidated and georeferenced data by Caoma/Labgeo represent a solid basis for decision-making and for the inspection of irregular activities, contributing significantly to the control of deforestation in Tocantins.

The methodology used included the georeferencing of all databases, allowing the precise and spatially referenced identification of deforestation events. The consolidated data and results achieved are presented below:

- **Deforestation Authorizations:** More than 3,400 authorizations were mapped, totaling 886,000 hectares. Of these, more than 2,800 rural properties had their authorized deforestation areas properly identified in the Rural Environmental Registry (CAR).
- **Pasture Cleaning Declarations:** More than 1,800 declarations were analyzed, covering an area of 693,000 hectares.
- **Alert Monitoring:** More than 34,000 deforestation alerts from four distinct sources were processed: Mapbiomas, DETER, Brasil Mais, and SAD Cerrado.
- **Consolidated Deforestation Analysis:** Between 2019 and 2024, more than 15,000 Mapbiomas alerts were consolidated, identifying 740,000 hectares of deforested areas. More than 10,300 properties were associated with these alerts.
- **Deforestation Qualification:** For the years 2023 and 2024, more than 5,000 properties were classified as legal or illegal deforestation, an exclusive qualification in the state that only the MPTO has been able to provide so far.
- **Real-Time Monitoring:** More than 1,400 properties with ongoing deforestation in 2025 have already been identified. The categorization into legal or illegal deforestation is carried out weekly, allowing for more agile inspection actions.

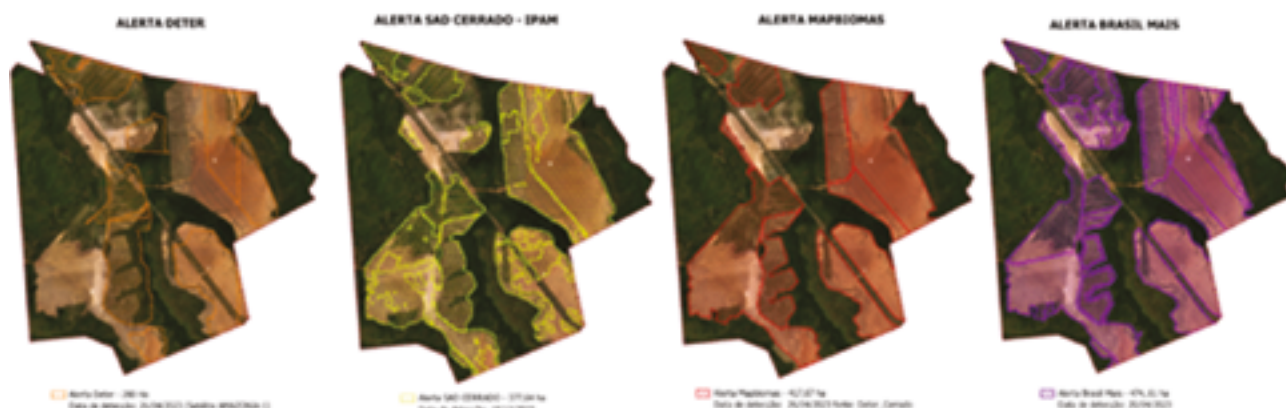
Figure 9. Dashboard with properties with legal and illegal deforestation in 2025 and identification of the deforested area per week for each property.



Source: Tocantins deforestation monitoring panel

The panels have been used to support investigations and assist in the construction of technical documents, strengthening the performance of Environmental Prosecutor's Offices. The public availability of data democratizes access to information, allowing civil society to monitor deforestation and demand effective actions from authorities. By making deforestation more visible and traceable, the panel acts as a preventive tool and a combatant against environmental illicit acts, discouraging illegal practices.

Figure 10. Comparison of alerts generated for the same property



Source: Tocantins deforestation monitoring panel

The platform provides actionable information for strategic decision-making by public managers, policymakers, and other stakeholders.

The project consolidates the role of the Public Prosecutor's Office as an agent inducing innovation and technology in environmental defense, serving as a model for other regions.

6. CHALLENGES AND NEXT STEPS

Despite the advances, the project faces continuous challenges, such as the need for constant data updates, the integration of new information sources, and the expansion of analysis capacity. The next steps include:

- **Platform Improvement:** Incorporation of new functionalities, such as deforestation trend analysis and future scenario projection.
- **Database Expansion:** Inclusion of historical deforestation data and other relevant environmental variables.
- **Strengthening Partnerships:** Establishment of new partnerships with research institutions, government agencies, and civil society to improve monitoring and inspection.
- **Dissemination and Training:** Broaden the dissemination of the tool and offer training to a wider audience, including local communities and students.

7. CONCLUSION

The Tocantins Deforestation Monitoring Panel represents a significant advance in the fight against deforestation, demonstrating how technology and innovation can be powerful allies in environmental protection. By transforming complex data into accessible and actionable information, the MPTO contributes to effective inspection, accountability of offenders, and the promotion of sustainable development.

This project is a concrete example of Brazil's commitment to the global environmental agenda and a valuable contribution to the discussions at COP 30, inspiring other similar initiatives in various regions. We believe that transparency and access to information are fundamental pillars for environmental governance and the construction of a more sustainable future.

ENVIRONMENTAL REGULARIZATION OF IRRIGATED PROPERTIES IN THE RIO FORMOSO BASIN

Saulo Vinhal da Costa¹

1. ABSTRACT

The Rio Formoso Hydrographic Basin, located in Tocantins, is formed by the municipalities of Formoso do Araguaia, Lagoa da Confusão, Santa Rita do Tocantins, and Dueré, being a region of intense conflict over water use, driven mainly by irrigated soybean farming. This conflict generates serious environmental and social problems, impacting ecosystems and traditional, indigenous, and riparian communities. The project “Environmental Regularization of Irrigated Properties in the Rio Formoso Basin” sought to diagnose legal reserve liabilities in 138 rural properties with irrigated agriculture in the Formoso and Pium river basins, aiming at environmental adequacy and the protection of sensitive areas. The methodology employed the analysis of data from the Rural Environmental Registry (CAR), satellite images, and other governmental databases, classifying properties into six categories, from total compliance to the need for mandatory regularization. The results revealed that 33.33% of the properties (Red Group) have a legal reserve deficit of 11,210.40 hectares to be recovered, with 69.50% (7,791.58 hectares) already occupied by agricultural or pasture activities. Another 3,466.65 hectares (Orange Group) can be offset, and 4,124.7107 hectares (Yellow Group) result from insufficient declarations in the CAR. The study also identified the irregular issuance of Forest Exploitation Authorizations in 17.39% of the properties and a 14.47% increase in the irrigated planted area between 2023 and 2024, highlighting the urgency of regularizing liabilities for the region’s water sustainability. Based on these findings, an integrated judicial action will be implemented to ensure the environmental adequacy of legal reserve areas.

2. INTRODUCTION

The Rio Formoso Hydrographic Basin, in Tocantins, is a representative scenario of the environmental and social challenges imposed by the expansion of agribusiness in Brazil. The growing demand for water for irrigated agriculture, especially for soybean cultivation, has generated an intense conflict over the use of water resources, compromising both the integrity of local ecosystems and

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the subsistence of traditional and riparian communities. From this context, the unavoidable nature of applying effective strategies for environmental adequacy and the consolidation of regional sustainability can be inferred.

The Brazilian Public Prosecutor's Office, through initiatives such as the "Environmental Regularization of Irrigated Properties in the Rio Formoso Basin" project, demonstrates its fundamental role in the global climate agenda, aligning with the objectives of COP30. This project, in particular, contributes directly to the axes of "Sustainable management of forests, oceans, and biodiversity" and "Transformation of agriculture and food systems," by seeking the environmental adequacy of rural properties and the recovery of degraded areas.

This document details the scope, methodology, and results of the project, highlighting the importance of the Public Prosecutor's Office's action in mitigating the environmental impacts of agriculture and promoting more sustainable development. Based on the data presented, an analysis of the implications for environmental governance and the need for more effective public policies in the Rio Formoso region is proposed.

3. CONTEXT OF THE RIO FORMOSO BASIN

The Rio Formoso Hydrographic Basin, in the state of Tocantins, covers the municipalities of Formoso do Araguaia, Lagoa da Confusão, Santa Rita do Tocantins, and Dueré. This region is a strategic hub for Tocantins' agribusiness, with irrigated agriculture, especially soybean cultivation, playing a significant economic role. However, this intense agricultural activity has generated an accentuated conflict over water use, which manifests itself in a series of environmental and social problems.

Large irrigated agriculture projects have compromised the maintenance of local ecosystems and the survival of traditional, indigenous, and riparian communities, which directly depend on the basin's water resources. The intensive exploitation of water for irrigation affects river flow, water availability for fauna and flora, and water quality, resulting in negative impacts on biodiversity and the health of aquatic and terrestrial ecosystems.

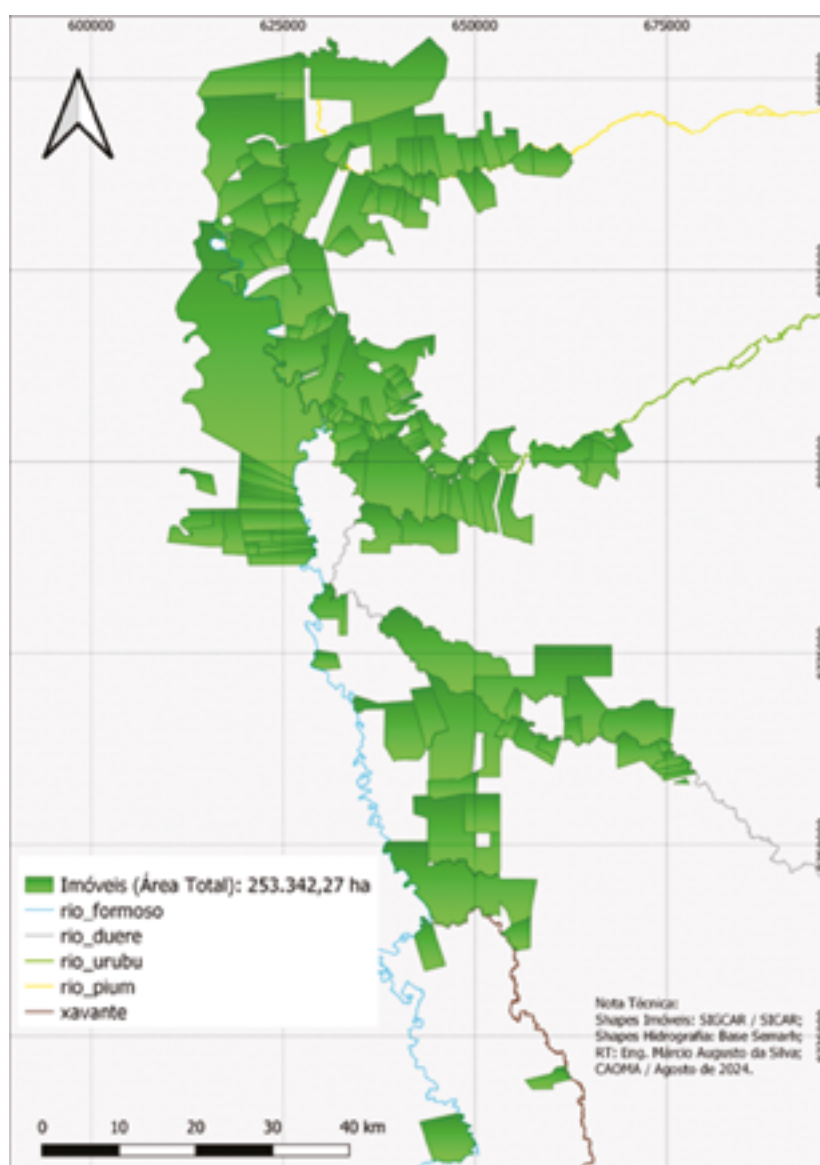
In this scenario, the environmental regularization of rural properties becomes a crucial tool to balance agricultural production with environmental conservation. The project in question emerges as a response to this problem, seeking to identify and quantify legal reserve liabilities and propose solutions for environmental adequacy, contributing to the basin's water and environmental sustainability.

4. THE PROJECT "ENVIRONMENTAL REGULARIZATION OF IRRIGATED PROPERTIES IN THE RIO FORMOSO BASIN"

The project "Environmental Regularization of Irrigated Properties in the Rio Formoso Basin" was conceived with the objective of carrying out a comprehensive environmental diagnosis. The main focus was to quantify and qualify the legal reserve liabilities in 138 rural properties that practice irrigated agriculture in the Rio Formoso Basin, including the municipality of Pium, totaling 253,342.27 hectares.

The goal was not only to identify these areas but also to subsidize the adequacy of usable areas and ensure the protection of environmentally protected areas.

Figure 1. Irrigating properties analyzed in the Formoso and Pium river basin.



Source: CAOMA Technical Report No. 056/2024.

4.1. METHODOLOGY

The methodology employed in the project involved a multifaceted approach, combining different data sources to ensure the accuracy of the diagnosis. The main steps included:

- **Analysis of Rural Environmental Registry (CAR) Data:** The CAR, a national electronic public registry, was the basis for identifying rural properties and analyzing information declared by owners, such as the location of legal reserve areas and APPs.
- **Satellite Images:** The use of high-resolution satellite images allowed for *in situ* verification of CAR declarations, identification of deforested areas, detection of agricultural activities in protected areas, and quantification of the expansion of irrigated areas.

- **Other Governmental Databases:** Other databases from environmental and land agencies, such as Naturatins (Tocantins' environmental agency), were consulted to supplement information and validate registrations.
- **Property Classification:** Based on data analysis, properties were classified into six distinct categories. This categorization ranged from total compliance with environmental legislation to the presence of liabilities requiring mandatory regularization on the property itself.

Table 1. Quantity of legal reserve liabilities by property class (qualification) of irrigating properties in the Rio Formoso and Pium basins.

Classe	Grupo	Imóveis	Área Total (ha)	Passivo RL (ha)
1	Verde	56	105.411,00	0,00
2	Azul	2	1.579,25	0,00
3	Cinza	4	5.499,15	886,95
4	Amarelo	13	54.740,60	4.124,72
5	Laranja	21	21.507,10	3.466,63
6	Vermelho	46	67.665,80	11.210,40

Source: Source: CAOMA Technical Opinion No. 056/2024.

- **Investigation of Irregular Use of Compensations:** The analysis also delved into investigating possible irregular uses of legal reserve compensations, which can be used as an alternative to recovery on the property itself, but must follow specific criteria.
- **Validation of Registrations by the Environmental Agency (Naturatins):** An effort was made to validate registrations with Naturatins, ensuring that the information was aligned with official records.
- **Monitoring of Planted Area Evolution:** A comparison of the planted area between 2023 and 2024 was conducted to identify the expansion of irrigated agriculture and its potential impacts.

This robust methodology allowed for a detailed diagnosis of the environmental situation of irrigated properties, providing crucial data for decision-making and proposing regularization measures.

4.2. RESULTS

The results of the environmental diagnosis revealed a worrying scenario in the Rio Formoso Basin, with the identification of significant environmental liabilities:

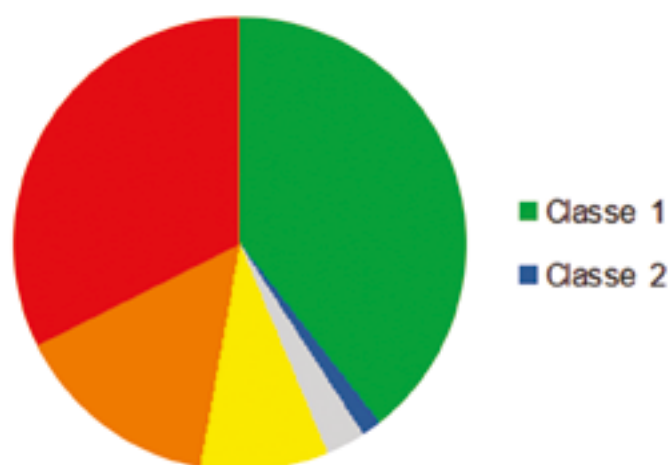
- **Legal Reserve Liability in the Red Group:** Approximately 33.33% of the analyzed properties were classified in the “Red Group,” indicating that they have a legal reserve liability of 11,210.40 hectares that must be recovered on the properties themselves. Of this total, 7,791.58 hectares (69.50%) are already occupied by agricultural or pasture activities, which aggravates the situation and hinders recovery.
- **Liabilities with Possibility of Compensation (Orange Group):** Other groups of properties showed a liability of 3,466.65 hectares, classified in the “Orange Group,” which indicates the possibility of legal reserve compensation in other areas, as provided for in environmental legislation. However, the feasibility and effectiveness of these compensations need to be rigorously evaluated to ensure genuine environmental protection.
- **Liability due to Insufficient Declarations in the CAR (Yellow Group):** The “Yellow Group” includes a liability of 4,124.7107 hectares, resulting from insufficient or inconsistent declarations in the Rural Environmental Registry (CAR). This points to the need for greater oversight and improvement in the quality of data declared by rural property owners.

Irregular Issuance of Forest Exploitation Authorizations: The study also identified the irregular issuance of Forest Exploitation Authorizations in 17.39% of the analyzed properties. These irregularities suggest flaws in environmental licensing and inspection processes, allowing the exploitation of forest resources in disagreement with regulations.

- **Increase in Irrigated Planted Area:** An alarming fact is the 14.47% increase in the irrigated planted area from one year to the next. This growth reinforces the pressure on the basin’s water resources and the urgency of regularizing legal reserve liabilities to ensure the region’s water sustainability.

Chart 1. Distribution of qualified/quantified classes of legal reserve liabilities

Distribuição das Classes / Passivo de Reserva Legal



Source: CAOMA Technical Opinion No. 056/2024.

These results demonstrate the complexity of environmental challenges in the Rio Formoso Basin and the imperative need for coordinated actions to reverse the degradation and ensure the environmental compliance of rural properties.

5. THE IMPORTANCE OF THE PUBLIC PROSECUTOR'S OFFICE IN THE GLOBAL CLIMATE AGENDA

The action of the Public Prosecutor's Office, as demonstrated by the project in the Rio Formoso Basin, is crucial for the global climate agenda and aligns directly with the objectives of COP30. The MP's intervention in combating illegal deforestation, protecting ecosystems, and ensuring the application of environmental legislation contributes to mitigating climate change and adapting to its effects.

Specifically, the project addresses the following axes of COP30's Action Agenda:

- **Sustainable Management of Forests, Oceans, and Biodiversity:** By focusing on legal reserve regularization, the project directly contributes to the conservation of forest ecosystems, which are essential for maintaining biodiversity and carbon sequestration. The recovery of 11,210.40 hectares of legal reserve, of which 7,791.58 hectares are currently occupied by agricultural or pasture activities, represents a significant effort to restore the capacity of ecosystems to provide environmental services.
- **Transformation of Agriculture and Food Systems:** Irrigated agriculture, although vital for food production, can generate significant environmental impacts. The project, by identifying the expansion of irrigated areas and the need for environmental regularization, contributes to promoting more sustainable agricultural practices. The adequacy of rural properties to environmental legislation is a fundamental step to transform food systems, making them more resilient and less dependent on predatory practices.

The Public Prosecutor's Office's ability to act both preventively, through diagnoses and recommendations, and repressively, through legal actions, gives it a unique role in promoting environmental governance. The judicial decision that will be fixed to ensure the regularization of rural properties with irrigation activity demonstrates the institutional strength of the MP in ensuring the effectiveness of environmental adequacy.

6. RECOMMENDATIONS AND NEXT STEPS

Based on the results and analysis of the project "Environmental Regularization of Irrigated Properties in the Rio Formoso Basin," several recommendations and next steps are essential to consolidate progress and ensure the effectiveness of actions:

- **Establishment of Integrated Action by Judicial Decision:** The judicial decision to ensure the regularization of rural properties, with a focus on the environmental adequacy of legal reserve and permanent preservation areas,

is crucial and must be implemented as a priority. This action should involve various actors, such as rural landowners, environmental agencies, and the Public Prosecutor's Office itself, to ensure its effectiveness.

- **Continuous Monitoring:** It is essential to establish a continuous monitoring system for the recovery of legal reserve areas and APPs, as well as the evolution of the irrigated planted area. This can be done through satellite images and field visits, ensuring that regularization goals are met and maintained over time.
- **Improvement of the Rural Environmental Registry (CAR):** The identification of liabilities resulting from insufficient declarations in the CAR (Yellow Group) highlights the need to improve the quality of information declared by landowners and intensify oversight of the veracity of this data. Training programs for rural producers and technicians can be implemented to improve CAR completion.
- **Combat Irregular Issuance of Forest Exploitation Authorizations:** The identification of irregular issuances of Forest Exploitation Authorizations demands a review of licensing and inspection procedures by the competent bodies. It is crucial to strengthen control mechanisms to prevent predatory and illegal exploitation of forest resources.
- **Incentive for Sustainable Agricultural Practices:** In addition to regularizing liabilities, it is important to encourage the adoption of more sustainable agricultural practices, such as efficient water use in irrigation, the implementation of agroforestry systems, and crop diversification. Technical and financial support programs can be developed to assist rural producers in this transition.
- **Dialogue with Traditional Communities:** The need to maintain the ecosystem and the survival of traditional, indigenous, and riparian communities must be considered at all stages of the regularization process. Dialogue and participation of these communities are fundamental to ensure that proposed solutions meet their needs and promote social justice.
- **Interinstitutional Articulation:** The complexity of environmental challenges in the Rio Formoso Basin requires strong articulation between the Public Prosecutor's Office, environmental agencies (Naturatins), universities, the productive sector, and civil society. Multi-sector collaboration is essential for the development and implementation of effective and long-term public policies.

7. CONCLUSION

The project “Environmental Regularization of Irrigated Properties in the Rio Formoso Basin” emphatically demonstrates the proactive and indispensable role of the Brazilian Public Prosecutor’s Office in the global climate agenda. By diagnosing and quantifying legal reserve liabilities and environmental irregularities in a region of intense water conflict, the project not only exposes the magnitude of the challenges but also paves the way for concrete and legally binding solutions.

The results, which reveal the extent of degradation and the urgency of recovering more than 11 thousand hectares of legal reserve, reinforce the need for firm and integrated action for the effectiveness of the Forest Code and other environmental legislations. The finding that almost 70% of these areas are occupied by agriculture and pasture, together with the increase in irrigated area, underscores the unsustainable pressure on natural resources and the imperative to transform agricultural production models.

The future judicial decision that will establish an integrated action for the regularization of rural properties represents an important milestone, consolidating the Public Prosecutor’s Office’s commitment to water sustainability and ecosystem protection. By aligning with the COP30 axes – “Sustainable management of forests, oceans, and biodiversity” and “Transformation of agriculture and food systems” – the project transcends the local scope, serving as a model of how legal action can be a catalyst for systemic changes in the pursuit of truly sustainable development. The experience of the Rio Formoso is a testament to the Brazilian Public Prosecutor’s Office’s ability to contribute significantly to building a more resilient and equitable future in the face of global climate change.

SOCIOECONOMIC INCLUSION OF WASTE PICKERS AND THE MITIGATION OF THE GREENHOUSE EFFECT AND THE CLIMATE CRISIS

Ileana Neiva Mousinho¹

Abstract: The Labor Prosecution Service (Ministério Público do Trabalho – MPT) has approved, among its strategic projects, the National Project for the Socio-Economic Inclusion of Waste Pickers of Recyclable Materials. This project is essential for reducing greenhouse gas (GHG) emissions, as it strengthens reverse logistics and recycling chains, preventing the disposal of reusable and recyclable materials in open dumps and landfills and promoting decent work for waste pickers through fair remuneration and compliance with occupational health and safety standards. In addition to its importance for reducing GHG emissions, the project is aligned with the just transition and the COP 30 Action Agenda, particularly Axis 5 – Promotion of Human and Social Development.

Keywords: MPT; strategic project; socioeconomic inclusion; waste pickers; climate change; reducing greenhouse gases; just transition.

INTRODUCTION

The Labor Prosecution Service (MPT), in defending social and non-waivable individual interests², has the duty to act in the promotion of decent work for all workers. In this role, the socio-economic inclusion of waste pickers of recyclable and reusable materials, with fair remuneration and compliance with occupational health and safety regulations, is of particular importance, as it simultaneously meets the goal of promoting decent work and the preservation of the environment while mitigating the climate crisis.

More than 15 million people worldwide work in the collection, sorting, and recycling of urban waste — an essential activity for the planet’s sustainable development. Waste pickers provide socio-environmental services, being responsible for the reverse logistics of recyclable materials and for the reuse of solid waste, saving natural resources used as raw materials and reducing GHG emissions.

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2 Articles 1, 5, §§ 1 to 4, and 127 of the Brazilian Constitution, and Complementary Law No. 75/1993. https://www.planalto.gov.br/ccivil_03/leis/lcp/lcp75.htm, accessed on August, 2, 2025.

However, waste pickers' activities are poorly remunerated, and the recycling economic chain needs to be organized to generate income for duly established cooperatives and associations of waste pickers, ensuring compliance with occupational health and safety standards.

Organizing waste pickers into cooperatives and associations is not only indispensable for promoting decent work; it is also crucial to removing from the environment tons of waste that would otherwise emit GHGs—chiefly methane (CH₄) and carbon dioxide (CO₂), and, to a lesser extent, nitrous oxide (N₂O), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF₆).

From both social and climate perspectives, integrating waste pickers into municipal solid waste management systems is imperative to reduce social inequalities, curb the rise in global temperatures, and mitigate impacts on water resources. However, the issue has been analyzed from the perspective of the closure of landfills in some municipalities without the parallel adoption of public policies for organization of these workers into associations and cooperatives. It's necessary to enable their hiring by public entities and large waste generators (public/private-sector legal entities).

On the contrary, waste pickers have been excluded from public tenders for urban cleaning and selective collection due to the adoption of capital intensive technologies (e.g., waste to energy solutions and new disposal systems) and the privatization and outsourcing of waste management to relatively large companies as recycling becomes increasingly profitable³.

In response, the MPT acts to ensure compliance with the obligation set forth in Bill 12.305/2010 (Brazil's National Solid Waste Policy) for public and private entities to prioritize the hiring of cooperatives and associations of waste pickers at stages of the recycling production chain and throughout the product life cycle.

The MPT's efforts dovetail with the implementation of public policies on climate, solid waste, and basic sanitation, because it supports closing open dumps and simultaneously promotes the socioeconomic inclusion of recyclable materials waste pickers in solid waste management. Improper disposal of solid waste in open dumps and the failure to reduce waste generation and to recycle place the country in a serious climate scenario, since methane and carbon dioxide are generated by the anaerobic decomposition of organic matter present in dumpsites.

Large volumes of food scraps and other biodegradable residues release methane, a gas with a global warming potential 80 times higher than carbon dioxide over a 20 year horizon; nitrous oxide is about 280 times more potent. Although methane is the main GHG in dumps, carbon dioxide is also emitted—especially when gases at disposal sites are burned or when organic matter decomposes in the presence of oxygen. Under aerobic conditions, decomposition releases carbon dioxide; to a lesser extent, nitrous oxide can also be produced, primarily from the breakdown of organic waste and effluents.

Despite the scale of the climate challenge, in Brazil most dumps have not been closed. The decentralized federal structure and the lack of resources in roughly 70% of municipalities—with fewer than 20,000 inhabitants—undermine the sustainability of certain services. Smaller municipalities have historically faced insufficient technical, institutional, and financial capacity for efficient urban cleaning and solid waste management.

3 <https://brasil.un.org/pt-br/114314-artigo-dia-mundial-dos-catadores-de-materiais-recic%C3%A1veis> , accessed on August 1, 2025

Accordingly, the MPT's Socioeconomic Inclusion Project promotes municipal public hearings to foster the creation and implementation of integrated solid waste management in local territories. It advances a set of actions aimed at seeking solutions for waste that consider political, economic, environmental, cultural, and social dimensions, with social oversight and under the premise of sustainable development.

THE SOCIAL DIMENSION OF INTEGRATED SOLID WASTE MANAGEMENT

The social dimension of integrated solid waste management must be mandatorily considered in the national, state, district, micro-regional, and intermunicipal solid waste management plans. Bill 12,305/2010 requires that all these plans include the social inclusion and economic empowerment of waste pickers of recyclable materials.

The National Solid Waste Plan (Planares), instituted by Decree 11,043 of 2022, is an instrument of the National Solid Waste Policy (PNRS). Other plans must align with the guidelines and goals set by Planares, which establishes the first step for plan elaboration as the conduction of a gravimetric study of the waste produced in each territory. Such a study is essential to understand the quantity and type of discarded materials, enabling better municipal waste policies and estimating potential energy recovery from waste, recyclable volumes, and mass reduction in landfills⁴.

After this gravimetric study, municipalities can evaluate the best available and applicable alternatives for solid waste management according to the type and amount of waste generated. Subsequently, the associations and cooperatives of waste pickers should be consulted to define which stages of the recycling chain they will perform activities in, with bidding exemptions as per Bill 14,133/2021.

Furthermore, Bill 12,305/2010 should be articulated with the National Climate Change Policy (PNMC) and the National Basic Sanitation Policy (Bill 11,445/2007), so the inclusion of cooperatives and associations of waste pickers in Municipal Solid Waste Management Plans requires planning and measurement of achieved results.

To measure whether socio-economic inclusion is socially just and effective in reducing GHG emissions and mitigating the climate crisis, it is necessary to verify the volume of waste diverted from dumps and landfills, as well as whether cooperatives receive the necessary technical support for their economic sustainability.

It is well known that there are fluctuations in the recycling market and distances between waste generation sites, where cooperatives operate, and recycling industries. This can make sales unviable and keep cooperatives and associations dependent on “middlemen.”

Therefore, solid waste management plans must include technical support for cooperatives and associations of recyclable material collectors. Municipal plans require a diagnosis to better structure and organize recycling chains, consistently linking cooperatives and associations of recyclable material collectors with recycling industries.

4 (FRICKE et al., 2015), cited in the Annex to Planares, at https://www.planalto.gov.br/ccivil_03/_ato2019-2022/2022/decreto/Anexo/and11043.pdf, accessed on August 2, 2025.

EXPLOITATION OF WASTE PICKERS BY MIDDLEMEN

Despite their importance for environmental sustainability, waste pickers in Brazil work under precarious conditions and often do not receive payment for their socio-environmental services. Society tends to normalize their compensation as mere donations of collected solid waste. However, this exchange disregards that waste pickers provide essential environmental services.

Worse yet, due to their lack of organization and capacity to store and market sorted waste, waste pickers become easy targets for so-called “middlemen.” These intermediaries purchase recyclable materials from waste pickers at low prices and resell them at a profit. This dependency perpetuates social exclusion and hinders the organization of cooperatives and associations, limiting better working conditions and fair remuneration.

Labor Prosecution Service (MPT) inspections have found instances of work conditions analogous to slavery within the recycling chain, including child labor at dumps, with serious human rights violations.

In research on the topic, the organization Papel Social – a Brazilian entity specialized in investigating production chains – identified the work of middlemen and the exploitation of the work of recyclable material collectors, without the large business corporations that buy the products from this chain – of which the collectors are the base – adopting due diligence measures to verify the origin of the recycled products purchased, and whether there are, along the chain, violations of human rights⁵.

Thus, in the MPT’s work for the socioeconomic inclusion of recyclable material collectors, problems such as the dependence of independent collectors on “middlemen” are highlighted, from which it can be concluded that the continuation of independent work hinders the organization of the recycling chain and the decent work of these workers, in addition to not being able to remove large quantities of waste, and, consequently, GHGs from the environment.

Therefore, municipalities must incorporate measures in their Solid Waste Management Plans to strengthen cooperatives and associations by encouraging autonomous waste pickers to join cooperatives, with active outreach from labor and social assistance departments to clarify benefits and rights. It is recommended that municipalities engage cooperative incubators at universities to provide technical support, continuous training, and education about rights and cooperative governance.

The Solid Waste Management Plans should provide subsidies and financial incentives for physical infrastructure, remuneration for environmental services, and technical and financial support to improve market negotiation capacities.

State action to help waste pickers work in cooperatives and associations, with social protection, should be combined with private sector action to conduct due diligence on their purchases of recycled products. To this end, the MPT will hold meetings for a broad social dialogue on how to ensure decent work for waste pickers, by raising awareness among large corporate buyers about investigating and rejecting human rights violations in the recycling chain, as well as financing projects to support cooperatives and associations, which are at the foundation of this economic chain.

5 Picolotto André, Disposable Humanity: exploitation of slave labor by large corporations in the recycling production chain/André Picolotto, Maria Helena de Pinho; coordination Marques Casara

FINANCIAL INCENTIVES FOR METHANE EMISSION REDUCTION AND SOCIO-ECONOMIC INCLUSION OF WASTE PICKERS

Most Brazilian municipalities lack sufficient financial capacity to properly manage the waste produced within their territories. Therefore, municipalities need financial incentives to organize and implement their Municipal Solid Waste Management Plans (PMGRS), including financial and technical support for cooperatives and associations of waste pickers.

The federal government created the Climate Fund, whose resources should finance actions to mitigate methane emissions, emphasizing the intersection between climate, solid waste, and basic sanitation policies. Specifically, the Global Methane Hub (GMH) has strengthened lines of credit and donations for green infrastructure, climate mitigation, sustainable sanitation, and circular economy initiatives. These funds require continuous replenishment due to the significant challenge of humanely closing open dumps while socio-economically including waste pickers.

Diversifying funding sources is essential for the viability of climate actions and the socio-economic inclusion of waste pickers, underpinning related public policies. Accordingly, the Climate Plan foresees sectoral plans, including the Solid Waste and Domestic Effluents Plan, currently under public consultation.

To implement these public policies effectively, resource allocation is necessary. Specific credit lines for biogas energy projects aim to increase biomethane's share in the national energy matrix, as well as expanding composting and anaerobic digestion of organic waste. However, it is essential that cooperatives of waste pickers are included in the biogas economic chain.

Despite enthusiasm for biogas production, some sanitary landfill experiences in Brazil have shown limited success due to low-efficiency drainage and gas flaring systems, resulting in significant methane and black carbon emissions. While better systems could yield more positive results and some units generate energy, there is a lack of comprehensive technical and economic evaluation regarding the number of landfills, gas volumes, capture efficiency, generated energy, and use of available incentives. This lack of consolidated information complicates measuring these efforts' results.

Conversely, waste pickers' activities are more efficient for climate effects at a lower cost, with the added social advantage of integrating many workers into the recycling chain. Waste pickers act as environmental agents, from environmental education and waste reduction to reuse, recycling, and reverse logistics, reducing the amount of waste sent to landfills.

Therefore, MPT's work to include waste pickers socially and economically has great potential to drive methane emission reduction while promoting social sustainability and circular economy principles.

As highlighted in the document available for consultation on the Sectoral Plan for Solid Waste and Domestic Effluents, "among the actions with the greatest potential for reducing emissions, those related to reducing waste and effluent generation and expanding solutions for their treatment and recovery, with a focus on circularity, stand out.

The use of products derived from the treatment of organic solid waste, such as compost and organic fertilizer, digestate, biogas, and biomethane, can also provide a source of income for waste pickers. It is appropriate to include, in the National Fertilizer Plan, in addition to specific targets and actions to increase national fertilizer production from solid waste, the participation of waste pickers

in this climate mitigation action, which has great potential to generate income for these workers, regenerate impoverished soils, promote urban and peri-urban agriculture, and strengthen food and nutritional security in municipalities.

The structuring and functioning of cooperatives and associations depend not only on direct incentives but also on formal contracts with public and private entities, ensuring remuneration for selective waste collection services and decarbonization operations, thereby promoting a just, inclusive, and sustainable socio-economic transition.

The draft Sectoral Plan for Solid Waste, currently under consultation, foresees stimulating contract formalization for managing and recovering the organic fraction of solid waste, prioritizing waste pickers' organizations. This aligns with Bill 12,305/2010, which foresees various incentives.

The priority hiring of cooperatives and associations by both public entities and large private waste generators is a form of incentive that requires no resource allocation and complies with Bill 12,305/2010. Political actors must ensure an environmentally balanced environment through regulatory functions embedded in government contracts. In other words, public procurement must require contracted companies to also hire cooperatives and associations of waste pickers when classified as large waste generators.

Finally, inclusion actions foreseen in the Diogo de Sant'Ana PróCatadoras and Pró-Catadores Program for Popular Recycling⁶, discussed within the Interministerial Committee for Socio-Economic Inclusion of Waste Pickers, in which the MPT participates, include announcements of resources to finance an efficient and inclusive environmental policy for waste pickers.

CONCLUSION

The Labor Prosecution Service's (MPT) efforts toward the socio-economic inclusion of waste pickers of recyclable materials also aim to create mechanisms that reduce methane and carbon dioxide emissions in open dumps and landfills.

The MPT's work seeks to ensure that waste pickers are not rendered invisible in the fight against the climate crisis. In line with recommendations from the United Nations, the MPT encourages cooperation among public entities, companies, civil society, and waste pickers to build more efficient and inclusive waste management systems.

Closing open dumps and controlled landfills, properly harnessing methane from sanitary landfills, expanding composting initiatives, broadening selective collection, and formalizing and remunerating waste pickers' work—both in the public and private sectors—are measures the MPT aims to implement within its strategic project, alongside constant demands for technical and financial support in waste management plans.

It is neither fair nor legally permissible for climate mitigation actions in waste and effluent management to disproportionately and negatively impact waste pickers. Therefore, the closure of open dumps must be humane, ensuring climate crisis mitigation measures do not cause social crises but rather present opportunities for social and economic inclusion of this vulnerable group within formal selective collection and composting chains, integrating them into the recycling sector.

6 Decree 11.444/2023 https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2023/decreto/D11414.htm accessed ago.11.2023

In sum, fulfilling the duty of just transition, waste management plans must mandate the formal contracting of cooperatives and associations of waste pickers by public and private entities (large waste generators) and require technical support for infrastructure development, equipment acquisition, and training.

Technical support for the development of cooperatives and associations is not only a public obligation but, due to shared responsibility for the product life cycle, also a duty of all companies and individuals. Therefore, companies should also maintain formal contracts with cooperatives and assume joint responsibility for the working environment in these grassroots enterprises.

The MPT's efforts focus on fostering diverse forms of inclusion of waste pickers' cooperatives and associations, integrating them throughout the recycling chain and sanitation actions. Accordingly, the MPT calls on countries at COP 30 to contribute to funds financing projects by municipalities, consortia, cooperatives, and associations aimed at reducing methane emissions and humanely closing open dumps to support mitigation and adaptation efforts.

NEGATIVE EXTERNALITIES OF PESTICIDES AND CLIMATE JUSTICE: STRATEGIES FOR PROTECTION OF WORKPLACE ENVIRONMENT AND WORKERS' HEALTH

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Abstract: This article presents the legal grounds and examples of concrete actions adopted by the Brazilian Labor Prosecutor's Office (MPT) to enforce national and international legal standards devoted to safeguard the health and life of workers. MPT is committed to mitigating the negative externalities associated with the widespread use of pesticides, protecting vulnerable exposed workers and the workplace environment, so that the goals of socioenvironmental justice and the Global Climate Agenda become a reality. Despite the judicial proceedings-related difficulties set by certain economic actors, the MPT, supported by solid factual and legal foundations, has obtained judicial responses consistent with the urgencies of sustainable development.

Summary: 1-Introductory remarks 2- Participation of the MPT in the National Forum to Combat the Impacts of Pesticides 3-Collective civil lawsuit to ban the use glyphosate 4-Collective civil lawsuit to ban the use atrazine 5-Final remarks

1. INTRODUCTORY REMARKS

In addition to the right to health (art. 6), the Brazilian Constitution integrated the workplace environment into the broad concept of legally protected environment (art. 200, VIII). At present the safeguard of workers' health and the protection of a healthy workplace environment are constitutional matters. Under a constitutional perspective, the concept of workplace environment is where labor activities are performed, regardless if paid or not; "its balance is based on the health of the surroundings and the absence of agents that jeopardize the physical and psychological safety of workers".²

The Brazilian Labor Prosecutor's Office (MPT) is the specialized branch of the Federal Union's Public Prosecutor's Office (MPU). It is vested in the Constitutional and legal attribution of defending the integrity of the legal order, the pillars of decent work, the fundamental rights at work and a

1 Members of the Brazilian Labor Prosecutor's Office (MPT).

2 Fiorillo, Celso Antonio Pacheco. Curso de Direito Ambiental brasileiro. São Paulo: Saraiva, 2000, p. 21.

healthy and balanced workplace environment. The MPT advances fundamental rights at work, guided by the constitutional goals of promoting human dignity and the valorization of human labor, with a view to building a free, fair and cohesive society.

The protection of a healthy and safe workplace environment is one of the priority areas of MPT action. In order to achieve these goals, MPT adopts strategies coordinated by the National Coordination for the Defense of the Workplace Environment and Worker's Health (CODEMAT), a collegiate body composed of members from all states.³

The warnings stemming from the international community due to the global environmental crisis⁴ have urged qualified actions in defense of the workplace environment. The promotion of decent work and a safe workplace is a high priority, given that environmental and climate emergencies – associated with extreme heatwaves, floods, droughts, fires, widespread chemical pollution and severe weather events - directly impact on the quality of life at work. Climate change, in the context of employment relations, jeopardizes the health, integrity and life of millions of workers and their families, specially the most vulnerable ones, such as those exposed to direct sun exposure, to degraded safety conditions and those working in sectors of intense exposure to chemicals.

Brazil is experiencing these challenges intensively due to the quantity and the high toxicity of the chemical inputs employed. This scenario demands urgent actions to safeguard workers and to ensure a fair ecological transition. Sustainable speeches are not enough. It is necessary to ensure that green jobs are safe, healthy and dignified.

Among the main dramas experienced by the Brazilian rural working population is the large-scale use of pesticides in monocultures, including chemical inputs whose use has been banned or restricted by the members of the European Union, such as atrazine and glyphosate⁵.

The relationship amongst occupational exposure to pesticides, climate change and workers' health interacts in a destructive cycle that aggravates the environmental crisis and degrades working conditions. It demands a global debate on sustainable alternatives for damage mitigation. The intensive use of pesticides is intertwined with the expansion of the agricultural frontier of export monocultures,⁶ specially in the Amazonian and Cerrado biomes⁷. This expansion is also associated with the use of chemical defoliants to accelerate deforestation.⁸

The intensive use of pesticides is associated with the contamination of air and water sources. It contributes significantly to the emission of greenhouse gases (GHG) and environmental degradation, by releasing chemical compounds into the atmosphere, through deforestation for the expansion of agricultural lands, which reduces natural carbon sinks. As climate change raises temperatures

3 In addition to CODEMAT, the MPT is made up of the following thematic bodies: COORDINFANCIA (defense of children's and adolescents' rights), CONAETE (fight against contemporary forms of slavery); COORDIGUALDADE (promotion of equality and non-discrimination at work); CONAFRET (fight against labor frauds); CONAP (decent work in the Public Administration); CONATPA (ports and water labor) and CONALIS (freedom of association and the right to organize). Available at: <https://mpt.mp.br/planejamento-gestao-estrategica/gestao-estrategica/coordenadorias-tematicas-mpt>. Access on August 9th, 2025.

4 <https://news.un.org/pt/story/2024/07/1834616>

5 <https://cadernos.ensp.fiocruz.br/static/arquivo/1678-4464-csp-37-04-e00061820.pdf>

6 <https://www12.senado.leg.br/noticias/materias/2024/07/11/cerrado-supera-amazonia-como-bioma-mais-devastado-no-pais-revela-audiencia>

7 <https://infoamazonia.org/2025/02/05/uso-de-agrotoxicos-cresce-quase-200-em-10-anos-no-maranhao-e-expoe-moradores-a-riscos/>

8 <https://reporterbrasil.org.br/2021/11/fazendeiros-jogam-agrotoxico-sobre-amazonia-para-acelerar-desmatamento/>

and changes rainfall patterns, it favors the proliferation of pests, which leads to increased use of pesticides. Its increased use triggers environmental damage and exposure of workers to hazardous chemicals which affect the environmental balance and increase health risks.

In the context of pressing demand for public policies aimed at mitigating the negative impacts of pesticides and the adverse effects of climate change on the workplace environment, the MPT, supported by the legitimate demands of affected communities and by scientific evidence, has taken measures, in and out of courtrooms, pursuing effective solutions from public and private employers and Public Authorities.

In line with the COP 30 Action Agenda, with emphasis on Axis 3 (more resilient, adaptable and sustainable food systems) and Axis 5 (promotion of human and social development), this article briefly addresses MPT's participation in the National Forum to combat the impacts of pesticides, and brings a panorama on recent collective civil lawsuits which seek to ban the use of atrazine and glyphosate, agrochemicals associated with severe negative externalities especially for workers and rural communities, across Brazil.

2. PARTICIPATION OF MPT IN THE NATIONAL FORUM TO COMBAT THE IMPACTS OF PESTICIDES

Established in October 2009, the National Forum to Combat the Impacts of Pesticides and Transgenics is a permanent public space for debate on the negative impacts of these products on human health and environment; it is guided by the principles of agroecology and social justice. It is currently coordinated by members of the Labor Prosecutor's Office (MPT) and of Federal Prosecutor's Office (MPF). The Forum's Executive Secretariat is under the auspices of the National School of Public Health Sérgio Arouca (ENSP/ FIOCRUZ). The Forum aims to boost, at national level, public debate on the social challenges related to pesticides with a view to stimulating concrete measures to safeguard the welfare of workers, consumers and the environment.

The Forum is made up of several Brazilian organizations, including public bodies, educational and research institutions, representatives of social movements, trade unions and local organizations such as the Brazilian Association of Public Prosecutor's Offices for the Environment (ABRAMPA) and the Public Defender's Office (DPU). In addition, the Forum is supported by 33 regional like-minded organizations and forums.

Aerial spraying is one of the action fronts of the Forum, provided the agricultural technique substantially jeopardizes the environment and human health. The so-called "technical drift" causes the dispersion of chemical particles in the air. It indiscriminately reaches vast regions far from the desired target, contaminating soil, water courses, flora, plantations, public and private properties, communities and schools. Due to the severe damages caused by the wide dispersion of pesticides, several countries restrict or forbid the use of aerial spraying.

Supported by scientific evidence of chronic harms to human health, the State of Ceará has enacted Law 16.820/2019, prohibiting aerial spraying of pesticides on its territory. The law was challenged before the Brazilian Supreme Court (direct unconstitutionality lawsuit ADI no 6.137). In the ruling rendered, the Brazilian Supreme Court (STF) deemed constitutional, legitimate and reasonable the aforementioned prohibition. The Rapporteur Justice, Justice Carmem Lúcia, pointed out that scientific evidence highlights the risks associated with the aerial spraying of pesticides for the human health and the environment. Due to "technical drift", applied agrochemicals can spread up to 32 ki-

lometers from the target area, impacting adversely on the health and welfare of entire communities. The ruling made reference to studies carried out by the National Cancer Institute (INCA), which point out the carcinogenic (in the long term) and intoxicating (in the short term) potential of pesticides, as well as to the EU Directive 2009/128, of 21 October 2009.

It is noteworthy that when aerial spraying is performed with fungicides of toxicological class 1 and 2 and of environmental class 2 (very hazardous products), a high level of contamination of rivers, lakes and aquifers as well as poly-exposure (i.e. contamination by more than one chemical ingredient) are very common outcomes⁹.

Accordingly, there are no effective safety parameters associated with the aerial spraying of pesticides. The restriction of aerial spraying, a measure that has been followed by several countries¹⁰, is the only possible way to prevent the dramatic environmental and human health risks associated therewith.

Given the severe negative socioenvironmental externalities and considering the caselaw of the Brazilian Supreme Court, the Forum along with partners have been working on strategies to restrict aerial spraying of pesticides across Brazil.

3. COLLECTIVE CIVIL LAWSUIT TO BAN THE USE GLYPHOSATE

Brazil is one of the world's main consumer markets for pesticides, especially glyphosate, a bestselling agrochemical. Local sales spiraled after the market release of transgenic soybean, corn and cotton seeds¹¹. From a human health perspective, several independent studies correlate exposure to glyphosate with chronic diseases and congenital malformations, autism, depression and Parkinson's disease. The release of a 2015 study by the International Agency for Research on Cancer (IARC/WHO), which describes glyphosate as a likely carcinogenic substance, has served as a call for action to public authorities across the world¹².

FIOCRUZ draws attention to Brazilian peculiarities that require precautionary measures, even in the case of pesticides whose use has been authorized elsewhere:

It is important to note that even for products authorized in Brazil and in other countries, in these countries the conditions of use and precaution measures may be stricter, reducing the damage caused.

Among them, stands out the use allowed for few crops with handling restricted to trained workers; this is the case of glyphosate in Europe. In addition, in Brazil, measures to guarantee the safe use of pesticide have not been effective for several reasons, such as long distances between properties and places of sale or improper disposal of packaging and difficulty in accessing

9 Chaim A. Tecnologia de aplicação de agrotóxicos: fatores que afetam a eficiência e o impacto ambiental. In: Silva CMMS e Fay EF. Brasília: Embrapa; 2004. p. 289-317.

10 OECD. Report of an OECD survey on risk management/mitigation approaches and options related to agricultural pesticide use near residential areas (ENV/JM/MONO(2014)25). Paris: OECD, 2014. Available at: https://www.oecd.org/content/dam/oecd/en/publications/reports/2020/07/report-of-an-oecd-survey-on-risk-management-mitigation-approaches-and-options-related-to-agricultural-pesticide-use-near-residential-areas_d7e3737a/f38f0238-en.pdf

11 <https://www.cartacapital.com.br/opinio/agrotoxicos-enquanto-o-mundo-condena-o-glifosato-o-brasil-o-inocenta/>

12 <https://cee.fiocruz.br/?q=node/1086>

information on proper use and potential harms. In addition to the use of large amounts of pesticides, Brazilian agriculture also cultivates extensively transgenic crops resistant to herbicides such as glyphosate, 2,4-D and dicamba. There is a greater demand for application of these substances and, accordingly, higher risk of harms to ecosystems.¹³

Based on robust technical data that points to the harms brought about by glyphosate to the environment and to human health, the MPT, the MPF and the Prosecutor's Office of the State of Mato Grosso jointly filed a collective civil lawsuit in 2019 against the following organizations representing the interests of rural producers: Association of Soybean and Corn Producers of the State of Mato Grosso (Aprosoja); the Federation of Agriculture and Livestock of the State of Mato Grosso (Famato); and the Association of Cotton Producers of the State of Mato Grosso (Ampa). The lawsuit seeks to ban the use of glyphosate in the territory of Mato Grosso. The plaintiffs filed a defendant class action, in which the above referred organizations represent and defend collectively the interests of the rural producers of the State of Mato Grosso who use glyphosate.

The first instance Labor Court declared its lack of jurisdiction to hear the case and render a judgment. In the second instance, the Regional Labor Court of the 23rd Region (TRT23) overruled that ruling and noted that the cause of action "unquestionably reveals relevance to the protection of the workplace environment and of the health of rural workers; it conveys a request for banning the use of any products containing glyphosate in their composition". The Court concluded in favor for the jurisdiction of the Labor Court to adjudicate the case and render a judgment¹⁴.

At present, the Regional Labor Court is in process of setting a binding regional precedent on the judicial authority to settle disputes involving the use of pesticides in the context of employment relations. To this end, the Court called a public hearing and invited stakeholders to share their contributions. The Court will discuss a number of relevant procedural issues, namely: the legitimacy of including private entities that represent the interests of rural producers as defendants in a collective lawsuit; the degree of representativeness of these organizations in the rural sector; the use of glyphosate in productive activities and the due diligence measures required, such as the use of personal protective equipment; and, finally, if the Labor Court has authority to ban the use of a product whose use has been authorized by the National Health Surveillance Agency (Anvisa)¹⁵.

4. COLLECTIVE CIVIL LAWSUIT TO BAN THE USE ATRAZINE

Brazil utilizes large amounts of pesticides banned in OECD countries, China and India. 67% of the agrochemicals marketed in Brazil is of pesticides deemed carcinogenic, endocrine disruptors and hazardous to the reproductive system. Among them, atrazine is noteworthy. In 2017, 24,730.90 tons of this chemical substance were marketed. It came in 5th place in sales that year, representing 5% of the total sold, among about 400 active ingredients marketed in Brazil¹⁶.

13 Cadernos de Saúde Pública. Available at: <https://cadernos.ensp.fiocruz.br/ojs/index.php/csp>

14 Labor Regional Court of the 23rd Region; proceedings: 0000680-48.2019.5.23.0003; date: 29-10-2021; Judging body: Gab. Des. Roberto Benatar - 2ª Turma; Rapporteur: Aguiar Peixoto.

15 <https://portal.trt23.jus.br/portal/noticias/abertas-inscricoes-para-audiencia-publica-que-discutira-limites-do-uso-do-glifosato-em-mt>

16 **Situação regulatória internacional de agrotóxicos com uso autorizado no Brasil: potencial de danos sobre a saúde e impactos ambientais.** Cad. Saúde Pública 2021; 37(4):e00061820. Disponível em: <https://cadernos.ensp.fiocruz.br/static/arquivo/1678-4464-csp-37-04-e00061820.pdf>

In October 2023, the MPT initiated judicial proceedings against the Federal Union and the National Health Surveillance Agency (Anvisa), seeking the revocation of the registration of atrazine-based pesticides and the prohibition of new authorizations for products whose composition includes this substance. The judicial application is supported by scientific evidence that points to the risks to human health and to the workplace environment arising from the exposure to atrazine, a substance banned in dozens of countries.

In addition to containing carcinogenic properties, scientific studies highlight that atrazine can cause serious chronic diseases such as hormonal and reproductive disorders, neurological, cognitive and behavioral impairments, decreased immune functions. Rural workers exposed to this substance face increased risk of non-Hodgkin lymphoma. There is also evidence of aggravated risk of breast, thyroid, kidney and prostate cancer.

The collective civil lawsuit filed by MPT's Special Working group on Agrochemicals (GEAF Agrochemicals) seeks a judicial order which cancels the registration and inhibits the authorization for production, export, import, marketing and use of pesticides containing atrazine. The court applications are supported by pieces of labor legislation; Constitutional norms; international standards for the protection of the workplace environment and the health of workers; and scientific data on the risks associated with atrazine exposure. The lawsuit was filed due to the risks and warnings vocalized by members of the international community and international organizations involved with health, food and environmental matters¹⁷.

The first instance Labor Court declared it has no jurisdiction to adjudicate the collective lawsuit. This ruling was overruled by the Regional Labor Court of the 10th Region. In this decision, the Rapporteur Judge welcomed the legal grounds raised by the MPT, emphasizing that "the protection of the workplace environment is of importance not only to the parties directly concerned in a employment contract (employee and employer), but concerns the whole society"¹⁸. The ruling highlighted the constitutional emphasis given to the duty to reduce occupational risks and to the jurisdiction of Labor Courts to settle disputes associated with the health and safety of workers.

Subsequently, the Regional Labor Court rejected the appeals addressed to the Superior Labor Court (TST), filed in light of the ruling that recognized the jurisdiction of Labor Courts to adjudicate the aforementioned collective lawsuit.

Thereafter, CropLife Brazil and the Brazilian Rural Society (Sociedade Rural Brasileira) filed a Constitutional Complaint before the Brazilian Supreme Court (Complaint no 82.717). The Justice Rapporteur, Justice Flávio Dino, rejected the complaint and pointed out that there was no previous exhaustion of ordinary instances, a necessary requirement for filing a constitutional complaint. He also pointed out that in the ADI 3.395 case the Supreme Court affirmed the jurisdiction of Civil Courts to settle disputes involving statutory public servants and the Public Administration, and that this precedent does not apply to the case under analysis: "In the conflict under analysis, the discussion revolves around the jurisdiction to prosecute and rule a collective civil lawsuit, which seeks the implementation of measures relating to the workplace environment".

The ruling reaffirms that Labor Courts have jurisdiction to adjudicate lawsuits concerning the protection of the workplace environment, including those seeking a ban on hazardous substances with potential to harm workers' health.¹⁹

17 <https://mpt.mp.br/pgt/noticias/acp-banimento-agrotoxicos-com-protocolo-judicial-3.pdf>

18 <https://protecao.com.br/destaque/justica-do-trabalho-julgara-banimento-de-agrotoxicos-com-atrazina/>

19 <https://mpt.mp.br/pgt/noticias/stf-reafirma-competencia-da-justica-do-trabalho-para-julgar-acao-do-mpt-sobre-agrotoxico>

5. FINAL REMARKS

The recent examples of concrete measures carried out by the MPT, designed to safeguard vulnerable workers and the safety of workplace environments, illustrate the commitment of the Brazilian Labor Prosecutor's Office to advance sustainable development, socio-environmental justice and the Global Climate Agenda.

The measures mentioned seek a structural solution for chemical substances and agricultural techniques that, although seem very profitable for economic agents in the short term, pose serious risks to workers and to the workplace environment. Parallel to the daily activities, associated with labor irregularities of ordinary dimension, it is essential to plan, articulate and foster institutional dialogue directed at strategic plans to combat major threats to the human dignity and to the environment. If there is no opposition to traditional methods of production, which display socio-environmental predatory character, it will be difficult to achieve the shared goal of preserving a healthy and balanced environment for present and future generations.

The collective civil lawsuits referred are still pending. Those judicial measures mirror the constitutional commitment of the Brazilian Labor Prosecutor's Office to the enforcement of national and international binding standards aimed at guaranteeing a healthy workplace environment and workers' health and lives.

LABOR CLIMATE JUSTICE: CLIMATE CHANGE AND THE WORLD OF WORK: CONSOLIDATED EXPERIENCES AND ACTION STRATEGIES

Mônica Fenalti Delgado Pasetto¹

Abstract: This article examines the impact of climate change on employment contracts and the legal treatment given by the International Labor Organization (ILO) and national legislation, especially with regard to the maintenance of employment relationships in situations of calamity. The survey also reviews bills that propose changes to article 473 of the Consolidation of Labor Laws (CLT), with the aim of improving the protection of workers in scenarios of natural and climatic disasters. The article also exposes the measures adopted by the MPT/RS Working Group during the floods of May/2024. The analysis points to the relevance of the COP30 event in Brazil to discuss and promote the revision of legislation to promote the human and social development of workers in the face of climate issues, highlighting the relevance of legal mechanisms that protect both workers' rights and the sustainability of companies in climate crisis scenarios.

Keywords: climate change, interruption of the employment contract, COP30, bills.

INTRODUCTION

The climate crisis poses increasing challenges to the world of work. Floods, droughts, heat waves, and other extreme events have had profound impacts on the health, safety, and income of millions of workers. These phenomena directly impact the stability of companies and local economies, increasing social vulnerability and accentuating existing inequalities. In Brazil, whose labor legislation is still mostly guided by the Consolidation of Labor Laws (CLT), enacted in 1943, there is a lack of specific provisions capable of responding to the complexity and growing frequency of these environmental emergencies.

In this scenario, the holding of **COP30**, which will take place in Belém do Pará, in 2025, represents a historic opportunity for Brazil to put labor climate justice on the agenda of global discussions. The United Nations Conference of the Parties (COP) is the most relevant international forum for the negotiation of commitments on the climate crisis, and its next edition, in Brazil, offers a priv-

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ileged context to promote the construction of normative mechanisms that protect work in times of environmental collapse. Given the magnitude of the disasters experienced, such as the 2024 floods in Rio Grande do Sul, it is urgent to integrate the protection of employment relationships with climate adaptation and social resilience policies. The articulation between decent work, a balanced environment and climate governance must constitute a new axis of public and legal action.

This article is based on this premise and proposes to present the impacts of the Floods in Rio Grande do Sul on labor relations and possible normative responses arising from this crisis. In the first topic, the impact on the world of work resulting from the 2024 flood in RS will be addressed, and the alert to the need to review labor standards in light of the environmental crisis. Then, in the second topic, the legislative projects in progress that aim to adapt labor legislation in situations of climate disasters will be examined. Finally, the role of the Labor Public Prosecutor's Office, in the context of public calamity, as a promoter of qualified information in the context of crisis, is analyzed.

Finally, it seeks to assess whether the existing provisions and the projects in progress offer adequate protection to the Brazilian working class in a scenario of intensification of extreme events, proposing reflections on the possible normative paths and on the role of COP30 in the consolidation of a new paradigm of climate justice in the world of work.

1. CLIMATE JUSTICE AND THE RIGHT TO WORK

The International Labor Organization (ILO) has already warned, since 2015, that climate change could aggravate occupational vulnerabilities, mainly affecting sectors such as agriculture, fishing, transport, and civil construction, with massive losses in productivity, increased unemployment, and widening regional and gender inequalities².

Labor **climate justice**, in this context, must be understood as a structuring principle of contemporary labor relations. It requires recognizing that workers — especially those on low incomes, in the informal sector and in urban peripheries — are the most affected by the consequences of the climate crisis, although they contribute very little to its origin. Without effective institutional measures, the risk is that these subjects will be doubly penalized: first by exposure to disasters, then by the absence of legal protection in the face of economic and social losses.

The ILO, although it has already published guidelines on just transition and green jobs³, has not yet developed specific conventional standards on the maintenance of employment contracts in situations of climate disasters. Convention No. 158⁴, which deals with arbitrary dismissals, is silent on this point. In countries like Brazil, where this convention has not been ratified, the normative gap tends to be even more acute.

2 INTERNATIONAL LABOUR ORGANIZATION. **Working on a warmer planet: The impact of heat stress on labour productivity and decent work**. International Labour Office: Geneva, 2019. Available at: https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_711919.pdf. Accessed on: 04 ago. 2025.

3 According to the United Nations Environment Program, green jobs are those that reduce the environmental impact of companies and economic sectors to levels that are ultimately sustainable. [...] such as work in the agricultural, industrial, service and administrative areas that contribute to the preservation or restoration of environmental quality. UNEP, 2008, p.5. Available at: <https://brasil.un.org/pt-br/55799-economia-verde-e-os-odms>. Accessed on: Aug 1. 2025.

4 INTERNATIONAL LABOUR ORGANIZATION. **Convention n.158**. Available at: <https://www.ilo.org/pt-pt/resource/news/demissao-sem-justa-cao-o-que-diz-convencao-no158-da-oit>. Accessed on: Aug 1. 2025

In our country, the legal system still lacks specific mechanisms aimed at maintaining the employment relationship and income in contexts of environmental disasters. In this sense, the provisions of the Consolidation of Labor Laws⁵, which regulate the concept of force majeure, do not reflect the complexity or continuity of the effects of current environmental disasters. Such devices are molded to a traditional conception of business crisis and do not adequately dialogue with the complexity of contemporary environmental disasters.

For example, article 501 of the CLT, which provides for the legal institute of “force majeure” as a justification for the suspension or termination of employment contracts, proves to be obsolete in requiring the definitive closure of the establishment in order for force majeure to be configured, since this does not correspond to the reality of temporary interruptions resulting from environmental catastrophes. The legislation also does not contemplate mechanisms for immediate protection of income and employment relationships in the face of environmental events.

The normative omission, regarding climate disasters, was evident in the face of the floods that devastated the state of Rio Grande do Sul in 2024, when thousands of companies and workers were affected without adequate legal support to deal with the effects of the calamity on the employment contract.

According to an estimate by the Institute of Applied Economic Research (Ipea), released in August 2024, between 84% and 92% of formal jobs were directly affected in the municipalities of Rio Grande do Sul most affected by the floods, such as Eldorado do Sul, Roca Sales, and Muçum⁶. In Porto Alegre, the percentage of jobs affected was 38%, and that of private establishments, 27%. In total, at least 334.6 thousand formal jobs and 23.3 thousand establishments were impacted in the 418 municipalities with calamity or emergency decrees, and may reach, according to spatial projections, 378.5 thousand jobs and 26.3 thousand establishments⁷. These data show the devastating effect of climatic events on the formal labor market, systematically affecting production chains, logistics infrastructure, flow and consumption.

5 BRAZIL. Decree-Law 5.452, of May 1, 1943. **Approves the Consolidation of Labor Laws.** *Official Gazette [of] the United States of Brazil: section 1, Rio de Janeiro, DF, year 82, n. 184, p. 11937-11984, 9 ago. 1943.* Art. 501 - Force majeure is understood to be any unavoidable event, in relation to the employer's will, and to which the employer did not contribute, directly or indirectly.

Paragraph 1 - The employer's lack of providence excludes the reason of force majeure.

Paragraph 2 - The occurrence of force majeure that does not substantially affect, nor is likely to affect, under such conditions, the economic and financial situation of the company, the restrictions of this Law regarding the provisions of this Chapter shall not apply.

Article 502 - In the event of force majeure that determines the extinction of the company, or of one of the establishments in which the employee works, the employee shall be ensured, when dismissed, an indemnity in the following form:

I - being stable, under the terms of articles 477 and 478;

II - not having the right to stability, half of what would be due in case of termination without just cause;

III - if there is a contract for a fixed term, the one referred to in article 479 of this Law, also reduced by half.

Article 503 - It is lawful, in case of force majeure or duly proven losses, to reduce the salaries of the company's employees, proportionally to the salaries of each one, but it may not exceed twenty-five percent (25%), respecting, in any case, the minimum wage of the region.

Sole Paragraph - Once the effects arising from the force majeure event have ceased, the reinstatement of the reduced wages is guaranteed.

6 IPEA. **Technical Note:** Impacts of the 2024 Floods on the Formal Labor Market of Rio Grande do Sul. Brasília: Ipea, 2024. Data prepared based on eSocial records and georeferencing of the impact spot from INPE. Brasília, 2024 Available at: <https://repositorio.ipea.gov.br/handle/11058/14186>. Accessed on: Aug 4, 2025.

7 IPEA. **Technical Note:** Impacts of the 2024 Floods on the Formal Labor Market of Rio Grande do Sul. Brasília: Ipea, 2024. Data prepared based on eSocial records and georeferencing of the impact spot from INPE. Brasília, 2024 Available at: <https://repositorio.ipea.gov.br/handle/11058/14186>. Accessed on: Aug 4, 2025.

In addition to force majeure, the suspension and interruption of the employment contract are fundamental institutes of Labor Law, which refer to the temporary stoppage of the provision of services and its legal effects, with important distinctions regarding the obligations assumed by employer and employee during the period of leave. In the interruption, the time of leave is computed as time of service for all purposes, integrating the vacation acquisition period, the calculation of the 13th salary and the other rights arising from the contractual continuity. In the case of suspension, these effects cease, removing the obligations of the employer and the employee, except when there is an express provision in a collective bargaining agreement or specific law that determines the contrary⁸.

Both institutes are provided for in the Consolidation of Labor Laws (CLT) and complemented by specific legislation, which delimits the authorized hypotheses and the legal effects arising from each modality on the employment relationship. However, none of these provisions is capable of guaranteeing the maintenance of the employment relationship, nor the obligation or not to pay wages when the worker is unable to attend work due to weather events.

In addition, the experience of Rio Grande do Sul during the flood demonstrates that the impossibility of attending work was often not related to the worker, but to the unfeasibility of commuting and the very physical existence of the business establishment, since many were flooded. Therefore, the absence of specific legal treatment of employment contracts in such contexts compromises not only the protection of the worker, but also regional economic stability and public governance in times of collapse, because no one knows how to act.

Despite the great gravity, the tragedy in Rio Grande do Sul was not an exception⁹. Between January 2013 and December 2024, a total of 5,279 Brazilian municipalities were affected by disasters, resulting in 70,361 records of the declaration of a Situation of Emergency (SE) or State of Public Calamity (ECP). The National Confederation of Municipalities (CNM) points out that, since 2013, 95% of the country's municipalities have been hit at least once by some type of disaster, which highlights the urgency of integrated actions between federative entities for risk management and disaster management¹⁰.

The recurrence of these episodes demonstrates the urgency of updating labor legislation, as a means of ensuring the preservation of employment and income, as well as the safety and health of workers against climate-related occupational risks. In the next topic, the bills related to the topic in progress in Brazil will be analyzed.

8 DELGADO, Maurício Godinho. **Labor Law Course**. 19. ed. São Paulo: LTr, 2020.

9 GOMES, L. **"We need to understand that this was not the work of chance"**, warns FURG professor about flooding. São Leopoldo: IHU-UNISINOS; 12 May 2024 [cited 14 Nov 2024]. Available at: <https://ihu.unisinos.br/639307-nos-precisamos-entender-que-isso-nao-foi-obra-do-acaso-alerta-professor-da-furg-sobre-enchente>. Accessed on: Aug 4. 2025.

10 NATIONAL CONFEDERATION OF MUNICIPALITIES. TECHNICAL STUDY - OVERVIEW OF DISASTERS IN BRAZIL – 2013 TO 2024, p.6 Available at: https://cnm.org.br/storage/biblioteca/2025/Estudos_Tecnicos/ET_DEFCIVIL_05-2025_Panorama_dos_Desastres_no_Brasil_2013_a_2024.pdf. Accessed on: Aug 4. 2025.

2. LEGISLATIVE PROJECTS AND COLLECTIVE BARGAINING AS A RESPONSE TO THE CLIMATE CRISIS IN THE WORLD OF WORK

The Brazilian Legislative Branch started, albeit belatedly, the processing of projects that intend to address the problem of the climate crisis in the world of work. Two legislative proposals stand out: Bill No. 1,791/2024, authored by Senator Paulo Paim, which aims to institute the National Strategy for Management and Emergency Action in Situations of Environmental Disasters (ENGD), and Bill No. 1,594/2024, by Federal Deputy Erika Hilton, which proposes the creation of the National Policy for Environmental and Climate Displaced People (PNDAC).

The first proposes broad guidelines for the prevention and response to climate disasters, but does not include mechanisms to protect workers and preserve employment relationships¹¹. The second presents a significant advance by providing, in its article 13, the inclusion of a new hypothesis to article 473 of the CLT, authorizing the employee's paid absence when his home is affected by an extreme environmental event that compromises his mobility¹².

Although this provision represents an important normative recognition of the reality experienced by thousands of workers, it has some technical limitations. First, it is a hypothesis of interruption of the employment contract, with maintenance of the payment of wages, but without definition of a maximum period for leave - an element that could bring legal uncertainty and discourage the maintenance of jobs. In addition, the restriction of the measure to the impairment of the employee's home and to the proof of "impaired mobility" excludes situations widely verified in the 2024 floods, in which the business establishments themselves were interdicted or made unfeasible.

In addition, the bill disregards that, according to article 6 of the CLT, there is no distinction between work performed at the employee's home or in another physical location as long as the requirements of the employment relationship are present. Thus, by linking the contractual interruption exclusively to the impact on housing and the impossibility of traveling, the proposal ends up limiting access to alternative solutions, such as telework, transfer or other hypotheses provided for in emergency collective bargaining.

The fragility of these legislative proposals highlights not only the absence of a systemic legal response, but also the need to rescue the central role of collective bargaining as a democratic instrument of regulation in times of crisis. In the Brazilian legal system, Law No. 14,020/2020¹³, enacted during the COVID-19 pandemic, allowed companies to enter into individual agreements to suspend

11 BRAZIL. Federal Senate. **Bill No. 1791**, 2024. Establishes the National Strategy for Management and Emergency Action in Situations of Environmental Disasters - ENGd, aiming to ensure the safety and well-being of the population in the presence of environmental disasters resulting from climatic and, meteorological or seismic events, as well as human action, and the adoption of measures for the prevention, repair or mitigation of damage to people, animals and facilities, and makes other arrangements. Available at: <https://www25.senado.leg.br/web/atividade/materias/-/materia/163558>. Accessed on: 04 ago. 2025.

12 BRAZIL. Chamber of Deputies. **Bill No. 1594**, 2024. Establishes the National Policy for Environmental and Climate Displaced Persons (PNDAC), establishing their rights and providing guidelines for the Government to promote their protection. Available at: https://www.camara.leg.br/proposicoesWeb/prop_mostrarintegra?codteor=2454130&filename=Avulso%20PL%201594/2024. Accessed on: 2 ago. 2025

13 BRAZIL. **Law No. 14,020**, of July 6, 2020. Establishes the Emergency Program for the Maintenance of Employment and Income; provides for complementary measures to address the state of public calamity recognized by Legislative Decree No. 6, of March 20, 2020, and the public health emergency of international importance resulting from the coronavirus, which is addressed by Law No. 13,979, of February 6, 2020; amends Laws No. 8,213, of July 24, 1991, 10,101 of December 19, 2000, 12,546 of December 14, 2011, 10,865 of April 30, 2004, and 8,177 of March 1, 1991; and makes other provisions. Official Gazette of the Union. Brasília, DF, July 7. 2020.

contracts and reduce working hours and wages. Subsequently, Law No. 14,437/2022 authorized the adoption of alternative measures in states of public calamity, but conditioned their application to an act of the Minister of Labor and Employment, which did not materialize in the case of the 2024 floods¹⁴.

These laws, by allowing the prevalence of individual agreements over collective ones, raise doctrinal and institutional criticism. The Federal Constitution, in its article 8, enshrines freedom of association and the valorization of collective bargaining as fundamental guarantees for balance in labor relations. By relativizing this priority in emergency contexts, the legislator weakens collective protection and places the worker in a situation of contractual vulnerability.

The decision of the Federal Supreme Court in ADI 6363¹⁵, which validated the individual agreements signed during the pandemic, made it clear that such a solution was only justified by the exceptionality of the moment. The rapporteur, Justice Ricardo Lewandowski, pointed out that, even in extraordinary situations, the constitutional preference should always be for collective bargaining, as a way of safeguarding the bargaining power of workers.

Therefore, any serious legislative effort to regulate the effects of climate change on labor relations must start from two pillars: (i) the clear standardization of hypotheses of contractual suspension and interruption in environmental disasters, with well-defined technical and legal parameters; and (ii) the valorization of collective bargaining as a legitimate and effective tool for the construction of agreed responses, adapted to the regional and sectoral specificities of each calamity.

3. MPT'S PERFORMANCE IN THE FLOODS OF RIO GRANDE DO SUL

The MPT constituted the Working Group "Climate Disaster in RS – May 2024", with the task of coordinating extrajudicial actions to safeguard transindividual rights. The strategy favored the issuance of Recommendations, an extrajudicial normative instrument, to guide municipalities, employers and workers on practices to be adopted during and after the weather event. The choice of this mechanism aimed at speed, broad scope and preventive character, with the MPT acting as a promoter of adequate information in the context of crisis.

The first Recommendation was directed to the affected municipalities, providing free flood exposure certificates. These documents helped to prove the situation of employment of displaced workers, displaced workers and residents in flooded areas¹⁶.

The second Recommendation, issued on 05/10/2024, was addressed to employers and provided guidance on the adoption of alternatives in the model of those provided for in Law No. 14,437/2022. The following stood out: flexibilization of working hours; telework; anticipation of vacations; collective vacations; bank of hours; professional qualification (article 476-A of the CLT). These

14 BRAZIL. Law No. 14,437, of August 15, 2022. Authorizes the Federal Executive Branch to provide for the adoption, by employees and employers, of alternative labor measures and for the Emergency Program for the Maintenance of Employment and Income, to address the social and economic consequences of a state of public calamity at the national level or at the state, district or municipal level recognized by the Federal Executive Branch. Official Gazette of the Union. Brasília, DF, 16 ago. 2022.

15 BRAZIL. Federal Supreme Court. **ADI 6363**, Rel. Min. Ricardo Lewandowski, Full Court, judged on 04/17/2020. Available at: <https://portal.stf.jus.br/processos/detalhe.asp?incidente=5886604>. Accessed on: 20 jul. 2025.

16 LABOR PUBLIC PROSECUTOR'S OFFICE. **Recommendation No. 1/2024** – Issuance of flood certificates. PRT4, Porto Alegre, 30 Apr. 2024. Available at: <https://www.prt4.mpt.mp.br/12112>. Accessed on: 1 Aug. 2025.

measures were aimed at maintaining the bond and income without resorting to dismissal. This recommendation signaled the importance of social dialogue in the construction of balanced solutions that reconcile the interests of employers and employees, even in the face of scenarios of environmental collapse¹⁷.

The third Recommendation focused on the health and safety of workers in the resumption of activities, with guidelines based on workers' health and safety legislation, such as NRs, and Civil Defense protocols. Measures such as prior inspection of facilities, provision of PPE, training in biological and chemical risks, and review of the Risk Management Programs (PGR) and Occupational Health Medical Control Program (PCMSO) were foreseen¹⁸, to add the risk of environmental disasters among the occupational risks. The measure also advised employers to seek coordination with health agencies for epidemiological monitoring, issue CATs in cases of accidents and ensure immunizations against tetanus, hepatitis and other diseases. The MPT also recommended psychological support for workers, recognizing the impacts of trauma and anxiety resulting from the disaster situation. The instrument provided for deadlines and forms of proof of the adoption of measures, applying principles of climate justice and the right to health.

The analysis of the Recommendations shows that this extrajudicial instrument allowed the MPT to respond quickly and broadly, benefiting workers directly or indirectly. Experience shows the effectiveness of the Recommendations as a collective redress mechanism, in line with the MPT's problem-solving profile.

FINAL THOUGHTS

In recent years, the increase in extreme weather events, such as floods and droughts, has directly impacted the world of work, revealing the insufficiency of the Consolidation of Labor Laws (CLT) to deal with the complexity of these situations. The holding of COP30, in Belém, in 2025, represents a strategic opportunity for Brazil to boost climate justice at the international level, integrating the protection of employment relationships with climate adaptation and resilience policies. The issue requires the construction of a new regulatory framework that articulates decent work, a balanced environment, and climate governance, given the urgency evidenced, especially after the floods in Rio Grande do Sul, in 2024.

As a result of the work of the Labor Public Prosecutor's Office, it was seen that the absence of integrated normative responses compromises not only legal certainty and social protection, but also the economic reconstruction of the affected territories. Labor legislation needs to evolve from the paradigm of the improvised exception to that of a planned normative paradigm, integrating the environmental, social, and productive dimensions of the world of work in the face of the climate emergency.

17 LABOR PUBLIC PROSECUTOR'S OFFICE. **Recommendation No. 2/2024** – Alternative labor measures. PRT4, Porto Alegre, 10 May. 2024. Available at: <https://www.prt4.mpt.mp.br/12113>. Accessed on: 1 Aug. 2025.

18 LABOR PUBLIC PROSECUTOR'S OFFICE. **Recommendation no. 3/2024** – Health and safety in the return of activities. PRT4, Porto Alegre, 20 May. 2024. Available at: <https://www.prt4.mpt.mp.br/12135>. Accessed on: 1 Aug. 2025.

REFERENCES

BRAZIL. **Decree-Law 5.452**, of May 1, 1943. Approves the Consolidation of Labor Laws. Official Gazette [of] the United States of Brazil: section 1, Rio de Janeiro, DF, year 82, n. 184, p. 11937-11984, 9 ago. 1943.

BRAZIL. **Legislative Decree No. 6**, of March 20, 2020. Recognizes the occurrence of the state of public calamity. Official Gazette of the Union. Extra Edition. Brasília, DF, 20 mar. 2020.

BRAZIL. **Law No. 14,437**, of August 15, 2022. Authorizes the Federal Executive Branch to provide for the adoption, by employees and employers, of alternative labor measures and for the Emergency Program for the Maintenance of Employment and Income, to address the social and economic consequences of a state of public calamity at the national level or at the state, district or municipal level recognized by the Federal Executive Branch. Official Gazette of the Union. Brasília, DF, 16 ago. 2022.

BRAZIL. **Law No. 14,020**, of July 6, 2020. Establishes the Emergency Program for the Maintenance of Employment and Income; provides for complementary measures to address the state of public calamity recognized by Legislative Decree No. 6, of March 20, 2020, and the public health emergency of international importance resulting from the coronavirus, which is addressed by Law No. 13,979, of February 6, 2020; amends Laws No. 8,213, of July 24, 1991, 10,101 of December 19, 2000, 12,546 of December 14, 2011, 10,865 of April 30, 2004, and 8,177 of March 1, 1991; and makes other provisions. Official Gazette of the Union. Brasília, DF, July 7. 2020.

BRAZIL. Federal Supreme Court. **ADI 6363**, Rel. Min. Ricardo Lewandowski, Full Court, judged on 04/17/2020. Available at: <https://portal.stf.jus.br/processos/detalhe.asp?incidente=5886604>. Accessed on 1 Aug. 2025.

BRAZIL. Federal Senate. **Bill No. 1791**, 2024. Establishes the National Strategy for Management and Emergency Action in Situations of Environmental Disasters - ENGD, aiming to ensure the safety and well-being of the population in the presence of environmental disasters resulting from climatic and, meteorological or seismic events, as well as human action, and the adoption of measures for the prevention, repair or mitigation of damage to people, animals and facilities, and makes other arrangements. Available at: <https://www25.senado.leg.br/web/atividade/materias/-/materia/163558>. Accessed on Aug 4, 2025.

BRAZIL. Chamber of Deputies. **Bill No. 1594**, 2024. Establishes the National Policy for Environmental and Climate Displaced Persons (PNDAC), establishing their rights and providing guidelines for the Public Power promotes its protection. Available at: https://www.camara.leg.br/proposicoesWeb/prop_mostrarintegra?codteor=2454130&filename=Avulso%20PL%201594/2024 Accessed on Aug 2, 2025

NATIONAL CONFEDERATION OF MUNICIPALITIES. TECHNICAL STUDY - PANORAMA OF DISASTERS IN BRAZIL – 2013 TO 2024, p.6 Available in https://cnm.org.br/storage/biblioteca/2025/Estudos_Tecnicos/ET_DEFCIVIL_05-2025_Panorama_dos_Desastres_no_Brasil_2013_a_2024.pdf accessed on Aug 4, 2025

DELGADO, Maurício Godinho. **Labor Law Course**. 19. ed. São Paulo: LTr, 2020.

GOMES, L. **“We need to understand that this was not the work of chance”**, warns FURG professor about flooding. São Leopoldo: IHU-UNISINOS; 12 May 2024 [cited 14 Nov 2024]. Available at: <https://ihu.unisinos.br/639307-nos-precisamos-entender-que-isso-nao-foi-obra-do-acaso-alerta-professor-da-furg-sobre-enchente> Accessed on 20. Jul.2025

LABOR PUBLIC PROSECUTOR’S OFFICE. **Recommendation No. 1/2024** – Issuance of flood certificates. PRT4, Porto Alegre, 30 Apr. 2024. Available at: <https://www.prt4.mpt.mp.br/12112>. Accessed on: 1ago. 2025.

LABOR PUBLIC PROSECUTOR’S OFFICE. **Recommendation No. 2/2024** – Alternative labor measures. PRT4, Porto Alegre, 10 May. 2024. Available at: <https://www.prt4.mpt.mp.br/12113>. Accessed on: 1ago. 2025;

LABOR PUBLIC PROSECUTOR’S OFFICE. **Recommendation no. 3/2024** – Health and safety in the re- turn of activities. PRT4, Porto Alegre, 20 May. 2024. Available at: <https://www.prt4.mpt.mp.br/12135>. Accessed on: 1 Aug. 2025.

UNITED NATIONS – UN, **United Nations Environment Program**. 2008. Available at: <https://brasil.un.org/pt-br/55799-economia-verde-e-os-odms>. Accessed on Aug 1. 2025

INTERNATIONAL LABOUR ORGANIZATION. **Convention n.158**. Available at: <https://www.ilo.org/pt-pt/resource/news/demissao-sem-justa-causa-o-que-diz-convencao-no158-da-oit> accessed on 20 Jul. 2025.

INTERNATIONAL LABOUR ORGANIZATION. **The Climate Action for Jobs Initiative unites global efforts on the environment and decent work**. International Labour Office: Geneva, 2015. Available at: <https://www.climateaction4jobs.org/> Accessed on 20 Jul. 2025.

INTERNATIONAL LABOUR ORGANIZATION. **Working on a warmer planet: The impact of heat stress on labour productivity and decent work**. International Labour Office: Geneva, 2019. Available at: https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_711919.pdf Accessed on 20 Jul. 2025.

CLIMATE CHANGE AND ITS IMPACT ON WORK: THE ROLE OF THE BRAZILIAN FEDERAL LABOUR PROSECUTION SERVICE (MPT)

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Abstract: This paper aims to present the role of the Brazilian Federal Labour Prosecution Service (MPT) in addressing the impacts of climate change on work, with a focus on protecting the health and safety of workers. It highlights the promotion of mitigation, adaptation, and just transition measures through social-environmental dialogue, the harmonization of social and environmental rights, and environmental education.

Keywords: MPT; climate change; workers' health; work environment; adaptation; mitigation; just transition; social-environmental dialogue; environmental education.

INTRODUCTION

Climate change poses urgent and multidimensional challenges to the realm of work, directly impacting on the health, safety, and dignity of millions of workers. The Brazilian Federal Labour Prosecution Service (MPT), committed to its constitutional mission of defending social rights, has taken a leading role in building an institutional agenda that places work at the center of the climate debate.

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3 Federal Labour Prosecutor, deputy national head for the Protection of the Work Environment and Workers' Health (CODEMAT) of the MPT.

4 Federal Labour Prosecutor, head of the Study Group on Climate Change and its Impacts on the Work Environment of the MPT.

5 Federal Labour Prosecutor, member of the Study Group on Climate Change and its Impacts on the Work Environment of the MPT.

6 Federal Labour Prosecutor, member of the Study Group on Climate Change and its Impacts on the Work Environment of the MPT.

7 Federal Labour Prosecutor, member of the Study Group on Climate Change and its Impacts on the Work Environment of the MPT.

MPT's efforts demonstrate that no effective response to the climate crisis can overlook its effects on work relations and the centrality of working people. With this commitment, MPT organizes its actions strategically and comprehensively, based on the axes presented below.

MITIGATION

Mitigation is one of the main pillars of the climate change legal framework, alongside adaptation and a just transition. It consists of reducing the accumulation of greenhouse gases (GHG) in the Earth's atmosphere, whether through the implementation of sinks or by reducing emissions resulting from various human activities.

From a legal standpoint, Climate Change Law — with emphasis on the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement — initially guides the adoption of measures aimed at flattening the trajectory of GHG accumulation, and subsequently toward achieving negative emissions. According to the GHG Protocol, incorporated into the Paris Agreement, this shift must be observed in the three scopes of emissions attributable to business activities: direct emissions; indirect emissions resulting from energy consumption; and indirect emissions related to the value chains in which companies are embedded.

Each of these scopes involves, to a greater or lesser extent, human work. Worker participation, therefore, is an indispensable element for effective climate ambition. In this regard, Climate Change Law incorporates from Environmental Law the Principle of Participation, recognizing that preserving the climate system under conditions compatible with a life of dignity is a shared responsibility — including for workers, who hold the right-duty to engage in mitigation efforts, without prejudice to their dignity and fundamental rights.

The MPT, as guardian of the legal order related to human work, plays a strategic role in safeguarding this transindividual right-duty, aligned with the collective dimension of the protected climate interest. The implementation of this right-duty attracts other related rights, informed by the need to ensure justice in the transition to a low-carbon economy, thus shaping Climate Change Labour Law.

ADAPTATION

Climate change increases the risk of occupational diseases and accidents in the workplace by intensifying factors such as excessive heat, ultraviolet radiation, air pollution, and extreme weather events.

In this context, the MPT, in its institutional role of defending the legal order and the collective rights of workers, has been engaging companies, organizations, and service providers to encourage the adoption of climate adaptation measures, aimed at protecting occupational health. These measures seek to reduce adverse impacts and prepare workers to face the risks arising from the climate crisis.

Adaptation involves administrative measures (working hours control, thermal breaks, suspension of activities during extreme events), engineering and collective controls (air conditioning and ventilation of environments), and personal protection (PPE, sunscreen, drinking water), observing

the hierarchy of occupational hazard controls, in addition to training for managers and workers. To guide its actions, the MPT compiled these measures in the document “CODEMAT/GE Climate Change and Impacts on the Work Environment” (Guidelines CODEMAT/GE)⁸, which offers general adaptation guidelines applicable to various work settings—indoor and outdoor, industrial, administrative, among others—as well as two specific studies on protection from extreme heat and wildfire smoke.

The document endeavours to guide both the repressive and promotional efforts of MPT prosecutors and presents general climate adaptation measures for worker protection, applicable to various work settings, such as indoor and outdoor, industrial, factory, administrative, and office environments, among others.

As a result of this work, the aim is to ensure that both workers and organizations are better prepared to face the risks of illness and accidents related to the effects of climate change in the workplace.

Below are examples of climate adaptation measures provided for in the Guidelines, the implementation of which has been advanced by the MPT within organizations:

Collective protection measures	Personal protection measures
• Reorganize work shifts and schedules to avoid exposing workers during periods with more extreme weather conditions, or schedule heavier work during times with milder temperatures. • Promote thermal breaks. • Ensure ventilation and air conditioning in the work environment. • Provide guidance on occupational hazards, as well as symptoms and health problems resulting from climate factors. • Temporarily suspend activities in the event of an extreme weather event that poses a serious and imminent risk to health or life.	• Provide clothing appropriate for the nature of the activity, with lighter fabrics and colours that absorb less heat. • Provide chilled potable water in sufficient quantity and encourage consumption. • Provide adequate and sufficient PPE, such as a legionnaire’s hat, mask, and goggles, as well as other protective measures such as sunscreen appropriate for the sun exposure and in sufficient quantities.

SOCIAL-ENVIRONMENTAL DIALOGUE

Social-environmental dialogue is a strategic instrument for public action in addressing contemporary challenges in the realm of work. Within the scope of the MPT, it is a necessary approach to the coordinated protection of social and environmental rights, especially given the effects of climate change on workers’ health and safety.

The 1988 Brazilian Constitution enshrines a democratic state governed by the rule of law that is, at the same time, social and environmental. This conception guides public policies and institutional actions focused on human dignity in its community, ecological, and cultural dimensions. From this perspective, the MPT operates based on the premise that sustainable development and social justice are inseparable and require cooperation, transparency and social dialogue.

8 Available at: <https://mpt.mp.br/pgt/noticias/mpt-divulga-diretrizes-sobre-impactos-das-mudancas-climaticas-no-trabalho>.

The constitutional text reinforces this approach by adopting a cooperative form of federalism, particularly in the areas of health and the environment. Although work matters fall within the legislative jurisdiction of the Union, legislative authority in work matters lies with the Union, the protection of the work environment is a matter of shared responsibility, according to Articles 23 and 24 of the Constitution. Furthermore, Article 200, item VIII, includes workers' health among the responsibilities of the Unified Health System (SUS), expanding the scope for integrated action. Some State constitutions, such as that of São Paulo, provide even broader protection for workers' health.

This framework requires interpreters of the Constitution - including civil society - to take an active role in promoting fundamental rights, especially socio-environmental rights, through qualified listening and the creation of permanent spaces for participation.

The MPT's institutional experience demonstrates that social-environmental dialogue must be supported by accessible and contextualized information, adapted to diverse social, educational, and linguistic profiles, to ensure real understanding and effective participation. In this sense, the Escazú Agreement, the first environmental treaty in Latin America and the Caribbean, represents an important normative reference by ensuring access to information, public participation, and justice on environmental issues, in addition to providing specific measures to protect human rights defenders. These principles guide MPT's initiatives aimed at ensuring that workers and communities have full access to environmental information relevant to their health, safety, and well-being.

Information, especially when targeted at vulnerable groups, is not a mere institutional formality, but a condition for dialogue, listening, and the development of legitimate, effective, and lasting solutions.

In practice, the MPT incorporates social-environmental dialogue on several fronts: public hearings, educational campaigns, theme projects, and collaboration with the Unified Health System (SUS) and the justice system. The promotion of safe and healthy workplaces depends on the integration of environmental protection, public health, and worker rights. In matters related to the health and safety of workers affected by extreme events, the MPT has increased its presence based on qualified listening and the collective development of solutions.

As Peter Häberle⁹ once stated, we are all interpreters of the Constitution. From this perspective, the MPT embraces its constitutional mission with the awareness that protecting the work environment also means promoting public health, preserving life, and affirming human dignity in all its dimensions. Social-environmental dialogue is therefore an essential pillar to ensure that decent work is a possible and sustainable reality for all.

CLIMATE ACTION PLANS

Climate Action Plans must include specific measures to protect the work environment, as established by Brazilian Bill 14.904/2024, with the purpose of promoting decent work and fostering social-environmental dialogue, making workplaces more resilient, especially in sectors with higher pollution potential and social vulnerability.

9 HÄBERLE, Peter. *Hermenêutica Constitucional*. Porto Alegre: Sergio Antonio Fabris Editor, 1997. p. 13.

Resilience measures must be anticipatory, aimed at preventing or mitigating climate impacts, considering the differentiated exposure of vulnerable groups due to factors such as housing, the nature of the work performed, length of exposure, and other specific conditions.

Certain activities are potentially more vulnerable to climate change, including those performed in outdoor environments, such as agriculture, fishing, construction, waste collection and disease control, among others.

The MPT acts to ensure that the protection of workers is included in Climate Action Plans, promoting climate justice. These plans must consider the impacts of climate change on occupational health and safety, particularly in contingency plans for disaster response, which may lead to job losses, suspension and disruption of economic activities, loss of productive land, climate displacement, and other direct and indirect effects on workers.

Workers' health is particularly vulnerable, as climate events intensify illness processes that go beyond infectious diseases, affecting both those directly exposed and those involved in emergency response efforts. Furthermore, these events exacerbate existing risks in production processes, increasing the likelihood of harm.

In this context, it is essential to implement early warning systems for air and water quality, heat and cold waves, floods and other extreme events. Climate Action Plans must generate reliable, localized data on climate variables, enabling accurate assessment of their impacts on occupational health and safety. Licensing and permit procedures must require urban buildings to be resilient to climate change, following minimum thermal comfort guidelines.

It is also crucial to promote research focused on protecting workers' health and to immediately adopt measures that ensure work environments are adapted to the new climate reality.

Accordingly, within the framework of MPT's Green April campaign, which in 2025 carried the slogan "Sustainable Future in Work and Climate," recommendations were issued to public authorities and bodies, with the following directives:

1. To include in Climate Action Plans — as per Bill n. 14,904/2024 — specific measures to protect the work environment, with emphasis on social-environmental dialogue, cooperation, the promotion of decent work, education and training, including professional retraining and prioritisation of sectors recognized as major polluters.
2. To include in Contingency Plans the predicted impacts of climate change on workers, along with responses to disasters and risk management measures, in accordance with article 1, items VII, XII, and XIII of Bill n. 12,608/2012.
3. To incorporate into the advisory and monitoring actions of health institutions and agencies, in the context of preserving health in the face of climate change, specific measures aimed at protecting the health of the working population exposed to extreme climate conditions.
4. To implement and enforce early warning systems for air and water quality, heatwaves, cold spells, flooding risks, and other aggravated risks arising from climate events, ensuring rapid issuance and lifting of alerts, as well as communicating the consequences of the alerted hazards to the working population in both public and private sectors.

5. To produce reliable, localized and widespread indicators on climate system variables and their impacts on workers' health.
6. To require and enforce — during licensing or business permit procedures — that urban buildings where work is conducted comply with minimum thermal comfort guidelines for climate adaptation, including sizing, ventilation, lighting, ergonomics, privacy, and quality of building materials.

In this way, the MPT remains vigilant in ensuring that Climate Action Plans include effective measures for the protection of workers' health and safety.

JUST TRANSITION AND DECENT WORK

The International Labour Organization (ILO) defines decent work as productive and quality work carried out in conditions of freedom, equity, security, and human dignity¹⁰. At the same time, it establishes “Guidelines for a just transition to environmentally sustainable economies and societies for all”, which encompass policies in several key areas, such as industrial and sectoral policies, business policies, social protection, and active labour market policies¹¹. A just transition must be well managed and contribute to the goals of decent work for all, social inclusion, and poverty eradication^{12 13}.

The Inter-American Court of Human Rights (IACtHR), endorsing ILO's view, issued an Advisory Opinion on the climate emergency, in which it considers that the member states of the Organization of American States (OAS) must, among other measures, develop just transition policies with the participation of employers' and workers' organizations. These policies should include mechanisms for job reintegration and training aligned with the transition toward environmentally sustainable economies, as well as the establishment of social protection systems suited to the challenges of such transition¹⁴. Along the same lines, the Inter-American Commission on Human Rights (IACHR) had already outlined policies to be adopted by states in favour of a just transition¹⁵.

A recent BRICS declaration, in turn, acknowledges the importance of actively engaging key stakeholders to promote social dialogue and create decent work in the context of climate change and just transition, across all sectors, including the informal economy¹⁶.

10 INTERNATIONAL LABOUR ORGANIZATION. Perfil do Trabalho Decente no Brasil: um olhar sobre as Unidades da Federação durante a segunda metade da década de 2000. Brasília: OIT, 2012.

11 INTERNATIONAL LABOUR ORGANIZATION. Guidelines for a just transition towards environmentally sustainable economies and societies for all. Geneva: ILO, 2015. p. 6-17.

12 INTERNATIONAL LABOUR ORGANIZATION. Guidelines for a just transition towards environmentally sustainable economies and societies for all. p. 4.

13 Brazil seems to tread this path, as seen for instance in arts. 3rd, I, 5th and 8th of Bill n. 14,904/2024.

14 CORTE INTERAMERICANA DE DERECHOS HUMANOS. Opinión Consultiva OC-32/25 de 29 de mayo de 2025 solicitada por la República de Chile y la República de Colombia – Emergencia Climática y Derechos Humanos. San José: Corte IDH, 2025. p. 161. Available at: <https://jurisprudencia.corteidh.or.cr/es/vid/1084981967>. Access on: jul 16th, 2025.

15 COMISIÓN INTERAMERICANA DE DERECHOS HUMANOS. Resolución No. 3/2021 – Emergencia Climática: alcance de las obligaciones interamericanas en materia de derechos humanos (Adoptada por la CIDH el 31 de diciembre de 2021). Washington DC: CIDH, 2021. Available at: https://www.oas.org/es/cidh/decisiones/pdf/2021/resolucion_3-21_spa.pdf. Access on: jul 16th, 2025.

16 BRICS. Declaração Conjunta da 17ª Cúpula do Brics. Rio de Janeiro: BRICS, 2025. Available at: <https://brics.br/pt-br/documentos/documentos-da-presidencia-brasileira/250706-brics-declaracao-de-lideres-ptbr.pdf/@download/file>. Access on: jul 16th, 2025.

The MPT understands that a fair and truly sustainable ecological transition must guarantee decent work, and that companies cannot limit their role to mere rhetoric about renewable energies, as precarious and deteriorating working conditions and poverty feed into the climate crisis and further hinder social adaptation¹⁷.

It is essential to withstand informality, ensure safe and healthy green jobs¹⁸, and protect all forms of work - especially regarding the most vulnerable and low-income populations¹⁹ - through the implementation and appropriate revision of Climate Action Plans by public authorities at the federal, state, and municipal levels. These plans must emphasize, among other aspects, social-environmental dialogue and the promotion of decent work, including worker retraining and prioritisation in sectors recognized as major polluters²⁰.

In this sense, the MPT, in cooperation and dialogue with other relevant stakeholders, holds the duty and authority to defend the human rights of workers in the pursuit of a truly just transition, leaving no one behind. This includes contributing to the creation of adequate public policies, in accordance with constitutional provisions and relevant international treaties and instruments, as set forth in articles 1, 5 (paragraphs 1-4), and 127²¹ of the Brazilian Federal Constitution and in Complementary Bill n. 75/1993²².

ENVIRONMENTAL AND CLIMATE EDUCATION

Addressing climate change and its direct effects on the health, safety, and working conditions of millions of people requires integrated and preventive actions, among which environmental education holds a strategic position.

The MPT has advocated for environmental and climate education as an instrument of social transformation and environmental protection - including a labour perspective – in accordance with article 225 in conjunction with article 200, VIII and article 7, XXII of the Brazilian Constitution. Based on Bill n. 9,795/1999, which established the National Environmental Education Policy, the MPT recognizes that building a sustainable society requires the formation of informed citizens who understand the causes and consequences of the climate crisis and can act to promote environmental, social and labour justice.

17 PEREIRA, José de Lima Ramos; ZIMMERMANN, Cirlene Luiza. Artigo portal Metrôpoles. In: MINISTÉRIO PÚBLICO DO TRABALHO. Guia Orientativo Abril Verde 2025. Brasília: MPT, 2025. p. 9-10.

18 MINISTÉRIO PÚBLICO DO TRABALHO. Apresentação Audiência Pública Abril Verde 2025: mudanças climáticas e MAT. In: MINISTÉRIO PÚBLICO DO TRABALHO. Guia Orientativo Abril Verde 2025. Brasília: MPT, 2025. p. 98

19 MINISTÉRIO PÚBLICO DO TRABALHO. Diretriz CODEMAT/GE Mudanças Climáticas e impactos no MAT nº 01/2024. In: MINISTÉRIO PÚBLICO DO TRABALHO. Guia Orientativo Abril Verde 2025. Brasília: MPT, 2025. p. 24.

20 MINISTÉRIO PÚBLICO DO TRABALHO. Recomendação Abril Verde II: mudanças climáticas e MAT para autoridades públicas. In: MINISTÉRIO PÚBLICO DO TRABALHO. Guia Orientativo Abril Verde 2025. Brasília: MPT, 2025. p. 88.

21 BRAZIL. Constituição da República Federativa do Brasil de 1988. Brasília: Presidência da República, 1988. Available at: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Access on: jul. 16th, 2025.

22 BRAZIL. Lei Complementar n. 75 de 20 de maio de 1993. Dispõe sobre a organização, as atribuições e o estatuto do Ministério Público da União. Brasília: Presidência da República, 1993. Available at: https://www.planalto.gov.br/ccivil_03/leis/lcp/lcp75.htm. Access on: jul. 16th, 2025.

Institutional action includes collaboration with the Ministry of Labour and Employment (MTE), ILO and educational institutions, as seen in the “Safety and Health in Schools” (SSE) project. This initiative brings the discussion of decent, safe, and healthy work, climate change and sustainability into the school environment through an interdisciplinary and transdisciplinary approach, raising awareness among children and adolescents about the relationships between production, consumption, environmental degradation, and working conditions.

The MPT also promotes the continuous training of educators, enabling them to critically address topics such as the environmental impacts of productive activities - including labor issues - the intensification of the climate crisis through technology, and its consequences on occupational health and safety. A concrete example of this initiative is the course “Introduction to Health, Environment, and Safety in Schools”, launched in 2024 in partnership with the Federal Institute of Espírito Santo (IFES), which integrates discussions on the environment, the sphere of work, and fundamental workers’ rights.

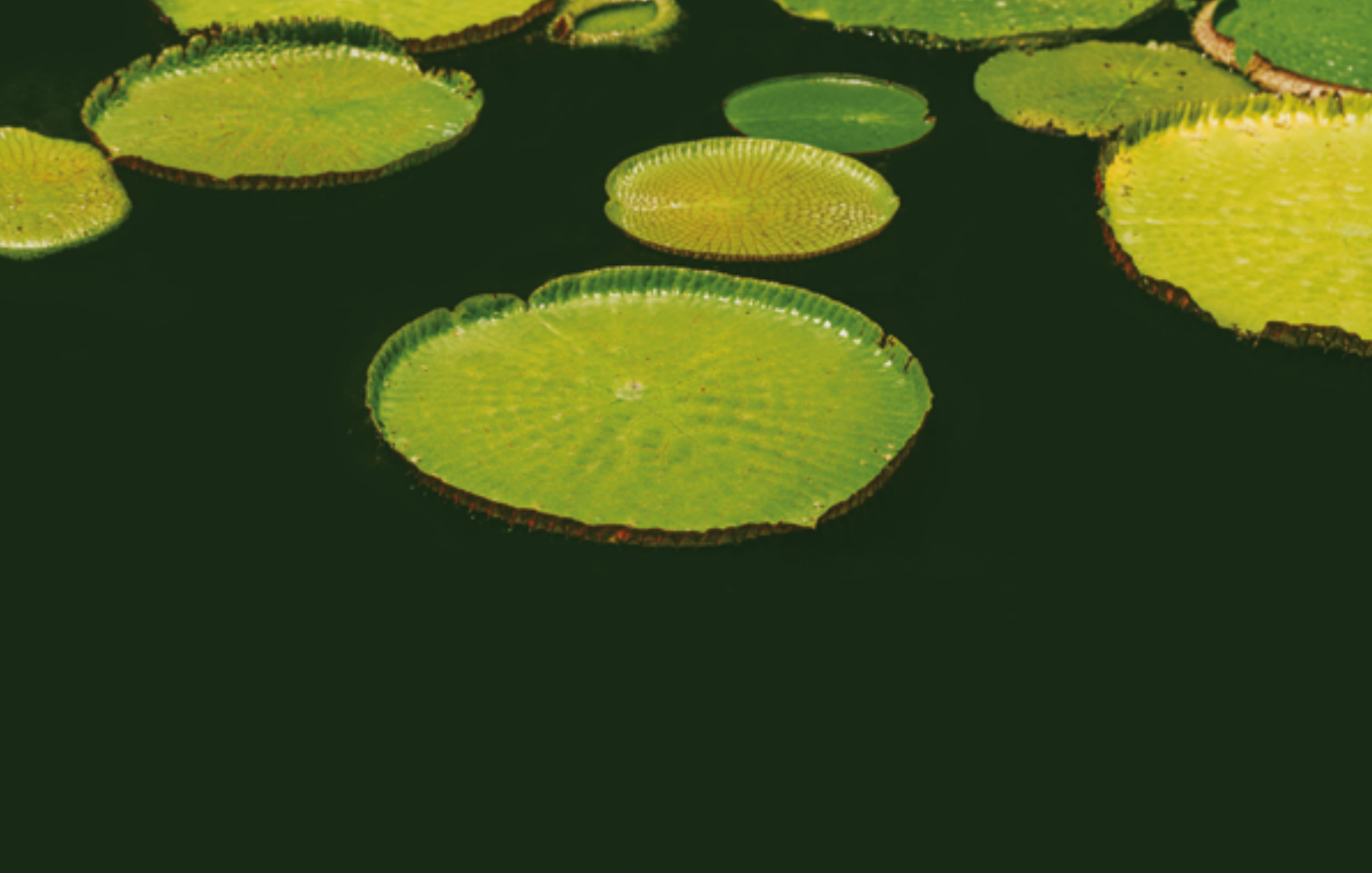
Furthermore, the MPT highlights the importance of adopting environmental education as a structuring axis in public education policies, promoting debate on climate justice, workers’ rights, responsible consumption, and the adaptation of work activities to new climate scenarios. The defense of a balanced environment - including in the workplace - represents the protection of a fundamental human right, essential to the dignity, health, and life of present and future generations.

Through these actions, the MPT strengthens a culture of risk prevention, contributes to environmental protection, and promotes a development model committed to the planet’s ecological limits and to dignified and safe working conditions, in the context of intensifying climate change.

CONCLUSION

MPT’s commitment to the prevention of work-related illnesses and accidents in the face of the impacts of climate change materializes through actions aimed at promoting the mitigation of its environmental effects, the adaptation of workplaces, the development of climate action plans with a focus on labour relations, the construction of a just and inclusive transition, and the advancement of environmental education.

In a scenario marked by uncertainty and growing risks, the MPT’s efforts seek to ensure that workers are not rendered invisible in public and private responses to the climate crisis. Building resilient, sustainable, safe, healthy and decent work environments is an inseparable part of protecting a balanced environment and promoting public health.



APPENDIX



MINISTÉRIO PÚBLICO

do Estado do Paraná

CENTRO DE APOIO OPERACIONAL DAS PROMOTORIAS DE JUSTIÇA DE PROTEÇÃO AO MEIO AMBIENTE E DE HABITAÇÃO E URBANISMO

OFÍCIO nº 359/2025 CAOPMAHU

Curitiba 28 de julho de 2025.

A Sua Excelência a Senhora
IVANA LÚCIA FRANCO CEI
Conselheira Nacional do Ministério Público
Presidente da Comissão de Meio Ambiente do Conselho Nacional do Ministério Público (CMA/CNMP)

A Sua Excelência o Senhor
LUCIANO FURTADO LOUBET
Promotor de Justiça do Ministério Público do Estado de Mato Grosso do Sul (MPMS)
Presidente da Associação Brasileira dos Membros do Ministério Público de Meio Ambiente (ABRAMPA)

Processo SEI nº 19.19.9011.0016478/2025-48

INTERESSADO: Conselho Nacional do Ministério Público, Comissão de Meio Ambiente (CMA)

ASSUNTO: Ofício Circular nº 1/2025/CMA/ABRAMPA - Participação do Ministério Público Brasileiro na Conferência das Nações Unidas sobre Mudança do Clima -COP 30

Excelentíssima Senhora Conselheira Nacional,
Excelentíssimo Senhor Presidente da ABRAMPA,

Com cordiais cumprimentos, venho por meio do presente expediente, prestar informações sobre a atuação climática do Ministério Público do Estado do Paraná, para inclusão no Portal do Ministério Público no âmbito da 30ª Conferência das Partes (COP 30). Destarte, abaixo seguem listadas as informações solicitadas pelo Ofício Circular nº 01/2025/CMA/ABRAMPA.

1. Apresentação do Ministério Público do Estado do Paraná

Em todas as comarcas do Estado do Paraná, o Ministério Público conta com pelo menos uma Promotoria de Justiça dedicada à proteção do meio ambiente. As respectivas Promotorias com atribuição em meio ambiente podem ser consultadas no link: <https://site.mppr.mp.br/Encontre-uma-Promotoria-de-Justica>.

Para além das Promotorias de Justiça, conta o MPPR com Grupos de Atuação Especializada em Meio Ambiente, Habitação e Urbanismo (GAEMAs), que atuam preventiva e repressivamente na proteção do meio ambiente, habitação e urbanismo, especialmente nos casos locais ou regionais de maior lesividade, repercussão, gravidade ou complexidade, nos termos da resolução nº 4859/2018 da Procuradoria-Geral de Justiça. Até julho de 2025 haviam sido instaurados 12 GAEMAs, quais sejam os das regiões: Curitiba; Campo Mourão, Cascavel, Foz do Iguaçu; Londrina; Maringá; Paranaguá; Pato Branco; Ponta Grossa; Santo Antônio da Platina; Umuarama; e União da Vitória.

O MPPR conta, ainda, com um órgão auxiliar da atividade funcional em matéria de meio

ambiente, o Centro de Apoio Operacional das Promotorias de Justiça de Proteção ao Meio Ambiente, Habitação e Urbanismo (CAOPMAHU).

Conforme Sistema de Estimativas de Emissões e Remoções de Gases do Efeito Estufa (SEEG) do Observatório do Clima, no Estado do Paraná, em 2023, foram emitidos 77,04 MtCO₂e. Desse total, 42,3% decorrem do setor da agropecuária, 32,6% do setor de energia, 13,4 % da mudança de uso da terra, 7,5% do setor de resíduos e 4,3% do setor de processos industriais.

O SEEG estima, ainda, que o Paraná foi responsável pela remoção de 8,55 MtCO₂e (em sua maior parte em razão de vegetação secundária), gerando uma emissão líquida de 68,49 MtCO₂e. Tal valor, ainda que pequeno se comparado ao valor emitido, ressalta a importância de atuação do Ministério Público estadual na proteção dos remanescentes de vegetação.

É importante notar que o Paraná tem cerca de 98% de seu território coberto pela Mata Atlântica e os 2% restantes pelo Cerrado. Particularidades do uso e proteção das vegetações remanescentes deste biomas são centrais na atuação ambiental do MPPR, tendo em vista o status de patrimônio nacional conferido pelo artigo 225, §2º da Constituição da República Federativa do Brasil e especial proteção garantida pela Lei Federal nº 11.428/2008 (Lei da Mata Atlântica)

Abaixo seguem colecionadas algumas das providências adotadas pelo Ministério Público do Estado do Paraná para adaptação e mitigação da crise climática já em curso.

2. Projetos e iniciativas para atuação climática adotados por unidades do MPPR

2.1 GEPClima

Em 10 de outubro de 2024 foi instituído, através da Resolução nº 8.629/2024 da Procuradoria-Geral de Justiça do MPPR (PGJ/PR), o Grupo Especial de Atuação e Prevenção em Desastres Socioambientais e Mudanças Climáticas (Gepclima). Sua finalidade é subsidiar a definição de estratégias de atuação pela PGJ/PR e viabilizar a articulação interinstitucional, além de complementar, quando necessário, a prestação de apoio técnico e jurídico aos órgãos de execução, para a efetiva proteção dos direitos relacionados a desastres socioambientais e mudanças climáticas no Estado do Paraná.

Integram o Gepclima o Procurador-Geral de Justiça, (II) o Subprocurador-Geral de Justiça para Assuntos de Planejamento Institucional e os coordenadores (III) do Centro de Apoio Técnico à Execução, (IV) de Assuntos Institucionais, (V) do Centro de Apoio Operacional das Promotorias de Justiça e Assistência Social, (VI) do Centro de Apoio Operacional das Promotorias de Justiça de Proteção à Saúde Pública, (VII) do Grupo de Atuação Especializada em Meio Ambiente, Habitação e Urbanismo – Regional Curitiba, e (VIII) do Centro de Apoio Operacional das Promotorias de Justiça de Promotorias de Justiça de Proteção ao Meio Ambiente e de Habitação e Urbanismo, sendo este último o responsável pela coordenação operacional do Gepclima.

Podem participar do grupo, ainda, Órgãos da Administração Pública Direta e Indireta e de entidades privadas, legalmente constituídas, que tenham entre suas finalidades institucionais a proteção ao meio ambiente, aos direitos sociais, à cidadania e, especialmente, entidades voltadas à prevenção e ao enfrentamento de desastres socioambientais e mudanças climáticas.

Para prevenção e enfrentamento de desastres socioambientais e mudanças climáticas, são atribuições do GEPClima, conforme artigo 3º da Resolução nº 8.629/2024:

- I - o assessoramento, apoio e cooperação à Procuradoria-Geral de Justiça, na definição de estratégia para que o Ministério Público do Paraná atue para garantir a necessária articulação entre instituições públicas, privadas, sociedade e Ministério Público, objetivando a prevenção e o enfrentamento em desastres socioambientais e mudanças climáticas;
- II - a atuação, baseada em estudos técnicos, frente às causas dos desastres climáticos de qualquer origem, sua incidência, extensão e consequências, no âmbito do Estado do Paraná, bem como afetos às medidas aplicáveis para a sua prevenção, recuperação, mitigação e adaptação;
- III - o compartilhamento dos dados e estudos com órgãos públicos e instituições privadas, a fim de subsidiar a implementação de políticas públicas de prevenção, mitigação, resposta e recuperação de áreas afetadas por desastres ambientais;
- IV - o levantamento de iniciativas exitosas e de especialistas na matéria, com o intuito de promover a troca de experiências e o desenvolvimento de ações conjuntas;
- V - a elaboração de material didático-pedagógico e informativo relacionado ao desenvolvimento da cultura de prevenção e de enfrentamento de desastres naturais decorrentes de mudanças climáticas;
- VI - o incentivo ao pleno funcionamento do Sistema Estadual de Proteção e Defesa Civil no Estado do Paraná, mediante a articulação dos órgãos estaduais e municipais, preferencialmente tendo por base os núcleos regionais do Grupo de Atuação Especializada em Meio Ambiente, Habitação e Urbanismo (GAEMA);
- VII - o estímulo à aplicação dos instrumentos e programas previstos na Lei Estadual nº 17.133/2012, que institui a Política Estadual sobre Mudanças Climáticas;
- VIII - o apoio à capacitação de membros do Ministério Público com atuação em matéria ambiental, urbanística e outras afetas aos objetivos do GEPClima, a fim de que conheçam, no âmbito de atuação de suas respectivas Promotorias de Justiça, as áreas de maior vulnerabilidade socioambiental, as causas e os riscos decorrentes dos fenômenos climáticos;
- IX - o incentivo à capacitação das entidades públicas e privadas parceiras, especialmente das defesas civis municipais;
- X - a elaboração de materiais para atuação do Ministério Público, propondo medidas resolutivas ao alcance dos objetivos do Grupo, preferencialmente por meio de atuação regionalizada;
- XI - a sugestão de medidas de desenvolvimento sustentável no âmbito do Ministério Público do Paraná, para subsidiar a Procuradoria-Geral de Justiça na elaboração de seu Plano de Ação Climática, a fim de reduzir as emissões atmosféricas danosas ao meio ambiente geradas pela própria instituição;
- XII - a provocação dos Municípios para que elaborem seus Planos de Ação Climática;
- XIII - a provocação para que o Estado do Paraná e seus Municípios favoreçam o desenvolvimento e promoção de uma cultura de prevenção de desastres e de autoproteção, pautada na informação sobre as causas de mudanças climáticas e desastres socioambientais e no reforço da percepção dos riscos desses eventos, voltando-se à população em geral e, especialmente, à população socialmente vulnerável.

2.2 Realização do Curso “Desafios do Ministério Público na Realidade de Mudanças Climáticas”

Durante os meses de outubro e novembro de 2024, o MPPR, através de sua Escola Superior e do CAOPMAHU, promoveu o curso on-line “Desafios do Ministério Público na Realidade de Mudanças Climáticas”.

O objetivo principal do curso foi de apoiar a atuação ministerial preventiva e responsiva diante dos desastres climáticos. Ao longo dos 5 (cinco) encontros foram discutidos temas como mudanças climáticas e seus impactos no Brasil, os instrumentos jurídicos nacionais e internacionais sobre a qualidade climática, a atuação do MP no fomento a políticas públicas e a atuação do Poder Público diante desastres socioambientais:

Data	Encontro	Expositores
Módulo 1 – Compreendendo o fenômeno e os impactos das mudanças climáticas no Brasil		

01/10	Mudanças climáticas em linhas gerais: compreensão, causas, emissões de gases do efeito estufa por setor, desmatamento e a atuação do Ministério Público	Bárbara Zimbres Francisco de Assis Mendonça Mariana Schuchovski
17/10	Água e desastres Climáticos: entre as estiagens e as inundações, a importância da gestão dos recursos hídricos	Ana Paula Cunha Belinda Pereira da Cunha
Módulo 2 – Atuação preventiva e responsiva diante de desastres climáticos		
31/10	Direito Constitucional Climático: dos deveres estatais de proteção climática ao direito fundamental ao clima	Tiago Fensterseifer
13/11	Desastres Socioambientais e Mudanças Climáticas: Manual Prático para atuação do Ministério Público.	Giovani Ferri
28/11	A importância da cooperação interinstitucional diante dos desafios das mudanças climáticas.	Alexandre Saltz Mariana Schuchovski

Destaca-se que o curso foi concebido na intenção de dialogar com o Projeto Nacional desenvolvido pela Comissão de Meio Ambiente do Conselho Nacional do Ministério Público (CNMP) para enfrentamento dos desastres socioambientais decorrentes das crises climáticas.

Todos os encontros estão disponíveis no canal do YouTube da Escola Superior do MPPR. O

Link para acesso é: [https://www.youtube.com/watch?](https://www.youtube.com/watch?v=71UsozB4oQ4&list=PLpRXIsTZQGoz6sX4IsggwnJkCYzkgCIMS)

[v=71UsozB4oQ4&list=PLpRXIsTZQGoz6sX4IsggwnJkCYzkgCIMS](https://www.youtube.com/watch?v=71UsozB4oQ4&list=PLpRXIsTZQGoz6sX4IsggwnJkCYzkgCIMS).

2.3 Operação Mata Atlântica em Pé - Inclusão da dimensão climática de forma explícita como fundamento

O projeto “Mata Atlântica em Pé” possui como objetivo central a conservação e recuperação do bioma Mata Atlântica por meio da realização de Operação no formato de força-tarefa e priorização do enfrentamento dos desmatamentos não autorizados (clandestinos) da vegetação remanescente desse bioma.

O projeto se desenvolve também a nível nacional, a partir da articulação e correalização dos 17 (dezoito) Ministérios Públicos Estaduais sob a abrangência do bioma Mata Atlântica (Alagoas, Bahia, Ceará, Espírito Santo, Goiás, Mato Grosso do Sul, Minas Gerais, Paraná, Paraíba, Pernambuco, Piauí, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Santa Catarina, São Paulo e Sergipe), em parceria com a SOS Mata Atlântica, sistema Mapbiomas, ABRAMPA, e com os Órgãos Públicos Ambientais, incluindo-se Polícias Ambientais e Florestais. Desde sua criação, e até 2023, o MPPR atuou como coordenador-geral nacional da Operação.

Para identificação de desmatamentos ilegais, a operação utiliza sistemas de monitoramento remoto fornecidos pela Plataforma MapBiomas. Frente a constatação equipes de fiscalização visitam as propriedades e, confirmado ilícitos ambientais, tratativas são empreendidas para sua responsabilização nas esferas administrativa, cível e criminal, buscando, assim a cessação dos ilícitos e reparação integral dos danos ambientais.

O Centro de Apoio das Promotorias de Proteção ao Meio Ambiente, Habitação e Urbanismo (CAOPMAHU) elaborou modelo de Inicial de Ação Civil Pública, Termo de Acordo Judicial, Termo de Ajustamento de Conduta, Denúncia e de Acordo de Não Persecução Penal para instrumentalização das tratativas pelas Promotorias de Justiça com atribuição em meio ambiente.

No modelo mais recente de ACP consta nos fundamentos tópico específico em que se explora os danos climáticos oriundos do desmatamento do Bioma Mata Atlântica. Pontuado, em síntese, que é o desmatamento de vegetação nativa e as mudanças de uso do solo a maior fonte GEE e que, neste contexto, a supressão ilegal dos

remanescentes de Mata Atlântica representa, também, violação do sistema climático, bem jurídico objeto de proteção normativa no Brasil pelo Acordo de Paris, internalizado pelo Decreto Federal nº 9.073/2017, bem como reconhecido pelo STF (ADPF 708). Ademais, também se fomenta a utilização pelas Promotorias de Justiça da calculadora do componente climático dos danos ambientais de desmatamento ilegal elaborada pela ABRAMPA.

2.4 Plano Setorial de Ação do GAEMA Pato Branco – diagnóstico e fomento da elaboração de Planos Municipais de Ação e Adaptação Climática.

Em fevereiro de 2025 o Grupo de Atuação Especializada em Meio Ambiente, Habitação e Urbanismo (GAEMA) – Regional Pato Branco instaurou Plano Setorial de Ação (Procedimento Administrativo nº MPPR-0105.25.000143-2) com o objetivo de diagnosticar e fomentar a elaboração dos Planos Municipais de Ação e Adaptação Climática pelos Municípios integrantes do respectivo Grupo de Atuação Especializada.

Normativamente, tais tratativas são justificadas pois a Política Nacional sobre Mudança do Clima - PNMC, instituída pela Lei Federal nº 12.187/2009 apresenta como uma de suas diretrizes o estímulo e apoio a participação dos governos federal, estadual, distrital e municipal, assim como do setor produtivo, do meio acadêmico e da sociedade civil organizada, no desenvolvimento e na execução de políticas, planos, programas e ações relacionados à mudança do clima. Ademais, a Lei Federal nº 14.904/2024, estabeleceu diretrizes para a elaboração de planos de adaptação à mudança do clima, com o objetivo de implementar medidas para reduzir a vulnerabilidade e a exposição a riscos dos sistemas ambiental, social, econômico e de infraestrutura diante dos efeitos adversos atuais e esperados da mudança do clima. Em sentido complementar, a Resolução nº. 3, de 3 de julho de 2024 da Presidência da República, estabeleceu o Compromisso para o Federalismo Climático, prevendo que os entes federativos desenvolverão planos, instrumentos e metas climáticas, a serem adotados de maneira continuada, progressiva, coordenada e participativa com todos os atores relevantes, assim como que as políticas públicas deverão considerar a mitigação das emissões dos gases de efeito estufa e à mudança do clima.

Procedimentalmente, o GAEMA oficiou os Promotores de Justiça com atribuição em matéria de meio ambiente das 16 comarcas que integram a área de atuação do GAEMA, consultando-os quanto interesse de participarem do programa. Após a manifestação de aderência das Promotorias de Justiça, os respectivos Municípios serão requisitados para informarem se possuem Plano Municipal de Ação e Adaptação às Mudanças Climáticas e, em caso de negativa, serão empreendidas tratativas para que sejam concebidos.

2.5 Ofício Circular nº 01/2024 - CAOP(s)MAHU/DH/PPOT/SAU/AS

Em janeiro de 2024 os Centro de Apoio Operacional das Promotorias de Justiça de Proteção ao Meio Ambiente e de Habitação e Urbanismo (CAOPMAHU), de Proteção aos Direitos Humanos (CAOPJDH), de Proteção ao Patrimônio Público e à Ordem Tributária (CAOPPOT), de Proteção à Saúde Pública (CAOPSAU) e de Assistência Social (CAOPAS) expediram o Ofício Circular Conjunto nº 01/2024.

Sua finalidade era de lançar iniciativa conjunta de fomento à conduta proativa, efetiva e integrada, no âmbito das Promotorias de Justiça do Ministério Público do Estado do Paraná, para o enfrentamento aos desastres acentuados pela crise climática, mediante a difusão de informações e primeiras orientações a respeito das atribuições institucionais pertinentes ao tema. Dentre outros documentos, o ofício circular encaminha o “Manual de Litigância Climática – Estratégias de defesa do clima estável para o Ministério Público” elaborado pela ABRAMPA em 2022.

3. Ações e medidas extrajudiciais referente ao tema

3.1 Recomendação Administrativa nº 03/2021

Em maio de 2021, foi recomendado pelo Grupo de Atuação Especializada em Meio Ambiente, Habitação e Urbanismo (GAEMA) – Regional Curitiba ao Diretor Presidente do Instituto Água e Terra – IAT a adoção de providências, sobretudo para edição de ato normativo próprio, no sentido de passar a exigir, para o licenciamento ambiental de empreendimentos e atividades consideradas efetiva ou potencialmente causadoras de significativa degradação do meio ambiente, que os estudos de EIA/RIMA incluam um diagnóstico climático. Foi também recomendado que tais estudos devem permitir identificar e mensurar os impactos que a implementação, operação e desativação de tais empreendimentos podem trazer ao clima, seja em razão da emissão de GEE, seja em razão do seu impacto nos serviços ecossistêmicos locais importantes para a regulação climática, de modo a também assegurar a adequada análise de alternativas locais e tecnológicas em uma fase de eventual aprovação do empreendimento, e a implementação de medidas de mitigação e compensação nas fases de instalação, operação e desativação.

O Instituto Água e Terra acatou a recomendação e, em fevereiro de 2022, editou a Portaria IAT nº 42/2022, em que, nos termos de sua ementa, inclui o diagnóstico climático em Estudos de Impacto Ambiental - EIA, no âmbito do licenciamento ambiental, em consonância com a Política Estadual sobre Mudança do Clima.

3.2 Ação Civil Pública nº 5023277-59.2020.4.04.7000

Proposta em conjunto pelo MPPR e o MPF, em face do IAT e do Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renováveis – IBAMA em que se sustenta a necessidade de aplicação da Lei da Mata Atlântica, em detrimento do Código Florestal, em razão da especialidade e maior proteção ao bioma proporcionado pela norma.

A ACP apresenta como um de seus fundamentos que a destruição da Mata Atlântica tem profunda relação com a intensificação das mudanças climáticas, isto pois segundo o Sistema de Estimativa de Emissões de Gases (“SEEG”) do Observatório do Clima, a maior fonte de gases do efeito estufa decorre do desmatamento e das mudanças de uso de solo e que a Lei Federal nº 12.187/2009, que instituiu a Política Nacional sobre Mudança do Clima (PNMC), prevê, dentre outras disposições, à redução das emissões antrópicas de gases de efeito estufa em relação às suas diferentes fontes. (artigo 4º, inciso II).

Em sentença proferida em 2024, condenado o IAT e IBAMA (I) a se absterem de cancelarem os autos de infração ambiental, termos de embargos e interdição e termos de apreensão lavrados no Estado do Paraná contanto que se cuide da imputação de tais condutas ou constatação da sua ocorrência no âmbito do bioma da Mata Atlântica; (II) se abster da homologação de pedidos de inscrição em cadastros ambientais rurais que tenham como pretensão a consolidação de ocupação de áreas de preservação permanente e de reserva legal em imóveis abrangidos pelo bioma Mata Atlântica e que tiveram as suas vegetações remanescentes suprimidas a partir de 26 de setembro de 1990, sem que tenha havido celebração de Termo de Compromisso para a recuperação integral dessas áreas. (III) a deixar de deferir licenças ambientais em favor de obras, atividades ou empreendimentos em Áreas de Preservação Permanente situadas no bioma Mata Atlântica - vale dizer: a empreendimentos que apenas poderiam ser reputados regulares, na hipótese de serem aplicados os arts. 61-A e 61-B Código Florestal nesse âmbito.

A Ação consta na Plataforma de Litigância Climática no Brasil, do Grupo de Pesquisa Direito, Ambiente e Justiça no Antropoceno (JUMA), da PUC Rio, onde podem ser consultadas informações centrais da ação e decisões dele decorrentes.

Sendo o que há para informar no momento, registro protestos da mais alta estima e consideração.

Daniel Pedro Lourenço
Promotor de Justiça

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