

WOMEN AND THE CLIMATE DEBATE

The role of female representatives
from the Brazilian justice system



Cataloging in Publication
Brazilian Biodiversity Fund – FUNBIO

Women and the climate debate: the role of female representatives from
the Brazilian justice system / Coordinated by Andréia Martins,
Herena Neves Maués Corrêa de Melo. _ Rio de Janeiro : FUNBIO, 2025.

240p. : il. ; 15,5x22,6 cm _ (Climate Dialogues ; 6)

ISBN (Impresso): 978-85-89368-57-5

ISBN (PDF): 978-85-89368-59-9

1. Mudanças Climáticas. 2. Meio ambiente. 3. Mulheres. I. Martins, Andréia.
II. Melo, Herena. III. Coleção.

CDD 333.72

IMPLEMENTED BY

Community, Protected Areas, and Indigenous Peoples Project in the Brazilian Amazon and Cerrado Savannah Program (COPAIBAS) Brazilian Biodiversity Fund (FUNBIO)

FUNDED BY:

Norwegian International Climate and Forest Initiative – NICFI
Norwegian Ministry of Foreign Affairs

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ACKNOWLEDGMENTS

We are grateful to all the people and institutions who contributed to shaping the ideas, recommendations, and solutions outlined in this book.

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Voices of Women for Justice and Sustainability

This book emerges from the convergence of knowledge, territories, and courage. It is the outcome of a collective endeavor that recognizes the transformative power of women in confronting climate change, protecting Brazil's biomes, and building a justice system that is more sensitive, democratic, and plural.

More than a compilation of articles, this work stands as both testimony and a call to action. A testimony to the active presence of women in spaces historically denied to them. A call to listen and to act in the face of a climate crisis that is anything but neutral, one whose impacts fall disproportionately on women.

Climate Dialogues stems from the conviction that, to confront the socio-environmental and political challenges faced in different parts of the world, it is essential to rethink the very logic that created them. It is necessary to pluralize power, question dominant paradigms, and recognize that knowledge takes many forms: it is found in laws, territories, research, and in the lived experiences of women who, through their reflections and practices, chart new paths forward.

Organized by women and written by women working within Brazil's justice system, this book offers a perspective that goes beyond legal technique. Here, the Cerrado and the Caatinga converge with the Amazon and urban centers; the world of labor intersects with the challenges of climate governance; and the strength of the law meets the power of traditional knowledge. All of this is mediated through attentive listening, sensitivity, and the incisive political critique that the authors imprint on every page.

The voices of prosecutors, public defenders, attorneys, professors, and analysts brought together in these pages illuminate and reflect on pressing issues such as climate justice, environmental racism, gender-differentiated impacts, the right to decent work, REDD+, public policy, deforestation, biome degradation, social participation, and more. Their perspectives bridge practice and theory, institutional routines and the lived realities of the territories where these struggles unfold.

It is crucial to acknowledge that climate change does not affect everyone equally. Women, especially Indigenous, Black, quilombola, extractivist, and river-side women, stand at the forefront of environmental defense, not only as defenders but as **protagonists** of solutions. This work amplifies their voices within the justice system, creating a powerful space for exchange rooted in deep listening, critical reflection, and shared learning.

By naming absences, addressing invisibilities, and consolidating a living memory built with eyes set on the future, this book embodies a vision for both the present and what lies ahead. A future where climate transition is just, inclusive, and plural.

May this reading spark more dialogue, deeper listening, and meaningful encounters. Because climate justice must walk alongside **gender, racial, and so-**

cial justice. And this journey, though full of challenges, gains strength when taken together, with respect, care, and mutual admiration.

ROSA LEMOS DE SÁ
FUNBIO's Secretary General

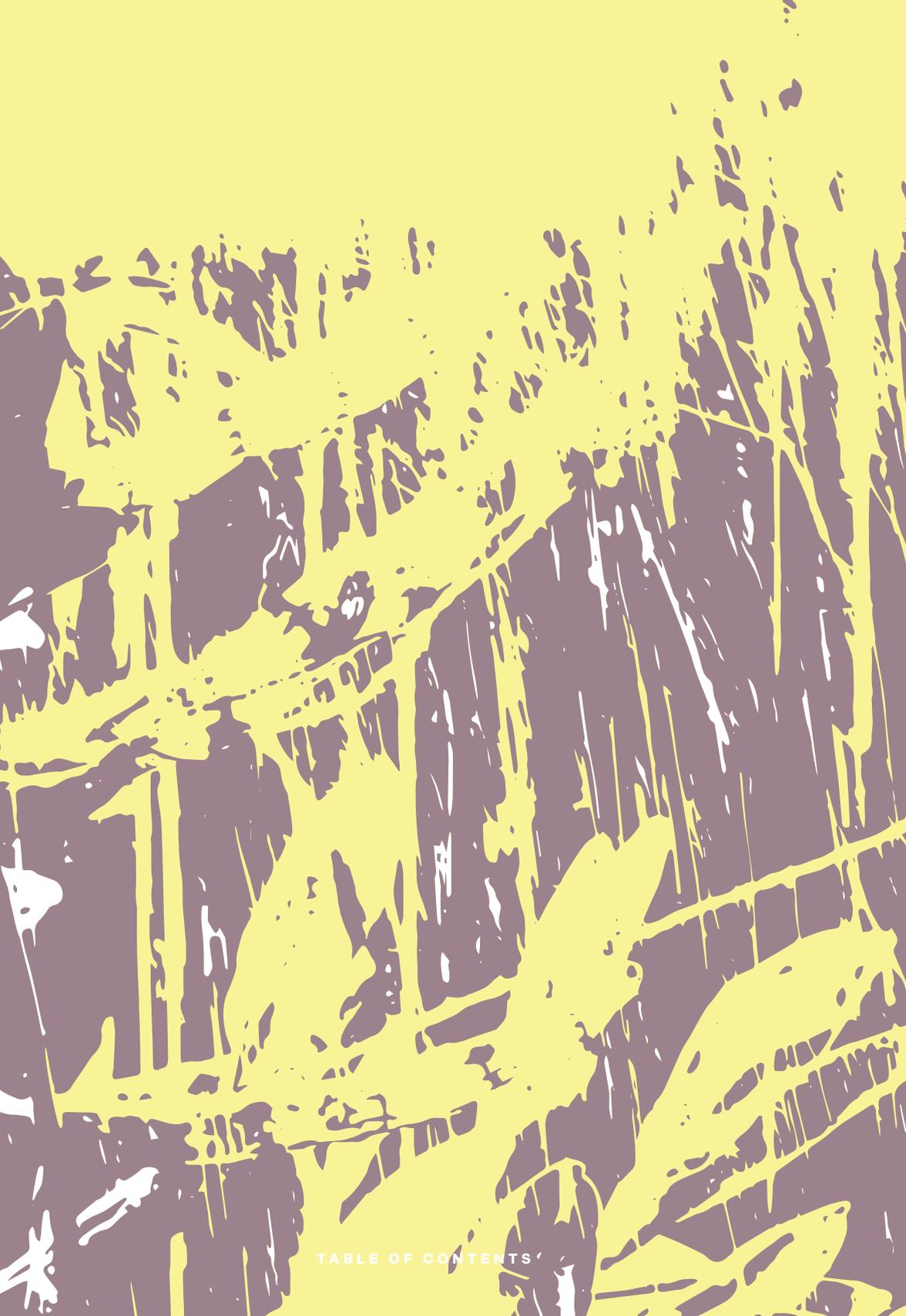


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Climate Dialogues

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A gathering of voices for a new future, this initiative is a call to action to create networks and build shared solutions. It is grounded in the understanding that while we are powerful individually, together we have far greater capacity to drive transformative change. Achieving this requires innovation and a shift away from traditional forms of communication, decentralizing knowledge and opening space for new ways of seeing and understanding reality.

At a moment when innovation is essential, Climate Dialogues emerges as an initiative designed to engage professionals from across the Brazilian justice system in discussions on climate change and efforts to combat deforestation in the Amazon and Cerrado. It goes beyond participants' usual areas of expertise, inviting them to broaden their perspectives on what can be achieved collectively when addressing highly complex challenges.

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

In 2020, a pandemic year marked by profound global challenges, FUNBIO entered into a partnership with the Ministry of Foreign Affairs of Norway to implement the Community, Protected Areas, and Indigenous Peoples Project in the Brazilian Amazon and Cerrado Savannah Program, also known as COPAÍBAS.² The program aims to curb deforestation and reduce associated greenhouse gas emissions through strategies that support the conservation of forests and native vegetation in the Amazon and Cerrado biomes.

Structured around four interconnected pillars, COPAÍBAS is a strategic initiative dedicated to environmental protection and the strengthening of sociobiodiversity. Its approach brings together complementary actions to foster climate change adaptation and recognize the value of traditional knowledge. The first pillar focuses on strengthening protected areas in the Cerrado, acknowledging their critical role in biodiversity conservation and climate regulation. In parallel, the program works to reinforce environmental and territorial governance among Indigenous peoples, safeguarding their rights and expanding their autonomy over traditional territories.

Another pillar is dedicated to disseminating knowledge on climate risks and promoting tools that support the fight against deforestation and encourage sustainable practices. These efforts are complemented by investments in improving the economic efficiency of value chains and local production systems, promoting the sustainable

1 For more information on FUNBIO – Fundo Brasileiro para a Biodiversidade, access: funbio.org.br.

2 For more information on the COPAÍBAS program, access: copaibas.org.br.

use of natural resources and enhancing the value of sociobiodiversity products as both a source of income and a pathway for environmental preservation.

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

Within this framework lies Climate Dialogues, part of the program's third pillar, which focuses on disseminating information on climate risks and promoting tools to support the fight against deforestation. One of its central objectives is to bring the issue of climate change closer to the daily work of professionals engaged in upholding the legality of public policies, defending human rights, and ensuring a healthy and balanced environment. Financing strategies serve as an essential line of support for innovation in this process. Through dedicated spaces for dialogue, knowledge exchange, and collective idea-building, the initiative seeks to foster practical solutions and actionable guidance on how legal obligations and emerging opportunities can be more effectively and efficiently implemented to address climate change.

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

Designed to unfold in multiple phases and engage a wide range of stakeholders, the initiative identifies opportunities for partnerships and connections to amplify local challenges and generate multiple pathways toward solutions.

In this context, gender discussions play a crucial role. They move beyond metrics or participation counts that can lead to superficial narratives of inclusion, focusing instead on elevating the active and empowered voices of women who approach climate challenges through a lens of socio-environmental and interpersonal justice.

Recognizing that climate change affects everyone, but that women and girls face unique and disproportionate impacts, especially in contexts marked by inequality, means expanding what is visible and building a future where these differences are acknowledged and addressed through public policies, private initiatives, and social relations.

This is why acknowledging the role of women within institutions such as the Brazilian justice system goes far beyond gender discourse. It is about giving visibility to the ideas and voices of women who engage with global, regional, and local challenges in all their intersecting dimensions.

In this context, it is important to understand that the Brazilian justice system is made up of multiple public legal careers, each with specific responsibilities. One example is the Public Prosecutor's Office (*Ministério Público*³, in Portuguese),

3 In Brazil, this institution has two branches: the *Ministério Público Estadual* (State Public Prosecutor's Office – MPE) and the *Ministério Público Federal* (Federal Public Prosecutor's Office – MPF). Both are responsible for ensuring compliance with the law, but they operate in different spheres. The MPE works at the state and municipal levels, while the MPF addresses issues of national relevance. Each state has a regional office of the MPF, which tailors its actions to local realities while always considering the national implications of public and private activities. Its role is to ensure that government authorities uphold the law and that private actors do not violate existing legal frameworks.

an independent institution whose main role is to uphold the rule of law and protect fundamental rights. Another important component is the network of State Attorney General's Offices, linked to the Executive branch at the state level (at the federal level, the Office of the Attorney General of the Union, and at the municipal level, Municipal Attorneys). These professionals act as the legal representatives of government entities, handling judicial and extrajudicial matters and providing legal advice to ensure the legality of administrative actions and legal certainty in the formulation of public policies. Also noteworthy are the Public Defender's Offices, composed of public defenders who provide free legal assistance to individuals who cannot afford legal services. They play a critical role in ensuring access to justice and defending the rights and interests of vulnerable populations across multiple areas.

It is within this evolving landscape of rights that the role of women stands out, professionals who, in large part, have accessed their positions through competitive public examinations. This is a relatively recent achievement, which only began to take shape in 1962, when the Statute of Married Women legitimized women's participation in the workforce and, consequently, their access to public positions and civil service exams. This shift significantly transformed the composition of the justice system and gained further visibility with Resolution N^o 255 of the National Council of Justice, dated September 4, 2018. This resolution established the National Policy to Promote Institutional Participation of Women in the Judiciary and expanded the traditional definition of "women," recognizing cisgender women, transgender women, and non-binary identities within its scope.

Yet women's contribution is not measured by numbers alone, but by the substance of their work and impact on society. To honor and amplify these voices, a dedicated space was created to highlight their perspectives through the publication of a book featuring the vision and positioning of representatives from public legal careers with mandates to address climate change.

This conceptual publication aims to increase transparency around ongoing initiatives, while also documenting legal and institutional perspectives on innovation. It seeks to highlight both challenges and opportunities, broaden the dissemination of ideas, and deepen collective reflection on these issues.

A book written by women, coordinated by women, and produced predominantly by women suppliers.

A partnership is born

Women's participation in spaces of power, particularly in decision-making related to climate and human dignity, energy transition, and sustainability, remains minimal when compared to their actual presence in Brazilian society, as women make up 52.47% of the national electorate. The partnership established for the development of this book reflects the need to elevate perspectives shaped by women, for women, and for all those affected by climate change and climate injustice. It underscores the growing role of women in shaping and implementing public policies that support a more democratic and just society.

The connection between women and climate decision-making is essential to advancing the democracy we aspire to build. It is crucial to recognize the dispro-

portionate impacts of the climate crisis on women, which makes incorporating a gender perspective into environmental policies not just relevant but necessary.

Despite their heightened vulnerability, women have increasingly emerged as key agents of transformation and leadership in the fight for sustainability. Indigenous, rural, extractivist, and quilombola women are on the frontlines of defending biomes and biodiversity, applying and transmitting their traditional knowledge and practices.

At the same time, women activists and political leaders are gaining more space and visibility in global debates and conferences, including the annual meetings of the Conference of the Parties (COP).

This publication was therefore written by women and developed with the co-organization of prosecutor Herena Melo, who works in the Amazon and holds a PhD in Sustainable Development. She supported the selection of authors based on the significance of their roles in public institutions and their engagement with environmental issues. Although women have achieved greater participation in scientific production, their representation in collections and publications remains significantly lower than that of men.

Initiatives such as the COPAÍBAS Program help strengthen women's leadership. Beyond consolidating a collection of articles written by women, this work intentionally values the stories and professional trajectories of each of the invited authors: public prosecutors, federal public defenders, professors, and state attorneys. Equally intentionally, the Brazilian states where these authors work are directly connected to the themes addressed throughout this publication.

Thus, when partnerships like this one are woven around care and protection through a women's perspective, they directly shape cultural memory, helping to cultivate a more inclusive and comprehensive historiography of decision-making and science.

Articles and text organization

This book brings together diverse perspectives that enrich its content, featuring contributions from representatives of the Public Prosecutor's Office, Public Defender's Office, State Attorney's Offices, and universities, from various states across Brazil's North, Northeast, and Central-West regions. The women who contributed to this publication offer distinct yet strongly interconnected viewpoints on issues addressed at national, regional, and local levels. For this reason, the book is structured in three parts.

The first section, **Women, Gender, and Climate Justice**, features contributions from Tarcila Santos Britto Gomes, Fernanda Jorge Sequeira, Cirlene Luiza Zimmermann, Elisângela Machado Côrtes, and Carolina Soares Castelliano Lucena de Castro. Through conceptual reflections and nationally relevant strategies, the authors examine the role of women and the concept of climate justice, drawing from cultural, social, and labor perspectives.

Tarcila, a public prosecutor from Goiás and member of the National Council of the Public Prosecutor's Office, explores the interdependence between nature, social development, and the economy, an interconnection that compels society to take concrete action against climate change. This challenge extends beyond the

environmental sphere to social and political dimensions, demanding integrated and inclusive responses that recognize women as key agents of change. She emphasizes that women play an essential role in this process, given their daily relationship with natural resources, shaped by historically defined social roles that provide them with a unique perspective on environmental management. This lived experience positions women as central actors in the development of sustainable policies, a role acknowledged by multiple international frameworks that highlight gender equality as a cornerstone of effective environmental policy. The author also underscores the need to account for the different degrees of impact depending on the social groups to which women belong. In the Amazon and Cerrado, for example, many women act as territorial guardians, leading monitoring activities, denouncing environmental crimes, and driving conservation initiatives. Their participation brings valuable diversity to environmental decision-making, strengthens democracy, and contributes to more lasting and effective policies. Recognizing women's leadership, therefore, means understanding that they are essential actors in confronting environmental challenges and advancing climate and social justice.

Fernanda Jorge Sequeira, a State Attorney from Pará, follows with an article that closely dialogues with the previous text, examining the climate emergency as a complex and unequal crisis shaped by gender, race, class, and territory. Within this framework, she underscores that women endure the most severe impacts of climate change despite contributing the least to its causes. This inequality is rooted in social structures that associate femininity with nature, reinforcing patterns of exploitation and marginalization. Moving beyond a broad analysis, she highlights that women are disproportionately affected by water and food insecurity, the spread of disease, and increased gender-based violence. They also face systemic barriers to accessing health care, education, and economic opportunities. These vulnerabilities are not biological; they stem from a complex web of gender roles, social norms, and structural inequalities that limit women's adaptive capacity and resilience. Sequeira adopts a biocultural lens to critique concepts such as the "feminization of poverty" and the persistent underrepresentation of women in environmental policymaking. This underrepresentation leads to policies that overlook their specific needs and perpetuate inequality. She also addresses environmental racism, which intensifies the vulnerability of racialized women who are often displaced to high-risk areas and exposed to abuse in temporary shelters. She argues that including women in climate debates is essential to achieving climate justice and building policies that are sensitive to diverse realities, overcoming "gender-blind" models that ignore power dynamics and structural barriers.

The third article, by Cirlene Luiza Zimmermann, a prosecutor with the Labor Prosecutor's Office, builds on these reflections by examining the impacts of climate change on human rights and labor conditions. From the perspective of workers increasingly exposed to health, safety, and dignity risks, she argues that the right to safe and healthy working conditions is a critical tool for climate action. It requires immediate adaptation measures and mitigation policies that promote a just transition. Because climate impacts are deeply unequal, they fall most heavily on vulnerable populations in precarious and hazardous jobs. This reality makes clear the need to strengthen the concept of socio-labor-environmental jus-

tice, a framework that integrates environmental, social, and labor protections, recognizing that there can be no climate sustainability without decent work. Zimmermann structures her analysis around three core areas: the impacts of climate change on the right to safe and healthy work; the disproportionate effects on vulnerable groups such as women, children, Black communities, and traditional peoples, and their connection to practices like child and forced labor; and the urgency of implementing mitigation measures and advancing a just transition, with special attention to often-invisible workers such as waste pickers and extractivist communities. She argues that climate mitigation is not merely a technical matter but a social project that requires transforming production chains and protecting workers. In this context, the involvement of institutions such as the Labor Prosecutor's Office is crucial to ensure that the ecological transition is also a just one. Socio-labor-environmental justice emerges as a vital normative framework for building a sustainable, inclusive, and dignified future.

The first chapter concludes with an article by federal public defenders Elisângela Machado Côrtes and Carolina Soares Castelliano Lucena de Castro, who examine Normative Ruling Nº 112/2021 issued by the National Institute for Colonization and Agrarian Reform (INCRA). This regulation governs the authorization of mining, energy, and infrastructure projects in agrarian reform settlement areas. The authors argue that the ruling undermines the right of settled communities to participate in decision-making by reducing it to merely informational procedures, in violation of the 1988 Federal Constitution and International Labour Organization Convention Nº 169. Drawing on Nancy Fraser's three-dimensional theory of justice and a climate justice perspective, the article shows how these communities face multiple, intersecting layers of injustice, deepened by the climate crisis and the unequal impacts of such projects on their territories. It also incorporates insights from decolonial theory, emphasizing how the regulation reproduces colonial logics of territorial occupation, silences local voices, and delegitimizes non-hegemonic forms of knowledge. The authors conclude that INCRA must refrain from granting new authorizations or approvals without ensuring social participation and the free, prior, and informed consultation of affected communities.

The second part of the book, **Biomes and Ways of Resisting Deforestation**, brings together contributions by Daniela Haun de Araújo Serafim, Aldeleine Melhor Barbosa, and Carla Zoaid Alves dos Santos. The authors examine the Cerrado and Caatinga biomes, offering concrete examples drawn from the states of Goiás and Sergipe.

The section opens with an article by Daniela Haun de Araújo Serafim, a state prosecutor with the Public Prosecutor's Office of Goiás, who examines the Cerrado, the second-largest vegetation formation in Brazil and the most biodiverse savanna in the world. Despite its ecological significance, the Cerrado has long been treated as a secondary priority in both legal and institutional protection. Focusing on Goiás, the author outlines structural challenges such as the perception of the biome as an agricultural frontier and the lack of integrated planning between urban and environmental policies. This disconnect has led to the suppression of native vegetation, excessive soil impermeabilization, and overburdened water and sanitation infrastructure, which increase the risks of flooding, erosion, and urban heat islands. Through a critical lens on land use, she issues a call to action struc-

tured around three pillars: legislative harmonization, ensuring that state laws do not roll back federal environmental protections, particularly the Forest Code; institutional strengthening of environmental agencies, guaranteeing adequate technical, human, and financial resources to respond to complex socio-environmental challenges; recognition of the Cerrado as a priority in national and international agendas, securing visibility and funding proportional to its ecological and climatic importance. She argues that this strategy can be advanced through the coordinated and assertive action of the Public Prosecutor's Office, which plays a critical role in defending the Constitution and fundamental rights. Such an approach helps ensure that environmental policy is not reduced to political cycles but consolidated as a long-term State commitment. The text also highlights the role of the Brazilian Association of Environmental Public Prosecutors (ABRAMPA), which strengthens this work by fostering cross-sector coordination and harmonizing legal interpretations. In the case of the Cerrado, this capacity for mediation is essential to confronting climate challenges and building multisectoral solutions. Finally, the author calls for overcoming the false dichotomy between economic development and environmental protection, advocating for a sustainability model that integrates production and conservation.

The second article in this chapter, which concludes the section on biomes, is authored by Prosecutor of Justice of the Public Prosecutor's Office of Sergipe, Aldeleine Melhor Barbosa, and environmental analyst of the Special Group for the Defense of the Environment, Housing, Urbanism, and Historical, Cultural, and Artistic Heritage (GAEMA), Carla Zoaid Alves dos Santos. The authors call for a renewed appreciation of the Caatinga, an exclusively Brazilian biome often reduced to images of drought and poverty. Far from being a desert, they argue, the Caatinga is a seasonally dry savanna, rich in biodiversity and of great ecological and socio-economic importance. However, accelerated degradation driven by unsustainable development models threatens not only its ecosystems but also the livelihoods of the communities that depend on them. Protecting the Caatinga, they contend, is therefore essential for tackling the climate crisis and advancing sustainable development. Achieving this requires moving beyond reductionist perceptions of the biome and strengthening enforcement, particularly against illegal deforestation. The Public Prosecutor's Office is identified as a key actor in this effort, with the ability to promote judicial and extrajudicial actions, demand reparations, and foster public policies focused on conservation and sustainable use. Priority measures include improving the regulation of Vegetation Suppression Authorizations (ASV), which require stronger oversight and transparency; creating new protected areas – since less than 10% of the Caatinga is currently protected; and supporting initiatives like the Integrated Preventive Inspection (FPI) of the São Francisco River, which demonstrate the power of coordinated action across multiple agencies. According to the authors, strengthening environmental governance at the state and municipal levels is fundamental to ensuring climate justice and preventing the impacts of the climate crisis from falling disproportionately on the most vulnerable. Protecting the Caatinga, therefore, stands as a powerful example of how sustainable solutions can be built with and for the communities that depend on this biome.

The third part of the book, **Regional challenges, global impacts**, explores how local issues translate into everyday realities. With contributions from Lu-

ciana Espinheira da Costa Khoury, Edvalda Pereira Torres Lins Aroucha, Ângela Patrícia Deiró Damasceno, Âurea Emília Bezerra Madruga, and Herena Neves Maués Corrêa de Melo, it addresses topics ranging from fire and open-air dumps to the carbon market.

This chapter presents specific case studies that examine the implications of state-level policies, or the lack thereof. The third part of the book opens with an article by Prosecutor of Justice of Bahia, Luciana Espinheira da Costa Khoury, PhD in Agroecology and Territorial Development, Edvalda Pereira Torres Lins Aroucha, and PhD in Sociology, Ângela Patrícia Deiró Damasceno. Their contribution focuses on the struggle to defend the São Francisco River Basin through the Integrated Preventive Inspection (FPI) program. This program brings together a wide range of public and private partners to curb the drivers of environmental degradation that affect the basin and compromise both the quantity and quality of its waters. Created by the Public Prosecutor's Office of the State of Bahia (MPBA) and the Regional Council of Engineering and Agronomy of Bahia (CREA-BA), the program takes a targeted approach to the semi-arid and arid regions, which are increasingly impacted by climate emergencies and the overexploitation of the São Francisco River by agribusiness. The article examines critical impacts such as the loss of springs, deforestation of groundwater recharge zones, widespread contamination resulting from intensive pesticide use, the ongoing invisibility and lack of legal recognition of the territories of traditional peoples and communities, and the progressive advance of desertification. These dynamics intensify precarious working conditions and food insecurity, particularly for women. The authors stress the importance of policies, programs, and projects to mitigate these harmful effects, ensuring that women and girls have real opportunities for a dignified life beyond mere subsistence. Their analysis underscores the need to approach these issues through the lens of socioenvironmental and climate justice.

The following article, authored by Prosecutor of Justice of the State of Piauí, Âurea Emília Bezerra Madruga, examines the contemporary environmental crisis through institutional and social instruments that safeguard ecosystems and guarantee the fundamental rights of present and future generations. Using the state of Piauí as a case study, a region that harbors significant natural and cultural heritage, including the Parnaíba Delta and Serra da Capivara National Park, the author highlights the persistent challenge of open-air dumps. These sites threaten biodiversity, water resources, public health, and quality of life. According to the author, poor and marginalized communities are the most affected, facing health risks and environmental degradation while depending economically on recyclable materials. The article emphasizes the urgency of social and economic inclusion for waste pickers. To address this structural problem, the text presents the Zero Dumps Project (*Projeto Lixões Zero*), an initiative led by the Public Prosecutor's Office of the State of Piauí (MPPI) that seeks to tackle technical, financial, and political bottlenecks. By doing so, it aims to advance long-overdue solutions to phase out dumps and improve waste management systems across the state.

To conclude the chapter and close the book, the final article is authored by the book's co-organizer and Agrarian Prosecutor of Pará, Herena Neves Maués Corrêa de Melo. It presents the experience of the Agrarian Prosecutor's Office of Western Pará in the development of the Pará Jurisdictional REDD+ System, analyzed through the lens of interinstitutional governance theory and related theoretical

frameworks. The study draws on a case study methodology combined with grounded theory. In this context, the analysis connects the State, society, and territorial traditionalities to the concept of climate justice. The Jurisdictional REDD+ System is portrayed not merely as a mechanism for the financialization of nature aimed at climate stabilization, but as a public policy tool designed to benefit its true stakeholders, the forest and riverine peoples who have long conserved their territories' natural environments and today play a crucial role in global sustainability efforts. A nuanced understanding of socio-regional realities proved essential for shaping the policy, made possible through a participatory process led by COGES-CLIMA, chaired by the State Secretariat for Environment, Sustainability, and Climate of Pará. From this analysis, the following theoretical categories emerged: public governance, social participation, and climate justice. The research seeks to answer a central question: To what extent did interinstitutional governance in the development of the Jurisdictional REDD+ System ensure meaningful social participation in favor of climate justice? The article concludes by formulating the theoretical category of "participatory articulation," derived from the analysis of empirical data. It underscores the role of the Agrarian Public Prosecutor's Office in shaping and facilitating proactive articulation between legality and effectiveness, an approach capable of generating innovative practices. By linking this documentary and institutional framework to theories of governance, participation, and traditionalities, the article highlights how these elements converge to support climate justice and strengthen interinstitutional action.

All the articles presented here go beyond a purely professional contribution. They were written by professionals who see law as more than a singular objective, seeking answers both within and for society. We hope this book will foster deeper reflections on the environmental, social, economic, and climate dimensions.

Women, Gender, and Climate Justice

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WOMEN, PARTICIPATORY DEMOCRACY, AND ENVIRONMENTAL GOVERNANCE: RELEVANCE FOR ADDRESSING THE CLIMATE CRISIS

BY TARCILA SANTOS BRITTO GOMES⁴

The interdependent and holistic relationship between nature, social development, and the economy presents contemporary society with the challenge of taking concrete actions to ensure a healthy and productive life in harmony with the environment. Today's climate crisis is not only ecological but also social and political, demanding inclusive and coordinated responses.

Against this backdrop, women occupy a singular position. Their daily interaction with natural resources is shaped by socially constructed roles and responsibilities across both private and public spheres. This lived experience endows women with a unique perspective on environmental management and conservation, positioning them as key actors in formulating sustainable policies.

Various United Nations documents recognize this importance. Since the 1992 Rio Conference, from Agenda 21 to the 2030 Agenda, women's leadership has been consistently emphasized as essential for the effectiveness of global sustainable development strategies. These initiatives emphasize that without women's full inclusion, achieving a balance between economic growth, social justice, and environmental protection is impossible.

A key milestone was Agenda 21, which devoted an entire chapter to strengthening the role of women and outlined measures to increase their participation in decision-making processes. This highlights the international recognition that gender equality is not only a matter of social justice but also essential for effective environmental policies⁵. In Section III, which focuses on empowering key groups, the document specifies actions to be implemented globally to support women in achieving sustainable and equitable development.

Agenda 21's core premise was to establish a global consensus and a strong political commitment to sustainable development and environmental cooperation. Within this framework, the document emphasized the important role of women in sustainable development and proposed measures to promote strategies that fully recognize women's central role in the socio-political dimension of environmental issues.

4 Prosecutor at the State of Goiás Public Prosecutor's Office (since 2007). Auxiliary Member of the National Council of the Public Prosecutor's Office (CNMP) in the Environmental Commission (2017/2018 and 2019/2022). Master's degree from the University of Lisbon, Portugal (2019/2020). Specialized in Civil Procedure, with emphasis on Collective Actions, from the Rio Grande do Sul State Public Prosecutor's School Foundation (2017/2018). Postgraduate in Environmental Law from the University of Lisbon (2019). Law Degree from Santa Cruz State University (2003). Former Public Defender in the State of Bahia (2006/2007). Professional experience in Law since 2007, with emphasis on Public and Environmental Law. Author of the book *The Right to Fresh Water in the Face of Water Scarcity: Legal Instruments for Mitigating the Problem*.

5 Agenda 21, United Nations Conference on Environment and Development. Available at: https://www.conexaoambiental.pr.gov.br/sites/conexao-ambiental/arquivos_restritos/files/documento/2019-05/agenda_21_global_integra.pdf.

International documents on environmental protection, such as the 1992 Rio Declaration, Agenda 21, the Sustainable Development Goals of the 2030 Agenda, and the Dublin Statement on Water, aim to strengthen women's leadership and introduce discussions on the need for greater female participation in decision-making processes. These documents will be examined in greater detail in Chapter 4 of this study.

Despite formal recognition of their role, a gap persists between women's central contributions to protecting life and ecosystems and their effective participation in institutional decision-making arenas. In many political and administrative spheres, women remain underrepresented, undermining democratic legitimacy and reinforcing structural inequalities.

This participation gap undermines the quality of decision-making and restricts the development of environmental policies that are more just, inclusive, and representative. The absence of women's voices in deliberative processes results in the loss of experiences, perspectives, and solutions that could enhance environmental management and improve responses to climate change.

Given this scenario, this article aims to examine the importance of women's participation in shaping and implementing environmental policies. The study is based on the principles of participatory democracy, equality, and non-discrimination – key pillars of the Escazú Agreement, a regional treaty that seeks to strengthen environmental democracy in Latin America and the Caribbean by amplifying the voices of historically excluded groups, especially women.

The principle of participation as a democratic foundation

Public participation is frequently narrowly understood as the right to vote⁶ or engage in electoral campaigns. Yet, a more comprehensive view is proposed by Azucena Serrano Rodriguez⁷, who distinguishes among social participation, community participation, political participation, and citizen participation. Social and community participation encompass organized acts of social support that occur independently of state institutions. Political participation involves citizen engagement within formal political structures, while citizen participation reflects a broader reality in which society exercises direct influence over the State.

The concept of participation used by the United Nations⁸ distinguishes among volunteering, service-learning, and advocacy or influence over policies. According to Gomes Canotilho and Vital Moreira, it refers to the “right of individu-

6 DICKSTEIN, A. C. *Public Participation in Environmental Decision-Making*. 1st ed. Lisbon: AAFDL Editora, 2019. vol. 1, 291 p.

7 SERRANO RODRIGUEZ, Azucena. Citizen participation in Mexico. In: *Political Studies*, no. 34, 2015, pp. 93-116, p. 95. Available at: <https://www.scielo.org.mx/pdf/ep/n34/n34a5.pdf>.

8 UNICEF. What works: adolescent participation in Latin America and the Caribbean. Panama City: 2010, p. 9. Available at: https://www.youthpolicy.org/uploads/documents/2010_Adolescent_Participation_Latin_Ameria_Caribbean_Eng1.pdf.

als and various social groups to intervene in the formulation and implementation of environmental policy⁹.”

Regarding environmental participation, Professor Jorge Miranda emphasizes the importance of citizen involvement as a means to prevent public authorities from having exclusive control over environmental decision-making: “the non-exclusivity of public entities in fulfilling their responsibilities and implementing rights, as the engagement and participation of citizens is required (Art. 66, §2, main text) – evident primarily (but not exclusively) in neighborhood associations (Arts. 263 ff., 248, and 267, §1) and in environmental protection associations – which is well understood within the framework of ‘participatory democracy’ (Arts. 2, second part; 9(c); and 267, first part).”¹⁰

The principle of participation in environmental decision-making holds that genuine protection of natural resources can only be achieved through the involvement of all stakeholders, precluding exclusive control by public authorities. A comprehensive understanding of this principle requires active citizenship, in which individuals engage directly – alone or collectively, without intermediaries – in the formulation and implementation of environmental policies.

Some constitutions, including Portugal’s, explicitly recognize the principle of participatory democracy, establishing that the democratic rule of law is enacted and strengthened through popular sovereignty, pluralism of expression, and democratic political organization¹¹.

Participatory democracy goes beyond classical democracy by granting citizens the right to engage directly in the State’s administrative functions and influence planning and decision-making processes¹². While classical democracy limits participation to voting and electing representatives, participatory democracy enables citizens to actively contribute to administrative management and public decision-making¹³.

Regarding participatory democracy, Jorge Miranda further explains: “It represents a radical shift in the relationship between public administration and citizens – a transition from a traditional, authoritarian, and bureaucratic administration to one that is open and increasingly decentralized and deconcentrated.”¹⁴ This form of administrative democracy¹⁵ reflects an evolution in the exercise of democracy, advancing the State’s administrative function.

Beyond the administrative and legislative dimensions, the right to participation must be developed across multiple areas, requiring firm adoption in matters

9 CANOTILHO, J. J. Gomes; VITAL, Moreira. *Constituição da República Portuguesa Anotada*. vol. I. 4th ed. Coimbra: Coimbra Editora, 2007. p. 846. ISBN 978-972-32-1464-4.

10 MIRANDA, Jorge. The Environment and the Constitution, *Journal of the Public Ministry of the State of Rio de Janeiro*, vol. 1, n° 1, Rio de Janeiro, Jan.-Jun. 1995, p. 145. ISSN 1413-3873.

11 Constitution of the Portuguese Republic, Article 2. Accessed on: May 24, 2019. Available at: <https://www.parlamento.pt/Legislacao/paginas/constituicaoorepublicaportuguesa.aspx>.

12 MIRANDA, Jorge; MEDEIROS, Rui. *Constituição Portuguesa Anotada*. Volume I. 2nd edition. Coimbra: Coimbra Editora, 2010. p. 112. ISBN 972-32-1307-9.

13 *Ibid.*, p. 113.

14 *Ibid.*, p. 113.

15 *Ibid.*, p. 113.

related to the environment, urban planning, education, and others. Public participation in administrative environmental decision-making aims to provide legitimate boundaries for the scope of discretionary administrative powers¹⁶ and to ensure that decision-makers have the information needed to make rational decisions that genuinely reflect the collective interest.

The Escazú Agreement¹⁷, aimed at ensuring the full and effective implementation of the rights to public participation in environmental decision-making processes and access to justice in environmental matters across Latin America and the Caribbean, states that “the public’s right to participate in environmental decision-making processes shall include the opportunity to submit comments through appropriate and available means, in accordance with the circumstances of the process.” Accordingly, before adopting any decision, the public authority must take into account the outcomes of the participation process.

Public authorities should promote and facilitate citizen participation in environmental decision-making through mechanisms that extend beyond public hearings. This includes ensuring meaningful individual and collective input throughout all stages – consultation, strategy, planning, and implementation – so that administrators remain aware of citizens’ interests and can make rational decisions consistent with administrative democracy.

Thus, participation ensures dialogue between stakeholders and decision-makers, strengthening environmental democracy and serving as a tool to uphold this democratic principle.

The Aarhus Convention, The Escazú Agreement, and the principle of public participation in environmental decision-making

The principle of environmental participation was recognized as an international standard in the Aarhus Convention (Denmark, 1998), which applies at the European Union level. One of the Convention’s objectives is to implement this principle to enhance decision quality, raise public awareness, and ensure that authorities remain informed about societal environmental concerns¹⁸.

The Aarhus Convention, in its Article 6, defines procedures for public participation in decision-making for specific activities and emphasizes that certain administrative decisions must not only ensure public participation but also, to the extent possible, take into account the input received through this process¹⁹.

Particularly relevant are Articles 7 and 8 of the Convention, which establish public participation in developing environmental plans, programs, and actions, as

¹⁶ GOMES, J. J. Canotilho. *Administrative Procedure and Environmental Defense* [Procedimento Administrativo e Defesa do Ambiente]. R.L.J., vol. 123, n° 3990, p. 267.

¹⁷ Regional Agreement on Access to Information, Public Participation and Access to Justice in Environmental Matters in Latin America and the Caribbean. Available at: <https://repositorio.cepal.org/server/api/core/bitstreams/29b2d738-4090-45c5-a289-428b465ab60c/content>.

¹⁸ Aarhus Convention. Accessed on: May 10, 2019. Available at: [https://eur-lex.europa.eu/legal-content/PT/TXT/HTML/?uri=CELEX:22005A0517\(01\)&from=PT](https://eur-lex.europa.eu/legal-content/PT/TXT/HTML/?uri=CELEX:22005A0517(01)&from=PT).

¹⁹ *Ibid.*, Article 6.

well as during the preparation of implementing regulations and other legally binding normative instruments²⁰.

In Latin America and the Caribbean, the Escazú Agreement²¹ was signed in March 2018, during the 73rd session of the United Nations General Assembly. It establishes regional standards for access to information, public participation, and access to justice in environmental matters. Grounded in the principles of transparency, openness, and participation, it reaffirms the region's collective commitment to environmental protection and the promotion of human rights.

The Escazú Agreement – formally, the Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean – is a human rights treaty uniting 15 countries to ensure public participation in environmental decision-making and access to information on environmental issues. It is the region's first environmental treaty and the world's first to incorporate binding provisions on the protection of environmental human rights defenders.

It is important to highlight that “this treaty aims to combat inequality and discrimination and to guarantee the rights of all people to a healthy environment and sustainable development, with special attention to vulnerable individuals and groups, placing equality at the heart of sustainable development.”²² Its focus on vulnerable groups directly relates to women's participation and aligns with the United Nations' Agenda 21²³, which stresses that the engagement of all social groups is essential for implementing environmental protection objectives.

20 Aarhus Convention (...) “Article 7 Public participation concerning plans, programmes and policies relating to the environment. Each Party shall make appropriate practical and/or other provisions for the public to participate during the preparation of plans and programmes relating to the environment, within a transparent and fair framework, having provided the necessary information to the public. Within this framework, Article 6, paragraphs 3, 4 and 8 shall be applied. The public which may participate shall be identified by the relevant public authority, taking into account the objectives of this Convention. To the extent appropriate, each Party shall endeavour to provide opportunities for public participation in the preparation of policies relating to the environment. Article 8 Public participation during the preparation of executive regulations and/or generally applicable legally binding normative instruments. Each Party shall strive to promote effective public participation at an appropriate stage, and while options are still open, during the preparation by public authorities of executive regulations and other generally applicable legally binding rules that may have a significant effect on the environment. To this end, the following steps should be taken: (a) Time-frames sufficient for effective participation should be fixed; (b) Draft rules should be published or otherwise made publicly available; and (c) The public should be given the opportunity to comment, directly or through representative consultative bodies. The result of the public participation shall be taken into account as far as possible.” Accessed on: May 10, 2019. Available at: [https://eur-lex.europa.eu/legal-content/PT/TXT/HTML/?uri=CELEX:22005A0517\(01\)&from=PT](https://eur-lex.europa.eu/legal-content/PT/TXT/HTML/?uri=CELEX:22005A0517(01)&from=PT).

21 Regional Agreement on Access to Information, Public Participation and Access to Justice in Environmental Matters in Latin America and the Caribbean. Available at: https://repositorio.cepal.org/bitstream/handle/11362/43611/S1800493_pt.pdf.

22 Regional Agreement on Access to Information, Public Participation and Access to Justice in Environmental Matters in Latin America and the Caribbean. Available at: https://repositorio.cepal.org/bitstream/handle/11362/43611/S1800493_pt.pdf.

23 Agenda 21, United Nations Conference on Environment and Development. Available at: https://www.conexaoambiental.pr.gov.br/sites/conexao-ambiental/arquivos_restritos/files/documento/2019-05/agenda_21_global_integra.pdf.

Agenda 21 prescribes in Chapter 23 that: “Individuals, groups, and organizations should have access to relevant environmental and development information held by national authorities. Any policy, provision, or regulation affecting NGOs’ access to the work of United Nations institutions and bodies related to the implementation of Agenda 21, or their participation in this work, must apply equally to all major groups.”²⁴

Ensuring equality at the heart of sustainable development requires the active participation of women and vulnerable groups in environmental decision-making, fostering inclusive policies that uphold gender justice and address barriers to access to information and participation.

The Escazú Agreement is notable for its innovative regulation of regional rights to access information, public participation, and justice in areas such as sustainable resource use, biodiversity conservation, efforts to combat land degradation, climate change, and disaster resilience. The agreement recognizes and values the multicultural character of Latin America and the Caribbean and its peoples. Attentive to the specific regional circumstances faced by local populations, it frames the exercise of the rights to access information and public participation within the context of vulnerability and violence experienced by communities across the region.

The Escazú Agreement reaffirms Principle 10 of the 1992 Rio Declaration on Environment and Development²⁵, which states: “The best way to address environmental issues is by ensuring the participation of all concerned citizens at the appropriate level. Nationally, every individual shall have adequate access to environmental information held by public authorities, including information on hazardous materials and activities in their communities, as well as the opportunity to take part in decision-making processes. States shall promote public awareness and participation by making information available to all and ensure effective access to judicial and administrative remedies, including compensation and redress for harm.”

Within the scope of the agreement, “environmental information” is defined as any information relating to the environment, including information on environmental risks and potential adverse impacts that affect or may affect the environment and human health.

The agreement also defines vulnerable individuals or groups as those facing particular difficulties in fully exercising the access rights it recognizes. These challenges may stem from circumstances or conditions linked to social or gender inequalities. Importantly, equality and non-discrimination are recognized as foundational principles of the Escazú Agreement.

In this regard, the parties to the agreement pledged to provide guidance and support to the public – especially to vulnerable individuals or groups – so that they can exercise their rights to access environmental information and participate in environmental decision-making.

The parties to the Agreement must ensure public participation from the earliest stages of environmental decision-making, so that public input is duly consid-

²⁴ Ibid.

²⁵ Rio Declaration on Environment and Development. Available at: <https://www.scielo.br/j/ea/a/szzGBPjxPqnTsHsnMSxFWPL/?lang=pt>.

ered and informs decisions. Information enabling effective participation must be provided to all in a clear, timely, and accessible manner, upholding equality and non-discrimination.

Women’s participation and environmental governance: recognition in international environmental law

Social participation is fundamental for the rational decision-making process in environmental policy, as it ensures the exercise of participatory democracy. Women’s role in such decision-making is widely recognized. Principle 20 of the 1992 Rio Declaration on Environment and Development states: “Women play a vital role in environmental management and development. Their full participation is, therefore, essential to achieve sustainable development.”²⁶

This statement is based on clear evidence of women’s vital role in environmental preservation and in efforts to conserve natural resources worldwide.

Chapter 24 of the United Nations’ Agenda 21²⁷ introduces the “Global Action for Women for Sustainable and Equitable Development,” highlighting: “The international community has endorsed various action plans and conventions that promote the full, equitable, and meaningful participation of women in all development activities. The goal is to guide national governments in implementing proactive strategies to advance women, particularly in their role in managing ecosystems and combating environmental degradation.”

In recognizing the importance of women’s participation in environmental management and in combating environmental degradation, as well as the need to foster such participation due to women’s political vulnerability, Agenda 21 aimed to increase the proportion of women in decision-making, planning, technical advisory, management, and outreach roles in the field of environment and development. Accordingly, the signatory states committed to actively implement measures to:

- “1– Review policies and develop plans to increase the number of women participating as decision-makers, planners, managers, scientists, and technical advisors in the design, development, and implementation of sustainable development policies and programs;
- 2– Strengthen and empower agencies, NGOs, and women’s groups to build institutional capacity for sustainable development;
- 3– Support and expand employment opportunities for women under equal conditions and fair pay in both formal and informal sectors, with adequate

²⁶ Rio Declaration on Environment and Development. Available at: https://apambiente.pt/sites/default/files/_A_APA/Cidadania_ambiental/AssuntosInternacionais/1992_Declaracao_Rio.pdf.

²⁷ Agenda 21, United Nations Conference on Environment and Development. Available at: https://www.conexaoambiental.pr.gov.br/sites/conexao-ambiental/arquivos_restritos/files/documento/2019-05/agenda_21_global_integra.pdf.

economic, political, and social support – such as child care (especially nurseries), parental leave, and equal access to credit, land, and other natural resources.”²⁸

Agenda 21 emphasizes ensuring women’s effective participation in environmental decision-making by promoting mechanisms, programs, and measures that enable their greater involvement in sustainable development policies.

The measures promoted by the document include expanding employment opportunities, supported by suitable economic, political, and social systems and services. These cover child care – including day care and parental leave – as well as equal access for women to credit, land, and other natural resources.

More specifically, the Dublin Declaration²⁹ on Water states in its Principle 3: “Women play a central role in providing, managing, and protecting water, yet this is not reflected in the institutional frameworks for water resource management. Implementing this principle requires policies that meet women’s specific needs and empower them to participate at all levels of water resource programs, including decision-making and implementation, in ways defined by them.”

The Dublin Declaration highlights the importance of women’s full participation and decision-making at all levels of water resources programs. It emphasizes positive policies addressing gender-specific and social demands, noting that only through their implementation can women fully perform their recognized roles as water providers, users, and guardians of their daily environment, which must be reflected in water management decisions.

Similarly, the Sustainable Development Goals³⁰ reinforce the core message of Agenda 2030: “leaving no one behind.” But who is being left behind? SDG 6 aims to ensure universal and equitable access to safe drinking water and adequate sanitation for all, with particular attention to the needs of women, girls, and vulnerable populations. These groups continue to be the most affected by lack of access to basic resources, which compromises their dignity, safety, and full enjoyment of fundamental rights.

Women and girls are explicitly recognized as vulnerable groups, precisely for facing additional barriers that result in insufficient access to water of adequate quantity and quality at home, in schools, workplaces, or during productive activities. This scarcity subjects them to health risks, insecurity, and exclusion from education and employment. Other marginalized groups – such as indigenous peoples, ethnic minorities, refugees, children, and people with disabilities – also experience discrimination and inequalities in access to water and sanitation.

The United Nations emphasizes that such inequalities are deeply linked to factors including gender, race, ethnicity, religion, birth status, caste, language,

28 Agenda 21, United Nations Conference on Environment and Development. Available at: https://www.conexaoambiental.pr.gov.br/sites/conexao-ambiental/arquivos_restritos/files/documento/2019-05/agenda_21_global_integra.pdf.

29 Dublin Declaration. Available at: <http://www.meioambiente.uerj.br/emrevista/documentos/dublin.htm>.

30 SDG Brazilian Indicators for the Sustainable Development Goals. Available at: <https://odsbrasil.gov.br/objetivo/objetivo?n=6>.

nationality, disability, age, health, and socioeconomic status. This situation is further exacerbated by environmental degradation, climate change, population growth, conflicts, and forced migration, which create new groups of climate refugees.

Given this reality, women's participation in environmental policy and administrative decision-making is essential. Their effective and informed engagement contributes to more legitimate, inclusive, and equitable outcomes, reflected in public policies that safeguard water resources and promote socio-environmental justice.

The importance of women's participation in environmental decision-making to mitigate the impacts of climate change and curb illegal deforestation

The climate crisis and illegal deforestation are among the most pressing socio-environmental challenges of our time, directly impacting ecological stability, social justice, and the protection of fundamental human rights. In this context, women's involvement in environmental decision-making is not just a matter of gender equity but a crucial factor in creating more effective and legitimate policies. Women – particularly in traditional, rural, and marginalized urban communities – experience the impacts of climate change and environmental degradation firsthand, bringing essential knowledge and lived experience that must inform decision-making.

Climate change intensifies droughts, floods, and environmental disasters that disproportionately affect women's lives. In many societies, women are primarily responsible for family care, providing water and food, and managing basic resources. When these resources become scarcer or less secure, women shoulder an even greater burden and face increased social and economic risks. Excluding them from decision-making processes, therefore, means overlooking those who are on the front lines of climate impacts and who could offer solutions grounded in everyday realities.

Women's contributions are also crucial in combating illegal deforestation. Across the Amazon and Cerrado regions, women have emerged as guardians of their territories, leading community monitoring initiatives, reporting illicit activities, and driving conservation projects. Strengthening their participation in environmental councils, public hearings, and institutional decision-making spaces enhances social oversight over illegal forestry, mining, and agricultural and livestock chains, reinforcing the legitimacy of command-and-control policies. Without these voices, efforts to curb deforestation risk becoming confined to purely repressive measures, disconnected from on-the-ground realities.

Women's participation in environmental decision-making enhances perspective diversity and democratic legitimacy. The Escazú Agreement, by upholding public participation, equality, and non-discrimination, provides the framework for such inclusion. Ensuring women's involvement strengthens the effectiveness, transparency, and fairness of climate and forest policies, recognizing that environmental democracy relies on a plurality of voices, and that excluding women undermines the legitimacy of the process.

The intersectional dimension cannot be overlooked. Indigenous, quilombola, riverside, Black, and migrant women face heightened vulnerability due to poverty, discrimination, or violence. Considering their experiences is essential for environmental policies to reflect Latin America's diverse social and cultural realities. Women's participation should not be symbolic but a means to structurally transform environmental decision-making, promoting greater climate and social justice.

Women's presence in positions of power generates ripple effects beyond the environmental sphere. International experience shows that governments and councils with greater female participation tend to adopt stronger and longer-term environmental policies, making gender parity both an ethical imperative and an effective strategy. Moreover, women transmit values to younger generations, reinforcing community environmental education, fostering sustainable public policies, and promoting deeper cultural change.

Women's participation in environmental decision-making is essential to mitigate climate change and curb illegal deforestation. Their exclusion weakens democratic legitimacy and the effectiveness of socio-environmental responses. Inclusion strengthens participatory democracy, integrates local and traditional knowledge, enhances policy effectiveness, and promotes social justice. Supporting women's leadership is both a rights issue and a critical strategy for environmental sustainability and the dignity of present and future generations.

Conclusion

Participation is essential for strengthening participatory democracy and ensuring the legitimacy of environmental decisions. Meaningful societal involvement in planning and management fosters social oversight, transparency, and rational public choices, enabling socio-environmental policies to reflect collective interests.

For women, it is crucial to establish and strengthen mechanisms that guarantee their active participation in decision-making, both to redress historical gender, racial, and social inequalities and to leverage the practical knowledge they hold from daily interaction with natural resources.

Positive inclusion policies are needed to address the vulnerabilities women face in environmental crises, empowering them to fully exercise their rights to information, participation, and environmental justice under the Escazú Agreement.

Valuing and recognizing women's leadership acknowledges that they are not merely victims of climate impacts but crucial actors in providing, managing, and protecting natural resources. Their involvement enriches decision-making, brings diverse perspectives, and reinforces environmental democracy.

More than a matter of equity, it is a crucial strategy for addressing the climate crisis and curbing illegal deforestation. In many regions, women already act as forest guardians, leading monitoring and conservation efforts that enhance the legitimacy of protection policies. Their inclusion in decision-making bodies strengthens these initiatives, ensuring outcomes that are more effective, lasting, and legitimate.

Aligning women's everyday role in protecting the environment with their full participation in political and administrative decision-making is essential for fos-

tering more just, democratic, and effective environmental governance. Achieving this balance advances not only the protection of nature but also gender justice, while supporting climate and forest policies that meet the needs of today and the demands of future generations.

CLIMATE CRISIS AND GENDER: A BIOCULTURAL ANALYSIS OF VULNERABILITIES AND PERSPECTIVES FOR CLIMATE JUSTICE

BY FERNANDA JORGE SEQUEIRA³¹

The climate emergency, which presents complex environmental, economic, political, and cultural challenges, manifests itself unevenly across societies. Factors such as gender, race, class, and territory intersect to shape how individuals and groups experience the effects of climate change³².

In this sense, the climate crisis is intrinsically a crisis of inequality. While the wealthiest groups are disproportionately responsible for greenhouse gas emissions, it is the most vulnerable populations who endure the most severe consequences³³. The social construction of gender roles, in particular, reveals a deep and historical connection between humanity and the environment, one marked by asymmetry, in which the association of the feminine with nature has led to its parallel exploitation³⁴.

The current crisis can thus be seen as the outcome of worldviews grounded in patriarchy and anthropocentrism, which have long neglected the geological and environmental dimensions of human history³⁵. Challenging and deconstructing these structures of oppression is crucial to understanding how inequalities, especially gender inequalities, are intensified in the face of extreme climate events³⁶. Women's vulnerabilities are heightened by socioeconomic, cultural, and environmental factors such as the burden of unpaid care work, limited access to resources, and underrepresentation in decision-making spaces³⁷.

The contemporary world is distinctly shaped by what has been called the "Great Acceleration," a period beginning in the mid-twentieth century marked by the unprecedented intensification of human activities such as fossil fuel consumption and unplanned urban growth, signaling the advent of

31 Master's degree in Law and Sustainable Development (Federal University of Pará - UFPA). State Prosecutor of Pará. Lawyer. E-mail: fernanda.sequeira@pge.pa.gov.br; ORCID: <https://orcid.org/0000-0002-2345-5054>. Lattes: <http://lattes.cnpq.br/6564054672780581>.

32 CRENSHAW, Kimberlé W. Demarginalizing the intersection of race and sex. *Legal Forum*, Chicago, n° 1, pp. 139-167, 1989.

33 OXFAM. Carbon Emissions of Richest 1 Percent more than Double the Emissions of the Poorest Half of Humanity. Oxfam, p. 2, 2020.

34 SHIVA, Vandana; MIES, Maria. *Ecofeminismo*. Lisboa: Instituto Piaget, p. 2, 1993.

35 TRÓI, P. (2022). *O Antropoceno Revisado: Quem é o "Humano" da Crise Climática?*. Sustentável Editora.

36 RODRIGUEZ CÁCERES, Luz Stella. *A perspectiva do gênero na mudança climática: marcos para o debate*. Terra Livre, São Paulo, v. 40, n° 1, p. 208, 2025.

37 ANJUM, S., & AZIZ, S. (2025). *Women's Health and Climate Change: A Global Perspective*. Springer.

the Anthropocene³⁸. Yet, as Trói argues, it is essential to question the narrative that assigns responsibility for the climate crisis to a so-called “generic human.”³⁹

The true forces driving this acceleration lie within specific power structures: colonialism, capitalism, and patriarchy⁴⁰. This perspective is crucial, as the enduring human–nature dualism deeply embedded in Western thought has long served to justify the exploitation of both the environment and marginalized social groups, particularly women⁴¹.

Moving beyond a general analysis, it is clear that regions of the Global South, especially low- and middle-income countries (LMICs), bear the most severe consequences of the climate crisis, despite having contributed the least to its causes⁴². In these contexts, women are disproportionately affected by water and food insecurity, the spread of disease, and rising gender-based violence, while also facing systemic barriers to health care, education, and economic opportunity⁴³. These vulnerabilities are not biological in origin but arise from a complex web of gender roles, social norms, and structural inequalities that limit women’s capacity for adaptation and resilience.

In light of this complexity, a biocultural approach becomes indispensable. Such a perspective intrinsically links biological needs and constraints with the sociocultural contexts that shape behavior, opportunity, and the diverse outcomes for health and well-being.

This article argues that a biocultural framework, combined with an intersectional gender perspective, provides an essential analytical lens for understanding and responding to the climate emergency. Such an approach requires not only recognizing differentiated vulnerabilities but also valuing the leadership and ancestral knowledge of women, who have historically played a central role in managing natural resources and fostering local adaptation⁴⁴.

In this context, advancing gender equality is integral to the effectiveness of both mitigation and adaptation strategies. Because women and men occupy different social roles and have distinct needs in relation to the environment⁴⁵, a gender-responsive approach is vital to achieving climate justice.

38 STEFFEN, W. et al. The trajectory of the Anthropocene: the Great Acceleration. *Anthropocene Rev.*, v. 2, p. 83, 2015.

39 TROI, Marcelo de. *Salvador, cidade movente: corpos dissidentes, mobilidades e direito à cidade*. PhD Thesise. Federal University of Bahia, 2021.

40 LATOUR, Bruno. Para distinguir amigos e inimigos no tempo do Antropoceno. *Revista de Antropologia*, São Paulo, v. 57, n° 1, p. 20, 2014.

41 ANJUM, Gulnaz; AZIZ, Mudassar. Climate change and gendered vulnerability: a systematic review of women’s health. *Women’s Health*, v. 21, p. 8, 2025.

42 MATOS, H. A., et al. (2023). *Mulheres e Mudanças Climáticas no Sul Global*. Paz e Terra.

43 ANJUM, S., & AZIZ, S. Op. Cit., 2025.

44 RODRÍGUEZ CÁCERES, A. Op. Cit., 2025.

45 MATOS, H. A., et al. Op. Cit., 2023.

Gender and the climate crisis: vulnerabilities and injustices

Research and international organizations consistently demonstrate the heightened vulnerability of women and girls to the effects of climate change and environmental disasters⁴⁶.

This disparity does not stem from intrinsic biological differences but is deeply rooted in pre-existing social, economic, and cultural inequalities⁴⁷. The climate crisis thus acts as a threat multiplier, amplifying the injustices historically experienced by women, particularly those living in marginalized contexts.

Gender inequality lies at the core of this vulnerability, as it restricts women's access to resources, education, and decision-making power. In low- and middle-income countries (LMICs) and marginalized communities, women frequently lack financial resources and face barriers to land ownership, adequate health care, education, and stable employment opportunities⁴⁸.

This phenomenon, known as the “feminization of poverty,”⁴⁹ places women at a significant disadvantage in their ability to respond and adapt to climate shocks⁵⁰. Global data reinforce this inequality: women are far less likely to participate in the formal labor market (63% of women aged 25–54 compared to 94% of men), and approximately 2.7 billion women worldwide still face legal barriers that limit their employment opportunities relative to men⁵¹.

Beyond economic constraints, entrenched social norms and traditional gender roles assign women primary responsibility for caregiving and for securing essential resources such as water and food. In situations of water scarcity or food insecurity, these tasks become increasingly demanding, time-consuming, and hazardous, directly affecting women's physical and mental health and reducing their access to education and income-generating opportunities.

Following floods, for instance, women and girls often spend much more time and effort collecting safe water and food, walking long distances and exposing themselves to health risks and violence, while men tend to focus on rebuilding infrastructure or seeking external assistance. In areas affected by desertification, women are forced to travel farther to gather firewood, increasing their physical burden and risk of dangerous encounters, tasks that are rarely shared by men.

46 UN Women et al. *Gender, Climate & Security: Sustaining Inclusive Peace*. New York: UN Women, UN Environment Programme, UN Development Programme, UN Peacebuilding Support Office, 2020. Available at: <https://www.unwomen.org/en>. Accessed on: Oct. 1, 2025.

47 MATOS, H. A., et al. Op. Cit., 2023.

48 ANJUM, S., & AZIZ, S. Op. Cit., 2025.

49 The term “feminization of poverty” is widely attributed to American sociologist and researcher Diana Pearce, who introduced the concept in her 1978 article *The Feminization of Poverty: Women, Work and Welfare*. The term describes the growing global trend in which women—particularly heads of households and single mothers—constitute a disproportionately large share of the population living in poverty.

50 MCLANAHAN, S.; KELLY, E. L. The feminization of poverty. In: CHAFETZ, J. Z. (org.). *Handbook of the Sociology of Gender*. Boston, MA: Springer, 2006.

51 WORLD BANK. *Mulheres, empresas e Direito*. Washington, DC: World Bank, 2022.

These conditions exacerbate stress and anxiety and can lead to mental health disorders, including eco-anxiety and post-traumatic stress disorder, impacts that remain largely underestimated⁵². Women’s health, in particular, is acutely vulnerable to the effects of the climate crisis.

In LMICs, the intensification of extreme weather events, air pollution, and rising temperatures are linked to adverse maternal and neonatal health outcomes such as preterm births, low birth weight, and stillbirths⁵³. During heat waves, pregnant women face a significantly higher risk of dehydration and pregnancy complications compared to men, and disruptions to health services caused by climate-related disasters directly affect them by limiting access to prenatal care and safe deliveries.

The lack of access to reproductive health services during climate crises further deepens this vulnerability⁵⁴. Beyond cisgender women, non-binary and transgender individuals face additional challenges, including social stigma and discrimination, which often restrict their access to essential services during climate-related emergencies⁵⁵.

Women’s limited participation in political and environmental decision-making perpetuates and reinforces these inequalities. Female underrepresentation in global climate negotiation bodies, such as the United Nations Conferences of the Parties (COPs), remains striking, sustained by lingering perceptions that women are “unsuited” for active participation⁵⁶. In post-disaster reconstruction committees, the absence of women can lead to plans that overlook the need for safe spaces for women and children, adequate sanitation, or gender-sensitive aid distribution – prioritizing physical infrastructure over differentiated human needs.

This exclusion results in public policies that often fail to consider women’s needs and perspectives. The systematic omission of women from decision-making processes, together with the persistence of restrictive cultural norms, can have fatal consequences⁵⁷. The gendered division of labor, which historically confined women to domestic spheres, has long limited their public voice and participation in positions of power⁵⁸.

An intersectional perspective reveals that the impacts of the climate crisis are far from uniform among women. Factors such as race, class, ethnicity, and geography intersect to create overlapping layers of disadvantage, making some groups of women significantly more vulnerable than others⁵⁹. Women from low-income

52 Ibid., 2025.

53 ROTHSCCHILD, J.; HAASE, E. Socioeconomic stresses of climate change and eco-anxiety for women and their children. *Int J Gynecol Obstet*, v. 160, p. 417, 2023.

54 Ibid., 2025.

55 Ibid., 2025.

56 ANJUM, S., & AZIZ, S. Op. Cit., 2025.

57 UNFCCC. Women Still Underrepresented in Decision-Making on Climate Issues under the UN. UNFCCC, 2019.

58 RODRÍGUEZ CÁCERES, A. Op. Cit., 2025.

59 TEIXEIRA, M., & SCHMITT, C. Op. Cit., 2023.

communities, Indigenous peoples, and minority groups, for instance, face compounded vulnerabilities that are both amplified and accelerated by the effects of climate change⁶⁰.

Environmental racism exemplifies this inequality by disproportionately situating racialized populations in areas of higher environmental risk, often forcing them into conditions of “climate displacement.”⁶¹ In temporary shelters following extreme weather events, gender-based violence, including sexual abuse and exploitation, becomes an acute concern for women and girls, who experience these risks at far higher rates than men.

During climate emergencies, preexisting social inequalities are intensified, exposing the multiple dimensions of gender-based violence, extreme poverty, and food insecurity that disproportionately affect marginalized groups⁶². The climate crisis is, fundamentally, a crisis of inequality, its most severe consequences borne by those already pushed to the social and economic margins⁶³.

Bioculturality as a key to climate justice

The concept of bioculturality transcends the simple coexistence of biological and cultural dimensions; it recognizes that human experience is intrinsically shaped by the interdependence between the body and cultural practices.

This interconnection is essential for understanding the climate crisis, as both vulnerability and resilience are deeply rooted in this inseparable relationship. Ignoring the biocultural dimension therefore leads to an incomplete understanding of climate impacts and to the design of responses that are neither effective nor equitable.

Fundamental biological dimensions, such as reproductive health and overall well-being, are directly and disproportionately affected by the climate crisis, calling for a biocultural approach. Women, particularly in low- and middle-income countries (LMICs), face heightened risks, with strong evidence that extreme weather events and environmental pollution increase the incidence of preterm births, low birth weight, and infectious diseases.

Recent systematic reviews show that exposure to extreme temperatures and air pollution has adverse effects on maternal and fetal health, representing a major factor in negative pregnancy outcomes. Yet this biological vulnerability is inseparable from its cultural context, which shapes access to health care, the distribution of water collection responsibilities, and the unequal burden of scarcity and pollution. The capacity to respond to these challenges is likewise culturally mediated by access to resources and information, both of which are often limited for women.

At the same time, cultural knowledge, particularly the traditional and ancestral wisdom of women in Indigenous, rural, and coastal communities, consti-

60 ANJUM, S., & AZIZ, S. Op. Cit., 2025.

61 RODRÍGUEZ CÁCERES, A. Op. Cit., 2025.

62 NASREEN, M. *Violence Against Women During Flood and Post-flood Situations in Bangladesh*. Dhaka: ActionAid Bangladesh, 2009.

63 CASTELO, A., et al. Op. Cit., 2024.

tutes a cornerstone of effective adaptation to environmental change. Ecofeminist scholars such as Vandana Shiva and Maria Mies⁶⁴ have shown how the domination of women and the domination of nature are interconnected, and how women's ecological and subsistence knowledge stands in contrast to the extractivist logic of industrial capitalism.

Women in these communities, through their daily relationship with the land and natural resources that sustain their families, develop a profound understanding of local ecosystems, resilient agricultural practices, and water management strategies. The relevance of the biocultural perspective is further exemplified by the Latin American concept of *Cuerpo-Territorio* (Body-Territory), an epistemology that views women's bodies as inseparable from the land they inhabit. This perspective, advanced by community and territorial feminisms such as those of Silvia Rivera Cusicanqui and activists from Chiapas, argues that the violence inflicted on women's bodies, whether through conflict, exploitation, or contamination, directly reflects the violence inflicted on the earth itself.

Consequently, defending territory becomes inseparable from defending the very existence and identity of these women and their communities. The expansion of polluting and extractive industries, typical of so-called "sacrifice zones", directly affects community health, particularly that of women, whose ways of life are sacrificed to the demands of industrial development. This reality offers a stark illustration of the interdependence between biological health and territorial integrity.

Despite their transformative potential, many of these biocultural forms of knowledge and women's lived experiences remain underrepresented in public policy, hindering meaningful progress. The persistence of decision-making models that privilege Western techno-scientific knowledge over traditional and experiential wisdom often leads to maladaptation, solutions that fail to address the root causes of vulnerability and, at times, even worsen them. Research shows, for example, that only 1.5% of global climate finance is directed toward supporting women, a figure that stands in sharp contrast to evidence demonstrating that investments in women generate broad and lasting community benefits.

Integrating bioculturality thus represents a transformative path for addressing the climate crisis, enabling responses that go beyond purely technological or economic frameworks. By recognizing the deep connection between ecosystem health and human well-being, especially that of women, the biocultural approach affirms the value of local and ancestral knowledge⁶⁵, such as resilient agricultural practices, sustainable water management, and the medicinal use of plants cultivated by traditional communities.

This perspective not only strengthens adaptation and mitigation efforts in culturally grounded and sustainable ways but also restores and amplifies the agency of historically marginalized groups. By placing women's voices and knowledge at the center of climate planning and implementation, bioculturality becomes a

64 SHIVA, V.; MIES, M. *Ecofeminismo*. Lisboa: Instituto Piaget, 1993.

65 ULLOA, A. *Feminismos territoriales en América Latina: defensas de la vida frente a los extractivismos*. *Nómadas*, Bogotá, v. 45, p. 125, 2016.

catalyst for more equitable and effective policies, ones that respect diverse ways of life and promote harmonious coexistence between humans and nature, essential for achieving genuine climate justice.

Gender in climate policies

Integrating gender perspectives into climate policies is essential for building responses that are both effective and equitable. Studies show that advancing gender equality strengthens community resilience⁶⁶, as greater female participation and leadership in decision-making processes generate more innovative solutions that are better suited to local realities⁶⁷. In this context, recognizing biocultural knowledge and ensuring women's meaningful inclusion in environmental governance are indispensable steps toward achieving climate justice⁶⁸.

The importance of this approach is particularly evident in regions such as the Brazilian Amazon, especially among riverine and traditional communities in the state of Pará. These communities depend deeply on rivers, forests, and natural cycles for their subsistence and are directly affected by climate change through shifting rainfall patterns, prolonged droughts, and increasingly severe floods⁶⁹.

Women in these communities play a central role in managing water and forest resources, in subsistence farming, and in preserving traditional knowledge about biodiversity and the signs of nature. They serve as guardians of biocultural practices that function as vital adaptation strategies. Research indicates that in traditional Amazonian communities, women are often responsible for collecting and processing non-timber forest products, maintaining agroforestry plots and home gardens, and transmitting knowledge about medicinal plants and sustainable land management practices⁷⁰.

These activities are directly affected by climate disruptions. During extreme floods or droughts, riverine women face heightened difficulties in accessing clean water, traveling within their territories, and ensuring food security for their families, reflecting the same patterns of vulnerability observed in other parts of the world⁷¹.

Yet it is these same women who often lead local resilience efforts, diversifying crops to adapt to new climatic conditions or organizing collectively to defend their territories and water resources from contamination. Indirect data highlight the significance of sustainable extractivism, frequently led by women, for the economies of communities such as those in Pará. According to the Brazilian Institute

⁶⁶ SINGH, P. et al. The role of women in community resilience to climate change. *Womens Stud Int Forum*, v. 90, 102550, p. 11, 2022.

⁶⁷ MATOS, H. A., et al. Op. Cit., 2023.

⁶⁸ TEIXEIRA, M., & SCHMITT, C. Op. Cit., 2023.

⁶⁹ FEARNESIDE, P. M. (2018). *Desmatamento na Amazônia e Mudanças Climáticas*. Editora USP.

⁷⁰ NASCIMENTO, A. C. S., et al. (2018). *Conhecimento Tradicional e Adaptação Climática na Amazônia*. Editora Garambone.

⁷¹ RODRÍGUEZ CÁCERES, A. Op. Cit., 2025.

of Geography and Statistics (IBGE), non-timber forest products play a vital role in local livelihoods, an activity deeply rooted in women’s knowledge and in maintaining biocultural balance⁷².

The persistence of political and economic disempowerment reveals that the effectiveness of gender policies is often limited by weak political commitment and by the failure to meaningfully integrate women’s perspectives and priorities into governmental agendas⁷³. As Anjum and Aziz observe⁷⁴, gender integration in climate policy frequently remains confined to a “simplistic male–female dichotomy,” overlooking intersectional realities and the complex power dynamics that shape vulnerability and adaptation.

It is therefore essential that climate policies move beyond a merely “gender-sensitive” approach toward a truly “gender-transformative” one⁷⁵. This means not only recognizing differentiated vulnerabilities and capacities but also actively dismantling the patriarchal structures and systemic inequalities that underpin them.

Such transformation requires targeted investments, such as allocating half of climate funds, including those for loss and damage, directly to women or women-led organizations⁷⁶. Evidence from microcredit programs already shows that investing in women generates more substantial and long-lasting benefits for entire communities⁷⁷.

Valuing traditional knowledge and women’s leadership, as exemplified by the riverine women of Pará, demonstrates women’s agency and challenges the notion that they are passive victims of the climate crisis⁷⁸. Incorporating biocultural knowledge into policy design not only enhances effectiveness and local relevance but also fosters epistemic justice by recognizing diverse ways of knowing and living.

By ensuring women’s participation at every stage – from design to implementation and monitoring – climate policies can produce far-reaching benefits that extend beyond the environmental sphere, strengthening social equity and advancing sustainable development.

Challenges and potential pathways

Despite progress in awareness and the development of legal frameworks to integrate gender perspectives into climate policy, persistent structural bar-

72 IBGE. (2020). *Estatísticas da Produção Extrativista Vegetal e da Silvicultura*. IBGE.

73 MATOS, H. A., et al. Op. Cit., 2023.

74 ANJUM, S., & AZIZ, S. Op. Cit., 2025.

75 Ibid., 2025.

76 CASTELO, S. et al. The impact of the climate crisis on gender inequality. *Frontiers in Sustainable Cities*, v. 6, pp. 1-12, 2024.

77 Ibid., 2024.

78 ANJUM, S., & AZIZ, S. Op. Cit., 2025.

riers continue to hinder the creation of fair and effective responses to the environmental crisis. Overcoming these obstacles requires more than new policies, it demands a profound transformation of existing power structures and decision-making models⁷⁹.

A major challenge remains the underrepresentation of women in high-level environmental negotiations. Although “gender balance” is a recurring objective in international forums such as the United Nations Conferences of the Parties (COPs), women still occupy, on average, only about 33% of seats in global climate negotiation bodies⁸⁰.

This disparity is not merely a matter of numbers; it reflects the persistence of an institutional culture that fails to recognize women as active agents in shaping climate action⁸¹. The predominance of male-centered narratives and perspectives in these spaces limits the inclusion of women’s lived experiences, priorities, and knowledge systems⁸². Consequently, climate policies risk reproducing, or even worsening, existing gender inequalities instead of addressing their structural causes⁸³.

Another critical issue lies in the limited capacity of public policies to respond to the intersecting vulnerabilities that women face. There remains a wide gap between the vast academic and policy literature documenting gendered climate vulnerability and the actual incorporation of gender-responsive measures into concrete projects and programs⁸⁴. This gap becomes especially evident in disaster response contexts, where essential needs, such as safe shelters for women and girls, access to gender-sensitive sanitation facilities, and the provision of menstrual hygiene products, are often neglected⁸⁵.

The so-called “inclusion” of gender in climate policies often masks its dilution and depoliticization, turning what should be a transformative agenda into a mere bureaucratic formality with little real impact on the lives of marginalized women⁸⁶. As a result, gender-blind policies continue to prevail, those that ignore or fail to address the underlying power dynamics and structural inequalities that the climate crisis deepens⁸⁷.

A further challenge lies in the limited recognition and integration of biocultural knowledge, particularly among traditionally marginalized groups⁸⁸. The

79 CASTELO, A., et al. Op. Cit., 2024.

80 Ibid., 2024.

81 MATOS, H. A., et al. Op. Cit., 2023.

82 ANJUM, S., & AZIZ, S. Op. Cit., 2025.

83 Ibid., 2025.

84 CASTELO, A., et al. Op. Cit., 2024.

85 CASTELO, A., et al. Op. Cit., 2024.

86 RODRÍGUEZ CÁCERES, A. Op. Cit., 2025.

87 ANJUM, S., & AZIZ, S. Op. Cit., 2025.

88 This limitation in recognizing biocultural knowledge is intrinsically linked to the concept of epistemicide, which refers to the systematic suppression of the knowledge systems of marginalized groups, such as traditional peoples, by a hegemonic Western scientific model. This process results

dominant Western paradigm in environmental science and policymaking has historically devalued the traditional and ancestral knowledge of Indigenous peoples and local communities, including the essential contributions of women⁸⁹.

This epistemicide, the systematic erasure of non-Western and community-based ways of knowing, constitutes not only a grave injustice but also a significant loss of locally grounded strategies for resilience and adaptation. Women from rural and Indigenous communities, such as riverine populations in Pará, possess deep expertise in natural resource management, sustainable agriculture, and environmental indicators, knowledge systems developed through generations of lived interaction with their ecosystems⁹⁰.

However, the persistence of the prevailing Western rationalist model, which tends to view nature as a resource to be controlled and exploited, continues to marginalize these perspectives⁹¹. The chronic underinvestment in science and technology in developing countries, combined with the lack of recognition of traditional knowledge, prevents these insights from being meaningfully integrated into climate adaptation and mitigation efforts⁹².

Overcoming these obstacles ultimately demands an urgent shift from policies that are merely “gender-sensitive” to those that are genuinely “gender-transformative,” capable of confronting patriarchal norms and dismantling the structural inequalities that sustain them⁹³. This transformation requires not only expanding women’s participation at every level of decision-making but also ensuring equitable access to resources, funding, and capacity-building opportunities⁹⁴.

Directing a significant share of climate finance to women and women-led organizations, such as the proposal to allocate 50% of loss and damage funds⁹⁵, represents a key step toward economic empowerment. Likewise, valuing biocultural knowledge calls for promoting participatory research and establishing platforms that allow local and traditional knowledge to be shared and integrated into climate strategies in respectful and equitable ways⁹⁶.

Ultimately, only through a consolidated biocultural approach, anchored in the active participation and leadership of women and other historically marginalized groups, can societies build climate responses that are not only just but also effective and enduring⁹⁷.

in epistemic injustice and the loss of locally effective strategies for climate adaptation.

89 PITTS, M. M.; KHANDER, S. R. Does micro-credit empower women? Evidence from Bangladesh. *Policy Research Working Paper*, The World Bank, 2003.

90 MATOS, H. A., et al. Op. Cit., 2023.

91 RODRÍGUEZ CÁCERES, A. Op. Cit., 2025.

92 MATOS, H. A., et al. Op. Cit., 2023.

93 ANJUM, S., & AZIZ, S. Op. Cit., 2025.

94 MATOS, H. A., et al. Op. Cit., 2023.

95 CASTELO, A., et al. Op. Cit., 2024.

96 RODRÍGUEZ CÁCERES, A. Op. Cit., 2025.

97 FREITAS, S. Op. Cit., 2010.

Conclusion

The climate crisis is not a uniform phenomenon but a complex intersection of environmental, social, and cultural forces that demand an equally multifaceted response. This article has argued that bioculturality, when combined with an intersectional gender perspective, provides an essential framework for understanding and addressing the multiple dimensions of this global emergency.

The analysis shows that women, across diverse realities, are not passive victims of climate change but actors whose vulnerabilities are intensified by long-standing inequalities and social hierarchies. At the same time, they are key agents of resilience, guardians of ancestral and biocultural knowledge essential for adaptation and for building more just and sustainable futures.

Ignoring these dimensions – through women’s underrepresentation in decision-making, the persistence of gender-blind policies, or the devaluation of local knowledge – has led to maladaptation and the deepening of injustices. True climate leadership must therefore go beyond technology and emissions targets to embrace gender-transformative policies that both recognize difference and dismantle the unequal systems that produce vulnerability in the first place.

This requires an unwavering commitment to women’s empowerment, political, economic, and social. Integrating biocultural knowledge, amplifying marginalized voices, and dedicating financial resources to women-led initiatives must become non-negotiable pillars of substantive climate justice.

The vision that emerges is of a new climate paradigm, one that celebrates the plurality of life and knowledge, recognizes the interdependence between human well-being and planetary health, and forges solutions grounded in an ecology of knowledges, with women at the forefront of leadership and innovation.

Only through this path can humanity aspire to a truly sustainable and equitable model of development, affirming that gender equality and biocultural justice are not complementary goals, but the very foundation of planetary resilience.

CLIMATE CHANGE: DECENT WORK AND SOCIOENVIRONMENTAL JUSTICE

BY CIRLENE LUIZA ZIMMERMANN⁹⁸

Climate change and its adverse effects on the environment and on people are no longer a distant forecast but a tangible reality that already shapes everyday life. Extreme heat waves, floods, prolonged droughts, fires, and landslides are impacting communities across the planet, causing environmental and economic losses as well as profound violations of human rights. The world of work is among the most affected arenas, as workers are directly exposed to environmental transformations that compromise their health, safety, and dignity.

In this context, the fundamental right to work in safe and healthy environments, recognized by the Federal Constitution and elevated by the ILO in 2022 to the status of a fundamental principle of work, has gained central importance in contemporary legal debate. Safeguarding protected workplaces in times of climate crisis requires both adaptation measures aimed at the immediate protection of workers' physical and mental health and integrity, and mitigation policies capable of transforming production systems and reducing greenhouse gas emissions through a just transition.

However, the climate crisis does not affect everyone equally. Its consequences fall most heavily on socially vulnerable populations: low-income communities, Black people, women, children, Indigenous peoples, quilombola communities, artisanal fisherfolk, and small-scale farmers. These are precisely the groups occupying the most precarious, informal, and hazardous jobs, suffering simultaneously from environmental degradation and the violation of their fundamental rights.

It is at this point that the concept of socio-labor-environmental justice emerges, integrating environmental protection with social and labor protection, and affirming that there can be no sustainable climate without work that is sustainable, decent, safe, and healthy⁹⁹. The Labor Prosecutor's Office (MPT), through its guidelines and recommendations, has helped consolidate this understanding by aligning the defense of the work environment with the global agenda to confront the climate crisis.

This article therefore seeks to analyze the relationship between climate change, labor, and socioenvironmental justice along three main lines: the impacts of the climate crisis on the fundamental right to safe and healthy work; its disproportionate effects on vulnerable populations and the connection with practices

98 Prosecutor at the Labor Prosecutor's Office (MPT) since 2016. National Coordinator of the Office for the Defense of the Work Environment and Workers' Health (Codemat/MPT) for the 2023–2025 term. Federal Prosecutor at the Office of the Attorney General (AGU) from 2007 to 2016. Holds a Master's and a Bachelor's degree in Law from the University of Caxias do Sul (UCS). Email: cirlene.zimmermann@mpf.br.

99 ZIMMERMANN, Cirlene Luiza; PEREIRA, José de Lima Ramos. *Abril Verde: por um futuro sustentável no trabalho e no clima*. [2025a]. Available at: <https://www.metropoles.com/colunas/juris/abril-verde-por-um-futuro-sustentavel-no-trabalho-e-no-clima>. Accessed on: Sept. 25, 2025.

such as child labor and forced labor; and the need for mitigation measures, a just transition, and the consolidation of socio-labor-environmental justice as a normative and political horizon.

The impacts of climate change on the fundamental right to safe and healthy work

Climate change stands as one of the greatest challenges of the 21st century, with direct implications for fundamental rights, particularly the right to safe and healthy work. The growing frequency and intensity of extreme weather events such as heat waves, prolonged droughts, floods, landslides, and wildfires have immediate repercussions on the world of work, threatening the health, safety, productivity, and even the survival of millions of workers. Reports by the Intergovernmental Panel on Climate Change (IPCC)¹⁰⁰ have repeatedly demonstrated that the impacts of the climate crisis are becoming more frequent, more severe, and unevenly distributed, disproportionately affecting vulnerable populations such as low-income communities, Black people, residents of marginalized urban areas, and informal workers, who are often exposed to higher risks and precarious working conditions.

In 2022, the right to safe and healthy work was elevated to the status of a fundamental principle of the International Labour Organization (ILO). This historic decision, grounded in the alarming rates of occupational accidents and illnesses, reaffirms that decent work cannot be separated from the preservation of workers' health and lives. The ILO provides essential normative instruments, such as Conventions N° 155 and N° 187, which set out guidelines for promoting national occupational safety and health policies, imposing on States and employers the duty to adopt adequate, effective, and comprehensive preventive measures against all occupational risks.

At the international level, this framework is reinforced by United Nations General Assembly Resolution 76/300, which in 2022 recognized the human right to a clean, healthy, and sustainable environment¹⁰¹. This recognition implicitly broadens the traditional concept of the environment to encompass the workplace, since a significant share of environmental pollution stems from choices related to production processes. This expanded notion also strengthens the link between human rights, climate justice, and workers' dignity. Furthermore, the UN 2030 Agenda for Sustainable Development¹⁰², under Target 8.8, establishes the global obligation to protect the safety and health of all workers, connecting labor protection to the broader pursuit of sustainable development.

100 Intergovernmental Panel on Climate Change (IPCC). Climate Change 2023: Synthesis Report. Available at: https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport_PO.pdf. Accessed on: Sept. 26, 2025.

101 UNITED NATIONS (UN). UN adopts resolution recognizing a healthy environment as a human right. [2022]. Available at: <https://news.un.org/pt/story/2022/07/1796682>. Accessed on: Sept. 25, 2025.

102 UNITED NATIONS BRAZIL. How the United Nations supports the Sustainable Development Goals in Brazil. Available at: <https://brasil.un.org/pt-br/sdgs>. Accessed on: Sept. 26, 2025.

Also at the international level, in July 2025, two landmark advisory opinions were issued, one by the Inter-American Court of Human Rights and the other by the International Court of Justice (ICJ). Both affirm the intrinsic link between the duty to protect the climate and the duty to safeguard the work environment.

The Inter-American Court of Human Rights delivered Advisory Opinion N° 32/25, titled “Climate Emergency and Human Rights”¹⁰³, underscoring the urgency of the climate crisis and recognizing it as a direct threat to human rights. The Court determined that States must act with due diligence, guided by the best available science and through the adoption of ambitious targets for both mitigation and adaptation to climate impacts. The Advisory Opinion further recognized the Human Right to a Healthy Climate as an autonomous right and elevated climate protection to the status of a peremptory norm of international law (*jus cogens*), binding on all States. It also highlighted corporate responsibility, the importance of access to information and public participation, and the duty to protect vulnerable groups who are disproportionately affected by the climate emergency.

The advisory opinion of the International Court of Justice (ICJ), the main judicial organ of the United Nations, declared climate change to be an “urgent and existential threat,” emphasizing that “the adverse effects of climate change may significantly undermine the effective enjoyment of certain human rights, such as the right to health” and “the right to an adequate standard of living.”¹⁰⁴ In doing so, the Court recognized that States bear international obligations in the context of climate change and the global climate crisis, clarifying the extent of their legal responsibilities under international law. These include the duty to adopt measures that contribute to the mitigation of greenhouse gas emissions; to exercise due diligence in fulfilling their shared responsibilities; and to prevent significant environmental harm by acting diligently and using all means available to ensure that activities under their jurisdiction or control do not cause substantial damage to the climate system or other parts of the environment.

The Court further determined that any breach by a State of the obligations identified constitutes an internationally wrongful act, giving rise to international responsibility. Consequently, the State has an ongoing duty to cease the violation, restore the situation to the status quo ante, provide guarantees of non-repetition, and ensure full reparation to affected States in the form of restitution, compensation, and satisfaction.¹⁰⁵

In Brazil, the right to an ecologically balanced environment is enshrined in Article 225 of the 1988 Federal Constitution¹⁰⁶; the reduction of work-related risks

103 INTER-AMERICAN COURT OF HUMAN RIGHTS. Advisory Opinion N° 32 of 2025: Climate Emergency and Human Rights. Available at: <https://corteidh.or.cr/tablas/OC-32-2025/>. Accessed on: Sept. 26, 2025.

104 G1. Tribunal Mundial: Mudanças climáticas são ‘ameaça existencial’. Available at: <https://g1.globo.com/meio-ambiente/noticia/2025/07/23/em-parecer-historico-o-tribunal-mundial-afirma-que-as-mudancas-climaticas-sao-uma-ameaca-existencial.ghtml>. Accessed on: Sept. 26, 2025.

105 CONSULTOR JURÍDICO. Histórica opinião consultiva da CIJ sobre mudanças climáticas. Available at: <https://www.conjur.com.br/2025-jul-28/historica-opiniao-consultiva-da-cij-sobre-mudancas-climaticas/>. Accessed on: Sept. 26, 2025.

106 BRAZIL. Constitution of the Federative Republic of Brazil of 1988. Brasília, DF: Office of the

is safeguarded under Article 7, item XXII; and the right to health is protected by Article 196. Together, these provisions underscore the fundamental nature of the right to safe and healthy work, which must be understood as a specific dimension of the broader right to an ecologically balanced environment. This interpretation is reinforced by legal scholarship, labor jurisprudence, and the Regulatory Standards of the Ministry of Labor¹⁰⁷, which recognize that employers are responsible not only for the intrinsic risks of productive activities but also for foreseeable external hazards, including those resulting from climate crises.

Climate change is introducing new occupational risks. Extreme heat can lead to heat stress, exhaustion, dehydration, and even death, particularly in outdoor sectors such as agriculture, construction, urban cleaning, and delivery services. Floods and landslides, in turn, expose workers to serious accidents, material losses, and infectious diseases, with special concern for those on the front lines, such as rescue workers and firefighters. Smoke from wildfires and agricultural burning worsens respiratory illnesses, while increased solar radiation heightens the risk of skin cancer. Even in indoor settings, rising temperatures and inadequate climate control contribute to higher risks of both physical and mental illness.¹⁰⁸

The International Labour Organization (ILO), in its report “Ensuring safety and health at work in a changing climate”¹⁰⁹, estimates that more than 2.4 billion people worldwide are already exposed to excessive heat as a consequence of climate change. In Brazil, recent events confirm this scenario: the 2024 floods in Rio Grande do Sul and the 2022 tragedy in Petrópolis revealed the vulnerability of workers facing environmental disasters, resulting in loss of life, employment, and income¹¹⁰.

In this context, it is urgent to rethink public policies and corporate practices in occupational safety and health. Adaptation, mitigation, and prevention measures must be integrated into workplace safety and health programs, including the reorganization of work schedules, rest breaks, access to hydration, provision of appropriate protective equipment, training, and early warning systems for ex-

President of the Republic, [1988]. Available at: http://www.planalto.gov.br/ccivil_03/Constituicao/Constituicao.htm. Accessed on: Sept. 25, 2025.

107 BRAZIL. Ministério do Trabalho e Emprego (Ministry of Labor and Employment). Regulatory Standard Nº 01. 2020. Available at: <https://www.gov.br/trabalho-e-emprego/pt-br/aceso-a-informacao/participacao-social/conselhos-e-orgaos-colegiados/comissao-tripartite-partitaria-permanente/normas-regulamentadora/normas-regulamentadoras-vigentes/nr-01-atualizada-2024-i-1.pdf>. Accessed on: Sept. 10, 2025.

108 ZIMMERMANN, Cirlene Luiza. O direito fundamental ao trabalho seguro e saudável em situações de crises socioambientais. In: *Revista do MPT/RS, A preservação dos direitos fundamentais do trabalho durante situações de crises ambientais*. [2025b]. Vol. 1, nº 1. Porto Alegre: Procuradoria Regional do Trabalho da 4ª Região, 2025. Available at: https://www.prt4.mpt.mp.br/images/Ascom/2025/revistaprt4/revista/RevistaPRT4_n1_2025.pdf. Accessed on: Sept. 25, 2025.

109 International Labour Organization (ILO). Ensuring safety and health at work in a changing climate. [2024]. Available at: <https://www.ilo.org/pt-pt/publications/sintese-do-relatorio-garantir-seguranca-e-saude-no-trabalho-num-clima-em>. Accessed on: Sept. 25, 2025.

110 ZIMMERMANN, Cirlene Luiza. [2025b].

treme weather events¹¹¹. Preventive education, as provided for in Article 14 of ILO Convention N^o 155, should also be promoted in schools through initiatives such as *Segurança e Saúde nas Escolas* (Safety and Health in Schools)¹¹², a partnership among the Labor Prosecutor's Office (MPT), the International Labour Organization (ILO), and the Ministry of Labor and Employment. These initiatives seek to integrate environmental education, the promotion of decent work, and a culture of prevention¹¹³.

The right to safe and healthy work, therefore, cannot be downplayed in times of climate crisis. On the contrary, the urgency of the current context demands an expansion of its scope to ensure that Workers, even when facing environmental disasters, have their dignity, health, integrity, and lives protected. In this sense, climate justice and labor justice are inseparable: there can be no sustainable future without the simultaneous preservation of the planet and the fundamental rights of working people.

The climate crisis and its negative effects on the most vulnerable populations: black people, low-income communities, and traditional peoples

The climate crisis has emerged as a global phenomenon that deepens historical inequalities. Its impacts are far from neutral: they disproportionately affect the most socially vulnerable groups, such as low-income communities, Black people, women, children, and traditional peoples. This reality, documented in scientific reports such as the IPCC's and confirmed by recent lived experiences, shows that the adverse effects of the crisis cannot be understood solely in environmental or economic terms, but must also be recognized as a profound issue of social and labor justice.

The link between social vulnerability and climate impacts is undeniable. Low-income populations tend to live in peripheral urban areas or underserved rural territories, often in precarious housing and with limited access to essential public services. In such settings, floods, landslides, and prolonged droughts cause devastating effects. Moreover, many of these individuals work in precarious, informal, and hazardous occupations, such as agriculture, construction, waste collection, urban cleaning, and extractive activities, which are precisely those most exposed to climate risks.

This precariousness is directly linked to serious violations of fundamental rights, including child labor and contemporary forms of slavery. Data from the

111 ZIMMERMANN, Cirlene Luiza. *Mudanças Climáticas: Desafio para a Saúde e a Segurança no Trabalho*. [2024]. Available at: <https://www.conjur.com.br/2024-mar-31/mudancas-climaticas-desafio-para-a-saude-e-a-seguranca-no-trabalho/>. Accessed on: Sept. 25, 2025.

112 BRAZIL. Labor Prosecutor's Office, International Labour Organization and Ministry of Labor and Employment. *Segurança e Saúde nas Escolas*. [2023]. Available at: <https://segurancaesaudenas-escolas.trabalho.gov.br/pt>. Accessed on: Sept. 25, 2025.

113 ZIMMERMANN, Cirlene Luiza. *Segurança e saúde nas escolas: enfrentando as mudanças climáticas e seus impactos no mundo do trabalho a partir da educação*. In: *Mudanças Climáticas e Proteção do Meio Ambiente do Trabalho*. Brasília: MPT. Forthcoming, 2025b.

Labor Prosecutor's Office (MPT)¹¹⁴ show that areas affected by deforestation, illegal burning, and clandestine mining are among the main hotspots for degrading labor exploitation. A devastated environment walks hand in hand with human exploitation: where nature is destroyed, workers are, as a rule, exploited.

In the case of child labor, this connection becomes even more evident¹¹⁵. Environmental degradation and climate emergencies reduce subsistence opportunities for families living in extreme poverty, pushing children and adolescents into work, often in highly dangerous conditions, when they should instead enjoy their constitutional rights to protection from labor or, in the case of older adolescents, to safe and regulated work. In rural areas, children are exposed to pesticides, exhausting work hours, and extreme heat; in dumpsites, they face contamination and accident risks; and in informal urban work, they endure violence, exploitation, and the absence of protection¹¹⁶. In addition to violating the Federal Constitution and ILO Convention Nº 182, early labor compromises children's physical, psychological, and educational development, perpetuating cycles of poverty and exclusion.

Even when they remain in school, children and adolescents are more vulnerable to the effects of extreme weather. Excessive heat in classrooms can severely impair learning, with losses up to 50 percent greater when temperatures exceed 38°C. More than 15 million Brazilian high school students (57.6%) attend schools with low or minimal resilience to flooding, and 8 million (33.8%) study in institutions unprepared for drought. In 2024 alone, more than one million students in Brazil lost class time due to extreme weather events such as droughts and floods.¹¹⁷

Women workers are also disproportionately affected by the climate crisis. Many are employed in low-paid jobs with little or no social protection, such as domestic, rural, or informal work. When environmental disasters occur, they are often the first to lose income and the last to be included in protection measures. In addition, the burden of caregiving, of children, the elderly, and sick family members, increases significantly during crises and falls disproportionately on women, further heightening their vulnerability. According to data from the United Nations High Commissioner for Refugees (UNHCR), women constitute the majority

114 MINISTÉRIO Público do Trabalho (Labor Prosecutor's Office). Observatório da Erradicação do Trabalho Escravo e do Tráfico de Pessoas. Available at: <https://smartlabbr.org/trabalhoescravo/>. Accessed on: Sept. 26, 2025.

115 MINISTÉRIO Público do Trabalho (Labor Prosecutor's Office). Observatório da Erradicação do Trabalho Escravo e do Tráfico de Pessoas. Available at: <https://smartlabbr.org/trabalhoescravo/>. Accessed on: Sept. 26, 2025.

116 ZIMMERMANN, Cirlene Luiza; ROSA, Ingrid Millene de Oliveira. Mudanças climáticas e impactos no direito de crianças e adolescentes ao não trabalho. In: *Livro Comemorativo dos 25 anos de atuação da Coordenadoria Nacional de Combate ao Trabalho Infantil e de Promoção e Defesa dos Direitos de Crianças e Adolescentes – Coordinfância*. Brasília: MPT. Forthcoming, 2025a.

117 BRAZIL. Ministério Público do Trabalho (Labor Prosecutor's Office). Cartilha Educativa Segurança e Saúde nas Escolas e Mudanças Climáticas. [2025a]. Available at: https://mpt.mp.br/pgt/publicacoes/seguranca-e-saude-nas-escolas/cartilha-educativa-seguranca-e-saude-nas-escolas-e-mudancas-climaticas/@@display-file/arquivo_pdf. Accessed on: Sept. 25, 2025.

of climate-displaced populations, representing about 80 percent of those forced to migrate due to environmental changes¹¹⁸.

Among the groups most affected by environmental degradation and the impacts of climate change are traditional peoples such as Indigenous communities, quilombolas, artisanal fisherfolk, small-scale farmers, and extractivists. Their livelihoods depend on the integrity of ecosystems that are increasingly degraded by deforestation, mining, pollution, the intensive use of pesticides, and the effects of climate change itself. The loss of territories, contamination of rivers, and destruction of forests threaten not only their means of subsistence but also their cultural survival. Moreover, these populations experience what has been termed environmental racism, the unequal distribution of environmental risks and damages that systematically burden Black, Indigenous, and marginalized communities.

Environmental racism reveals that climate degradation is not a natural occurrence but a political, social, and economic process that concentrates harm on groups already historically excluded. The occupation of high-risk areas such as hillsides, floodplains, and urban peripheries; vulnerability to extreme heat in inadequate housing; and dependence on natural resources for subsistence in traditional territories all demonstrate that the effects of climate change are deeply intertwined with structural inequality.

In this scenario, the fundamental right to decent, safe, and healthy work is at risk. Precarious workers, those exposed to extreme environmental and climatic conditions and deprived of social protection, are unable to perform their jobs under conditions compatible with human dignity. The degradation of nature and climate and the degradation of labor are mutually reinforcing, perpetuating a cycle of human rights violations.

Therefore, protecting the most vulnerable populations must be understood as an essential condition for achieving socio-labor-environmental justice. Public policies aimed at eradicating child labor and forced labor, protecting women workers, and safeguarding traditional peoples must be strengthened and coordinated. More broadly, addressing the climate crisis requires recognizing that vulnerability is not only environmental but also social, racial, and labor-related.

The interconnection between the climate crisis and inequality thus makes clear that climate justice cannot be separated from social and labor justice, which leads to the next discussion: the need for mitigation measures, the construction of a just transition, and the promotion of socio-labor-environmental justice.

The United Nations Entity for Gender Equality and the Empowerment of Women (UN Women), in its report “Gender Snapshot 2025” released on September 15, 2025, found that under the worst projected climate scenarios, 158.3 million women and girls could fall into extreme poverty by 2050, defined as living on less than US\$2.15 per day. Roughly half of them are expected to be in sub-Saharan Africa, a region comprising more than 40 countries.¹¹⁹

118 INSTITUTO CAMILA E LUIZ TALIBERTI. Refugiados climáticos: os deslocamentos forçados devido a desastres climáticos. Available at: <https://somosmentes.org.br/refugiados-climaticos/#:~:text=Essas%20mulheres%20carregam%20conhecimentos%20ancestrais,de%20um%20futuro%20mais%20sustent%C3%A1vel>. Accessed on: Sept. 26, 2025.

119 UN Women. Gender Snapshot 2025. Available at: <https://www.unwomen.org/en/resources/>

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Mitigation of Climate Change, Just Transition, and Socio-Labor-Environmental Justice

The climate crisis presents a dual challenge for the world of work: to adapt to environmental conditions already in transformation while also mitigating the future intensity of the crisis. Although adaptation and mitigation are distinct

gender-snapshot. Accessed on: Sept. 26, 2025.

120 ZIMMERMANN, Cirlene Luiza. Racismo ambiental e mudanças climáticas no mundo do trabalho. [2025d]. In: Seminário ESMPU e TRT12 "Mudanças Climáticas e Desastres Socioambientais: repercussões no mundo do trabalho". Florianópolis: ESMPU; TRT12, 2025. Available at: <https://www.youtube.com/live/HP3jdWPHuFs?si=eQ0jbqqL8QK2i42e>. Accessed on: Sept. 25, 2025.

concepts, they must be addressed in an integrated and complementary way. Adaptation involves immediate measures to protect workers' health and safety amid new climate risks, such as reorganizing work schedules, introducing rest breaks during heat waves, ensuring access to potable water, establishing emergency protocols, and strengthening health surveillance. Mitigation, in turn, demands structural changes in development models, reducing greenhouse gas emissions and transforming carbon-intensive production processes.

Within this context, the Labor Prosecutor's Office (MPT) has taken on a central role in connecting climate justice and labor justice. The Guidelines for Action on the Impacts of Climate Change in the Work Environment¹²¹, launched in 2025, sets out concrete recommendations for companies and institutions to implement both adaptation measures and mitigation strategies. These include reviewing risk prevention programs, reassessing environmental working conditions, and integrating the climate agenda into occupational health and safety policies and practices. By affirming that a healthy work environment is a fundamental human right, the MPT underscores that confronting the climate crisis necessarily entails ensuring the right to decent work.

A just energy transition is one of the core elements of this agenda. Combating climate change requires a drastic reduction in the use of fossil fuels and in highly polluting activities such as predatory mining, deforestation-based extensive agriculture, and carbon-intensive industrial production. However, this transformation cannot come at the cost of workers' livelihoods. Millions of people worldwide depend on jobs in so-called "brown" sectors and risk losing their sources of income as economies transition toward decarbonization¹²².

For this reason, the International Labour Organization (ILO) maintains that the transition must be just. This entails implementing public policies for professional retraining, enabling workers to move into sustainable sectors; ensuring social protection through minimum income and social security guarantees during the process; and fostering social dialogue that brings together unions, businesses, governments, and communities to define inclusive pathways¹²³. The energy transition, therefore, must be not only technological but also social, ensuring that no worker is left behind.

Socio-labor-environmental justice also requires acknowledging and valuing the role of groups historically marginalized yet essential to mitigation efforts. This includes recyclable material collectors, whose daily work removes tons of

121 BRAZIL. Ministério Público do Trabalho (Labor Prosecutor's Office). Guia de Atuação do MPT contra os impactos das mudanças climáticas no meio ambiente do trabalho. [2025b]. Available at: https://mpt.mp.br/pgt/publicacoes/manuais/guia-orientativo-abril-verde-2025_futuro-sustentavel-no-trabalho-e-no-clima/@@display-file/arquivo.pdf. Accessed on: Sept. 25, 2025.

122 ZIMMERMANN, Cirlene Luiza. Papel do Ministério Público do Trabalho na mitigação das mudanças climáticas. [2025c]. Available at: <https://www.conjur.com.br/2025-set-04/papel-do-ministerio-publico-do-trabalho-na-mitigacao-das-mudancas-climaticas/>. Accessed on: Sept. 25, 2025.

123 International Labour Organization (ILO). Resolution concerning a just transition towards environmentally sustainable economies and societies for all. [2023]. Available at: https://www.ilo.org/sites/default/files/2025-05/Resolu%C3%A7%C3%A3o-da-OIT-sobre-transi%C3%A7%C3%A3o-justa_PT.pdf. Accessed on: Sept. 26, 2025.

waste from dumps and landfills. Their activity contributes significantly to reducing methane emissions and strengthening the circular economy. However, their reality remains marked by precarious work, lack of formal employment, insufficient protective equipment, and social stigma. A study found that 90 percent of collectors interviewed across different regions of Brazil had been affected by extreme weather events related to climate change¹²⁴. Including these workers in public policies and reverse logistics programs, promoting environmental education to raise public awareness, and quantifying the positive environmental impact of their work are fundamental measures of social justice and effective strategies for climate mitigation.

Another relevant example involves workers in the bioenergy and wind power sectors, both expanding as cleaner alternatives to fossil fuels. The production of ethanol, biogas, and biodiesel, when carried out under safe and healthy conditions, can play a key role in reducing emissions. The same applies to workers employed in wind farms. Nonetheless, reports of precarious contracts, excessive working hours, extreme heat, and high accident risks, particularly in rural areas, remain frequent.

Communities located near supposedly “green” activities must also have their right to a balanced environment safeguarded. This, however, is not always the case, as illustrated by instances of so-called “turbine syndrome,” associated with symptoms such as insomnia, irritability, headaches, and anxiety caused by the constant noise and infrasound emitted by wind turbines in Brazil’s northeast region¹²⁵.

A similar pattern of social degradation can be seen in lithium mining in the Jequitinhonha Valley, in the state of Minas Gerais. Often referred to as the “white gold” of the energy transition, lithium is a key mineral for producing batteries used in everything from cell phones to electric vehicles. Yet lithium extraction has led to the displacement of communities, the destruction of farmland, and serious impacts on local culture¹²⁶, in addition to respiratory diseases and mental health disorders among residents¹²⁷. This shows that the shift toward renewable energy is not automatically just: it must ensure that new industries are both decent and sustainable, for the workers directly involved and for the surrounding communities.

124 WIEGO – Women in Informal Employment: Globalizing and Organizing. Catadores e catadoras obtêm apoio governamental para aumentar sua resiliência às mudanças climáticas. Available at: <https://www.wiego.org/press/catadores-e-catadoras-obtem-apoio-governamental-para-aumentar-sua-resiliencia-mudancas/>. Accessed on: Sept. 26, 2025.

125 FIOCROUZ. Pesquisadores analisam impactos da “síndrome da turbina eólica”. Available at: <https://fiocruz.br/noticia/2025/01/pesquisadores-analisam-impactos-da-sindrome-da-turbina-eolica>. Accessed on: Sept. 26, 2025.

126 Movimento pela Soberania Popular na Mineração (MAM). Sustentável para quem? O Lítio Brasileiro: A Promessa da Transição Energética e a Insustentabilidade Socioambiental. Available at: <https://www.mamnacional.org.br/2023/11/24/sustentavel-para-quem-o-litio-brasileiro-a-promessa-da-transicao-energetica-e-a-insustentabilidade-socioambiental/>. Accessed on: Sept. 26, 2025.

127 GUATELLI, Caio. *Comunidade no Vale do Jequitinhonha relata doenças após chegada de mina de lítio*. Available at: <https://brasil.mongabay.com/2024/11/mineracao-de-litio-adoece-comunidades-do-vale-do-jequitinhonha/>. Accessed on: Sept. 26, 2025.

Family farming and traditional peoples also play a strategic role in climate mitigation. Agroecological practices, the conservation of native seeds, sustainable artisanal fishing, and low-impact extractivism all help preserve ecosystems and reduce pressure on threatened biomes. However, these workers face constant threats from land grabbing, illegal deforestation, and the contamination of rivers and soils. Protecting them means upholding cultural and social rights while strengthening production models that are essential to curbing the climate crisis.

The connection between environmental degradation and labor exploitation highlights the need for a new legal paradigm: socio-labor-environmental justice. This concept recognizes that environmental and labor protections are inseparable, and that any mitigation strategy must take decent work as its guiding principle. There is no sustainable climate without sustainable work, and no environmental justice without social justice. The right to safe and healthy work, enshrined in Article 7, item XXII, of the 1988 Federal Constitution and in ILO conventions, and the principles of prevention and precaution that underpin environmental law, including labor environmental law, converge in the effort to build fairer and more sustainable societies.

Mitigating climate change is therefore not merely a technical challenge but a social endeavor. It requires reducing emissions, transforming production chains, and, above all, protecting workers and vulnerable communities. The future of humanity depends on linking a just energy transition with the recognition of undervalued labor and the full realization of fundamental rights, honoring the intergenerational duty to protect life and human dignity within a balanced environment.

Final considerations

There is no doubt that confronting climate change represents an environmental challenge of enormous magnitude. Yet the human rights crisis it generates, including its impacts on labor rights, must be addressed with equal seriousness. Millions of workers are already suffering the effects of extreme climate risks, whether through unbearable heat, smoke from fires, air pollution, water shortages, or the destruction of ecosystems on which their livelihoods depend.

The first chapter demonstrated that the fundamental right to safe and healthy work, enshrined in the 1988 Federal Constitution and recognized by the International Labour Organization (ILO) as a fundamental principle of work, is at risk in light of the accelerating climate crisis. Occupational risks associated with climate change must therefore be integrated into climate action plans and occupational risk management programs.

The second chapter showed that the impacts of the climate crisis are uneven and fall most severely on vulnerable populations, linking environmental degradation to illicit practices such as child labor and forced labor, and revealing the harsh reality of environmental racism. It also highlighted the urgent need for adaptation measures in work environments, particularly in activities most exposed to climate risks.

The third chapter emphasized that adaptive measures alone are insufficient. It is necessary to advance mitigation policies, ensure a just transition that does not exclude workers from “brown” sectors, and recognize the essential contributions

of historically invisible groups such as recyclable material collectors and traditional communities.

In conclusion, there can be no climate justice without social and labor justice. This requires the active commitment and effective engagement of institutions such as the Labor Prosecutor's Office¹²⁸. Addressing the climate crisis demands transforming production systems, reducing emissions, and protecting workers, ensuring that the ecological transition is also a just transition. Socio-labor-environmental justice thus emerges as a necessary guiding framework, one that integrates environmental protection and labor rights to build a sustainable, inclusive, and dignified future for present and future generations.

128 ABRAMPA – Brazilian Association of Members of the Public Prosecutor's Office for the Environment). *Mudanças Climáticas: a atuação institucional do Ministério Público do Trabalho (MPT)*. [2025]. Available at: <https://mpnacop30.org.br/ministerio-publico-brasileiro/ministerio-publico-do-trabalho/ministerio-publico-do-trabalho-mpt/>. Accessed on: Sept. 25, 2025.

EROSION OF SOCIAL PARTICIPATION IN AGRARIAN REFORM SETTLEMENTS: A CRITICAL ANALYSIS OF INCRA NORMATIVE INSTRUCTION N° 112/2021

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Agrarian reform and social justice: the constitutional promise and the challenges of its effectiveness

The 1988 Federal Constitution established the social function of property as a core principle of agrarian law, breaking with the patrimonialist tradition of previous constitutions. By linking property rights to collective purposes, the 1988 Charter advanced a vision grounded in social justice, environmental sustainability, and the reduction of historical inequalities in access to land.

The principle is initially enshrined in Article 5, Section XXIII, which states that “property shall fulfill its social function,” forming part of the fundamental rights and guarantees and, therefore, an unamendable clause. Article 170, Section III, reinforces this by establishing that the economic order must ensure a dignified existence for all, while observing, among other things, the principle of the social function of property.

For rural property, Article 186 of the Constitution sets objective criteria for fulfilling this social function: rational and appropriate use; sustainable management of natural resources; compliance with labor laws; and use aimed at the well-being of both owners and workers. These criteria are further defined by laws implementing constitutional provisions, such as the Land Statute (Law N° 4,504/1964), Law N° 8,629/1993 on agrarian reform, and Complementary Law N° 76/1993, which regulates the expropriation of rural property for social purposes. Together, they establish a legal framework linking property rights to human dignity, social justice, and the reduction of structural inequalities in rural areas.

According to Antônio Maués, agrarian reform is the main tool the Brazilian state uses to ensure the social function of rural property and to expand access to

129 Federal Public Defender. Master’s candidate in Law, State, and Constitution at the University of Brasília (UnB). Specialist in Criminal Law and Criminology from the Pontifical Catholic University of Rio Grande do Sul (2020). Holds a Bachelor’s degree in Law from the Federal University of Goiás (2013). Joined the Federal Public Defender’s Office (DPU) in 2020, working in the areas of human rights, access to justice, and the criminal justice system. Served as Regional Human Rights Defender in the State of Pará (2021–2022) and as Secretary for Access to Justice at the DPU (2023–2024).

130 Federal Public Defender. PhD in Contemporary Legal Theories from the Federal University of Rio de Janeiro (UFRJ), with a focus on Theories of Decision, Interpretation, and Justice (2023). Holds a Master’s degree in Contemporary Legal Theories from the same institution, with an emphasis on Human Rights (2018). Also holds postgraduate qualifications in Criminal Law and Criminology from the Institute of Criminology and Criminal Policy (2015), and in Administrative Law from the Fluminense Federal University (2009), where she also earned her Bachelor’s degree in Law (2008). Joined the Federal Public Defender’s Office (DPU) in 2010, working in the areas of human rights, the criminal justice system, and prison policy. Served as National Human Rights Defender (June 2023–June 2025) and as Secretary for the Prison System at the DPU (2022–2023).

land, in line with social justice, human dignity, and reducing inequalities¹³¹. The policy tackles Brazil's long-standing land concentration by combining land redistribution, support for family farming, productive inclusion, food security, and sustainable development. As José Afonso da Silva points out, it is a multidimensional constitutional mandate, encompassing the economic, social, environmental, and cultural dimensions of rural areas¹³².

Its effectiveness goes beyond simply granting land titles and requires coordinated state action in areas such as access, credit, technical assistance, infrastructure, and legal protection to fully include settled families and transform exclusionary land structures. Despite the advances of the 1988 Constitution, Brazil still has one of the highest levels of land concentration in the world. The 2017 Agricultural Census by IBGE¹³³, shows that just 1% of farms control nearly half of rural land, while farms of up to 10 hectares – about half of all establishments – hold less than 3% of the land. Family farming, which produces 70% of the food consumed in the country, occupies only 23% of the national agricultural area.

The situation has worsened due to the slow pace and weakness of land regularization and agrarian reform policies. According to Amílcar Baiardi, Paulo Mello, and Maria Pedrosa¹³⁴, settlement policies have sharply declined since 2011, affected by budget cuts, rising land prices driven by agribusiness growth and the commodities boom, legal obstacles to expropriation, and the perception that costs would outweigh social benefits. Amid this stagnation, rural conflicts have surged, reaching 2,203 incidents in 2023¹³⁵ – the highest number recorded since 1985, according to the Pastoral Land Commission.

Land access inequality also has a clear racial dimension: Black and Brown populations, who make up 52% of rural residents, control only 20% of cultivated land, while White populations hold 80%¹³⁶. This disparity, known as land-based racism¹³⁷, reflects the enduring legacies of slavery and colonialism, reinforced

131 MAUÉS, Antonio. Constitution and Inequality: The Right to Property and Agrarian Reform in Brazil. *Lua Nova: Revista de Cultura e Política*. São Paulo, 2022. Available at: <https://www.scielo.br/j/ln/a/zBkTKDFDKqtpgyqw6rH8HRt/?lang=pt>. Accessed on: Sept. 24, 2025.

132 SILVA, José Afonso da. *Curso de Direito Constitucional Positivo* [Course of Positive Constitutional Law]. 39th ed. São Paulo, 2016.

133 BRAZILIAN INSTITUTE OF GEOGRAPHY AND STATISTICS (IBGE). 2017 Agricultural Census: Final Results. Rio de Janeiro, IBGE, 2019. Available at: https://censoagro2017.ibge.gov.br/templates/censo_agro/resultadosagro/index.html. Accessed on: Sept. 24, 2025.

134 BAIARDI, Amílcar; et al. Reflections on Why Agrarian Reform Has Declined in Brazil. *Revista do Desenvolvimento Regional*, 2021. Available at: <https://seer.faccat.br/index.php/coloquio/article/view/2218>. Accessed on: Sept. 24, 2025.

135 PASTORAL LAND COMMISSION (CPT). Rural Conflicts in Brazil 2023. Goiânia: Dom Tomás Balduino Documentation Center – CPT, 2023. Available at: <https://cptnacional.org.br/2023/04/14/confilitos-no-campo-brasil-2023>. Accessed on: Sept. 24, 2025.

136 BRAZILIAN INSTITUTE OF GEOGRAPHY AND STATISTICS (IBGE). 2017 Census of Agricultural and Livestock Production: Final Results. Rio de Janeiro, IBGE, 2019. Available at: https://censoagro2017.ibge.gov.br/templates/censo_agro/resultadosagro/index.html. Accessed on: Sept. 24, 2025.

137 PENNA, Camila. Is Agribusiness White? Racial Selectivity and Land Policy in Brazil. *Estudos Sociedade e Agricultura*, 2022. Available at: https://revistaesa.com/ojs/index.php/esa/article/view/esa30-2_07. Accessed on: Sept. 24, 2025.

by ineffective public policies and the State's omission in implementing historical reparations.

In this context, the social function of property and agrarian reform, though established in the Constitution as binding state duties, remain systematically undermined in practice. This ineffectiveness does not stem from a lack of legal provisions, but from the absence of consistent public policies, the capture of institutions by private interests, and the State's repeated omission in guaranteeing minimum rights to historically vulnerable populations.

Normative Instruction N° 112/2021 and the erosion of social participation in agrarian reform policy

The ineffectiveness of the social function of property and agrarian reform is clearly illustrated by INCRA's Normative Instruction N° 112/2021¹³⁸. It was published just days after the agency signed a land-use concession with the Canadian mining company Belo Sun, which reduced the area of the Ressaca Settlement Project and the federal Ituna Block in the Volta Grande do Xingu – a region already deeply affected by socio-environmental conflicts from the Belo Monte Hydroelectric Plant. The instruction emerged amid intense legal¹³⁹ and social¹⁴⁰ scrutiny.

Normative Instruction N° 112/2021, aimed at regulating approvals for mining, energy, and infrastructure projects in settlement areas, effectively undermined the participation rights of settled communities, reducing them to mere formalities. Its only references to participation appear in Articles 16 and 17, §2: Article 16 allows the administration to provide “general clarifications” to settlers, with no deliberative or binding effect; Article 17, §2 requires a public hearing only for tenders for alternative energy sources, limited to an informational role.

In response to these omissions, the Federal Public Defender's Office, through its National Human Rights Division, initiated an administrative evaluation of the approval processes conducted by INCRA and the National Mining Agency (ANM)¹⁴¹.

The investigation conducted by the Federal Public Defender's Office (DPU) revealed a critical institutional scenario, marked by the absence of basic protocols for social participation and the failure to uphold the duty of prior, free, and informed consultation. None of the responsible agencies had internal rules or guidelines to ensure effective participation of affected communities: the ANM had no specific regulations on the matter, and the regional superintendencies of INCRA provided

138 Available at: https://www.gov.br/anp/pt-br/rodadas-anp/oferta-permanente/opc/arquivos/in_incra_112_22122021.pdf. Accessed on: Sept. 24, 2025.

139 Use Concession Agreement N° 1.224/2021, signed between INCRA and Belo Sun Mineração Ltda. on December 22, 2021, is the subject of Public Civil Action N° 1001161-22.2022.4.01.3903, filed by the Federal Public Defender's Office and the Public Defender's Office of the State of Pará. The contract was annulled at first instance, and the case is currently under appeal.

140 For further discussion, see: SILVA, Elielson Pereira da. *Dossier: Ecobiopolitical Expropriation and Mining in the Ressaca Settlement Project, Volta Grande do Xingu – Projeto Nova Cartografia Social da Amazônia*. Belém: Projeto Nova Cartografia Social da Amazônia; UFPA/NAEA, 2022.

141 SEI Process N° 08038.002021/2024-20.

no documentation showing that consultations took place. Moreover, both INCRA and ANM fail to conduct systematic studies on the socioeconomic impacts of overlapping mining projects in settlements, neglecting key issues such as food security, productive organization, and the sustained residence of families in rural areas.

For example, in Mato Grosso, INCRA reported to the DPU 23 approval processes covering over 4,700 hectares of agrarian reform areas, with no record of consultation with the families. The situation is worsened by “consultations” conducted by companies without state oversight. In Espírito Santo, according to INCRA, the mining company Gilmar José de Carvalho ME carried out the consultation at the São Felipe Settlement alone, reducing the mechanism to a mere formality without legitimacy. In Rio Grande do Norte, INCRA documented irregularities in the implementation of transmission lines – particularly wind energy – in settlements such as Zebelê, where settlers were pressured by entrepreneurs and intermediaries to request property titles and release resolutive clauses, even under land-use concession contracts.

These episodes are not isolated failures but reflect a pattern of erasure and systematic structural violations of the right to prior consultation and social participation, in blatant disregard of ILO Convention N° 169 and the Federal Constitution. Notably, despite a formal recommendation from the DPU that INCRA and ANM take measures to correct these irregularities¹⁴², no effective action was taken.

Persistent state inaction and ongoing omissions prompted the Federal Public Defender’s Office to file a public civil action to suspend approvals issued in violation of the legal framework and to ensure the establishment of institutional safeguards protecting settlement territories from unilateral interventions detrimental to community rights.

Prior consultation and social participation as fundamental guarantees for settled communities

The right to prior, free, and informed consultation, guaranteed by ILO Convention N° 169, is not limited to indigenous peoples and quilombolas; it also extends to so-called “tribal peoples.” In Brazil, this category includes traditional peoples and communities (PCTs), recognized by Decree N° 6,040/2007 as culturally distinct groups with their own social structures and historical, collective ties to their territories.

Aderval Costa Filho identifies four key criteria for the self-definition of these groups:

- ▶ ethnic-racial identity (indigenous peoples, quilombolas, Roma, terreiro communities, among others);
- ▶ connections to specific biomes or ecosystems (Geraizeiros, Caatingueiros, Pantaneiros, etc.);

¹⁴² Recommendation N° 7926065 – DPGU/DNDH.

- ▶ labor activities that serve as markers of identity (artisanal fishers, babassu coconut breakers, shellfish gatherers, etc.); and
- ▶ traditional forms of territorial occupation and use shaped by historical processes, such as the retireiros of Araguaia, the faxinalenses, and communities of fechos de pastos¹⁴³.

From this perspective, the diverse ways of life and patterns of territorial occupation in agrarian reform settlements reflect the sociocultural richness of Brazil's traditional peoples. By organizing their productive and social practices around solidarity, resource sharing, and the preservation of community ties, settlers meet the ILO's criteria for tribal peoples and should therefore be recognized as holders of the right to prior, free, and informed consultation, even when living in settlements not formally designated as environmentally distinct.

Even if not all settled communities are considered traditional peoples and communities – a position that would preclude the direct application of ILO Convention N^o 169 – this does not remove the need for their participation in decisions that affect them. The right to social participation is firmly rooted in fundamental constitutional principles, including publicity, administrative transparency, and legal certainty, whose observance is mandatory.

In this regard, the principle of administrative publicity operates in two ways. Its positive aspect requires the State to provide broad access to information, enabling knowledge, participation, and social oversight. Its negative aspect prevents the administration from acting in secrecy, except in exceptional cases to protect public security or privacy¹⁴⁴. Canotilho further identifies four complementary elements of this principle:

- ▶ the right to be informed of administrative proceedings and their reasoning;
- ▶ the right of stakeholders to participate in decision-making, countering procedural secrecy;
- ▶ the right of access to public files and records; and
- ▶ the right to demand proactive measures from the State that ensure visibility, accessibility, and oversight of public policies¹⁴⁵.

This democratic conception is reflected in constitutional provisions that guarantee direct social participation: the inclusion of workers and employers in

143 CERQUEIRA, Edmilton et al. (Eds.). *Traditional Peoples and Communities and the International Year of Family Farming*. Brasília: Ministry of Agrarian Development (MDA), 2015.

144 MOTTA, Fabrício. *Publicity and Transparency as Complementary Concepts*. *Revista Consultor Jurídico*. Brasília, Feb. 1, 2018. Available at: <https://www.conjur.com.br/2018-fev-01/interesse-publico-publicidade-transparencia-sao-conceitos-complementares>. Accessed on: Sept. 24, 2025.

145 CANOTILHO, J. J. Gomes. *Constitutional Law and the Theory of the Constitution*. 7th ed. Coimbra: Almedina, 2003.

public agency boards (art. 10); employee representation in collective bargaining (art. 11); public oversight of municipal accounts (art. 31, § 3); participation of users in the Public Administration (art. 37, § 3); social oversight in social security (art. 194, VII), health (art. 198, III), and social assistance (art. 204, II); workers' involvement in the formulation of agricultural policy (art. 187); democratic management of public education (art. 206, VI); and societal participation in the promotion and protection of cultural heritage (art. 216, § 1).

The duty of meaningful participation is also recognized by international human rights instruments, such as the International Covenant on Civil and Political Rights (1966) and the American Convention on Human Rights (1969), which guarantee everyone the right to take part in public affairs. In the environmental sphere, Principle 10 of the 1992 Rio Declaration stresses that the most effective way to tackle environmental challenges is to ensure the active involvement of all interested citizens, from access to information to participation in decision-making and mechanisms for redress.

Thus, the participation of settled communities – whether in granting their territories to mining, energy, or infrastructure projects, or in other situations that directly affect them – is not a discretionary matter for the Administration, but a prerequisite for the validity and legitimacy of state decisions. More than a formal procedure, it is an essential condition for these groups to exercise social oversight, defend their collective interests, and intervene in decisions that directly affect their territories and ways of life.

Climate justice and the special vulnerability of settled communities

The severe impacts of mining, energy, and infrastructure projects on settled communities must be understood within the broader framework of climate justice. These activities not only violate territorial and social rights but also directly and unevenly affect the climate crisis, disproportionately impacting groups that are historically most vulnerable.

Mining, in particular, has profound impacts that undermine communities' productive capacity, disrupt their socio-economic organization, and threaten families' ability to remain on their territories. This was highlighted in the recent study *Cumulative Climate Risks for Transition Minerals in Brazil*, conducted by the Mining Observatory (Observatório da Mineração). The research found that mining, combined with the effects of the climate crisis, has worsened water insecurity, exposed communities to increasingly frequent extreme events, and increased socio-environmental risks in states such as Pará, Minas Gerais, Goiás, and Bahia¹⁴⁶.

The report also identified a series of climate-related impacts linked to mining, including extreme temperatures, untimely heat waves, reduced annual rainfall,

146 OBSERVATÓRIO DA MINERAÇÃO (Mining Observatory). *Cumulative Climate Risks for Transition Minerals in Brazil, 2025*. Available at: https://observatoriodamineracao.com.br/wp-content/uploads/2025/04/TMO_Riscos-Climaticos-Cumulativos_POR_vCompleta_Abril2025.pdf. Accessed on: Sept. 24, 2025.

prolonged droughts, heavy precipitation, and consecutive days of high humidity. On both environmental and social levels, the study highlighted equally serious consequences, such as the interruption of productive activities, damage to equipment and infrastructure, water scarcity, heat stress, labor conflicts, hydroelectric power shortages, increased competition for resources, biodiversity loss, soil compaction, extended droughts, floods, health and safety risks, and heightened social tensions¹⁴⁷.

Thus, when mining projects take place in agrarian reform areas – already marked by institutional fragility and social vulnerability – these risks are amplified, turning settlements into genuine “sacrifice zones” where collective rights are systematically subordinated to external economic interests¹⁴⁸.

Climate justice is crucial. As Robert Bullard emphasizes, the environmental and climate costs of production are unevenly distributed: while large corporations and privileged sectors reap the profits, poor, Black, peasant, and traditional communities shoulder the consequences, affecting their territories and ways of life¹⁴⁹.

Within agrarian reform settlements, vulnerabilities are heightened, and environmental and social impacts converge within enduring patterns of historical inequality. To fully understand these injustices, it is necessary to adopt a theoretical framework that captures their multiple dimensions. Nancy Fraser proposes a three-dimensional theory of justice, based on redistribution, recognition, and representation. Applied to the Brazilian context, this framework allows for an analysis of agrarian reform settlements, showing how these three interdependent dimensions shape the injustices faced by these communities.

Between redistribution, recognition, and representation: Nancy Fraser’s theory and its application to agrarian reform settlements

Nancy Fraser argues that traditional social justice theories – focused solely on economic redistribution or cultural recognition and limited to the nation-state –

147 OBSERVATÓRIO DA MINERAÇÃO (Mining Observatory), 2025.

148 The concept of “sacrifice zones,” disseminated by environmental justice movements, refers to territories devalued and degraded by polluting enterprises, which tend to attract further harmful activities and perpetuate a vicious cycle of exploitation. In these areas, communities face private appropriation of resources, concentration of wealth and power, health and ecosystem damages on which they depend, as well as persistent barriers to making their demands heard in public spaces. For further reading, see: BULLARD, Robert D. Dumping in Dixie: *Race, Class and Environmental Quality*. Boulder: Westview Press, 1990. ACSERALD, Henri. Deregulation, Relocation, and Environmental Conflict: Considerations on the Control of Social Demands. In: ALMEIDA, Alfredo Wagner Berno de (Ed.). *Globalized Capitalism and Territorial Natural Resources: Frontiers of Accumulation in Contemporary Brazil*. Rio de Janeiro: Lamparina, 2010. VIEGAS, Rodrigo Nuñez. *Environmental Inequality and “Sacrifice Zones.”* Rio de Janeiro: FASE: IPPUR, 2006. Available at: <https://www.livrosgratis.com.br/ler-livro-online-21991/desigualdade-ambiental-e-zonas-de-sacrificio>. Accessed on: Sept. 24, 2025.

149 BULLARD, Robert. The Threat of Environmental Racism. *Natural Resources and Environment*, vol. 7, n° 3, 1993.

can no longer adequately address the challenges of globalized, interdependent societies. In response, she proposes a three-dimensional theory of justice that integrates three inseparable axes: redistribution (economic), recognition (cultural), and representation (political)¹⁵⁰.

In the political dimension, Fraser identifies three structural forms of injustice:

- ▶ intra-state misrepresentation, when formally democratic mechanisms exclude marginalized groups and limit their influence;
- ▶ misframing, which occurs when individuals directly affected by certain decisions are not even recognized as legitimate participants in deliberative processes; and
- ▶ metapolitical misrepresentation, arising when the very rules that determine “who” can take part in decision-making are unilaterally set by political and economic elites¹⁵¹.

From this critique arises the “all-affected principle,” which holds that any group or individual significantly impacted by a decision must have the right to participate in its deliberation, regardless of nationality, location, or institutional status. In short, democracy is legitimate only when it genuinely includes all those whose lives will be directly or indirectly affected by its decisions¹⁵².

From this theoretical perspective, INCRA’s Normative Instruction N° 112/2021 is a clear example of political injustice. By regulating project approvals in settlement areas, it ignores the right to social participation and prior, free, and informed consultation, limiting involvement to purely informational mechanisms such as “general clarifications” or public hearings in specific cases. In Fraser’s terms, this is misframing: settlement communities are not even recognized as legitimate participants in the deliberative process. At the same time, the regulation reflects metapolitical misrepresentation, unilaterally defining the criteria for participation and transferring decision-making power to state agencies – and, in many cases, to the very companies with vested interests in the projects.

Settlers thus face three interdependent layers of injustice:

- ▶ redistributive, through the denial of equitable access to common goods such as land, water, and biodiversity;
- ▶ recognition-based, through the erasure of their community identities and ways of life; and

150 FRASER, Nancy. Reframing Justice in a Globalized World. *Lua Nova: Revista de Cultura e Política*, n° 77, pp. 11-39, 2009.

151 FRASER, 2009.

152 FRASER, 2009.

- representational, through their recurring exclusion both from political and administrative bodies responsible for deciding on large-scale projects and from the very processes that determine who may legitimately take part in such decisions. Viewed through the lens of climate justice, this framework demonstrates that the Brazilian State's failure to ensure meaningful participation not only perpetuates historical inequalities but also heightens the country's climate vulnerability, thereby constraining its ability to confront the global crisis in a fair and democratically legitimate manner.

The decolonial critique: coloniality, epistemicide, and the right to be heard

Nancy Fraser's three-dimensional theory of justice exposes the redistributive, recognitional, and representational limits of INCRA's Normative Instruction Nº 112/2021. A decolonial lens, however, reveals that these limits are rooted in deeper colonial logics of spatial domination and the silencing of voices. What is at stake is not a mere institutional shortcoming, but the persistence of colonial patterns that continue to bind economic exploitation to environmental degradation and to the dehumanization of those who inhabit the affected territories.

In her seminal essay "Can the Subaltern Speak?"¹⁵³, Indian scholar Gayatri Chakravorty Spivak demonstrates how the subaltern "Other" is constructed through an epistemic regime that bars them from becoming speaking subjects. This dynamic is starkly evident in INCRA's normative framework: while the participation of agrarian reform communities is formally acknowledged, it is confined to formats dictated by state and corporate structures, reducing them to mere recipients of information rather than genuine interlocutors in decision-making. What appears to be an opportunity to speak, in reality, strips them of the possibility of being truly heard.

This dynamic is further underscored by Sueli Carneiro's concept of *epistemicide*¹⁵⁴, brought into the Brazilian context to highlight the systematic erasure of Black knowledge and ways of being. The term refers not merely to invisibility, but to the active suppression of epistemologies – understood as the epistemological frameworks through which a community structures its understanding of the world, establishes criteria for what is true or false, and determines which elements are considered relevant or even existent. In this sense, epistemology constitutes the very foundation of cultural existence, providing the horizon within which a community recognizes what is real, valid, and worthy of being transmitted.

When the Brazilian state disregards settlers' understandings of themselves, their livelihoods, and their relationship with the land, it not only violates the right to social participation and prior, free, and informed consultation, but also reinforces epistemicide. By dismissing these voices, it removes them from the field of

153 SPIVAK, Gayatri Chakravorty. *Can the Subaltern Speak?* Belo Horizonte: Editora UFMG, 2010.

154 CARNEIRO, Sueli. *Raciality Device: The Construction of the Other as Non-Being as the Foundation of Being*. Rio de Janeiro: Zahar, 2023.

the possible—the space where their perspectives could be legitimately acknowledged as valid and meaningful. This radical exclusion prevents dialogue between worldviews and perpetuates the epistemic hierarchy rooted in coloniality.

Authors such as Aimé Césaire and Frantz Fanon have argued that colonial logic extends beyond physical violence, infiltrating ways of thinking and institutional structures. In his *Discourse on Colonialism*¹⁵⁵, Césaire highlights the dehumanization of both the colonized and the colonizer as one aspect of colonial exploitation. Fanon, in *Black Skin, White Masks*¹⁵⁶, shows how colonization produces “zones of non-being,” in which the humanity of the colonized is constantly denied. The imposition of mining and energy projects on agrarian reform settlements updates this logic, turning peasant territories into “sacrifice zones,” as previously discussed.

In *Memories of Plantation*¹⁵⁷, Portuguese writer Grada Kilomba highlights how racism and coloniality operate on the levels of memory and subjectivity, reactivating hierarchies rooted in the era of slavery. In the case of agrarian reform settlements, the erasure of collective identities and community narratives echoes this process: by denying them the right to self-representation, the Normative Instruction reinforces the subordinate position historically assigned to them.

It is important to stress that the construction of the ‘other’ cannot rely on a one-sided, closed worldview. Settlers need to be recognized as interpreters of their own lives, and their understandings of their collective identity should be taken into account when determining who qualifies for the right to social participation and prior, free, and informed consultation. This recognition is key not only to address past injustices but also to disrupt the ongoing cycle of colonial mechanisms that continue to shape the relationship between the State, capital, and vulnerable communities.

Decolonial thought shows that the demand for recognition and decision-making power goes beyond formal participation. It challenges the very framework defining who counts as a political and epistemic subject. Social participation and prior, free, and informed consultation must therefore be reaffirmed as tools of radical democratization, enabling non-hegemonic ontologies and epistemologies to surface and break the silence imposed by coloniality and exclusionary development.

Conclusion

This study shows that the constitutional promise of the social function of property and agrarian reform remains systematically undermined by weak public policies, institutional capture by private interests, and the State’s neglect of settlers’ fundamental rights. INCRA’s Normative Instruction N^o 112/2021 exemplifies this: by reducing social participation to mere information-sharing, it mis-

155 CÉSAIRE, Aimé. *Discourse on Colonialism*. Lisboa: Sá da Costa, 1978.

156 FANON, Frantz. *Black Skin, White Masks*. Salvador: EDUFBA, 2008.

157 KILOMBA, Grada. *Plantation Memories: Episodes of Everyday Racism*. Rio de Janeiro: Cobogó, 2019.

frames communities, denies them the right to influence decisions affecting their territories, and effectively legitimizes projects that increase their socio-environmental vulnerability.

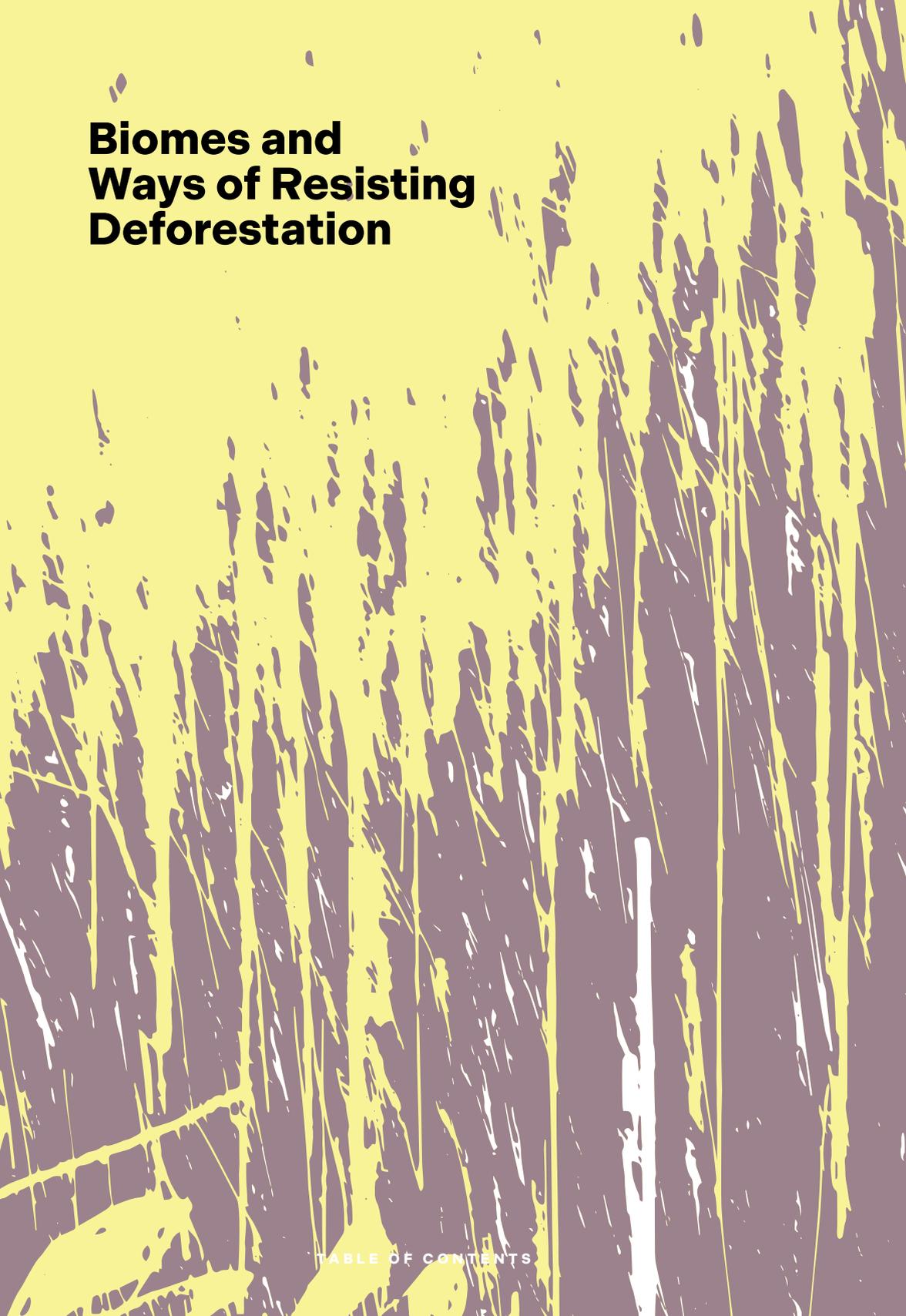
Agrarian reform settlers are entitled to social participation on two levels:

- as traditional peoples and communities under ILO Convention N° 169; or
- even if not formally recognized, on the basis of fundamental constitutional principles such as publicity, administrative transparency, and legal certainty. In either case, they must be recognized as entitled to meaningful participation in all decisions affecting their territories and ways of life.

By integrating the perspectives of climate justice and Nancy Fraser's three-dimensional theory of justice, it becomes clear that settlers experience multiple injustices: redistributive (denial of equitable access to common resources), recognitional (erasure of collective identities), and representational (systematic exclusion from decision-making processes). These injustices are exacerbated by the installation of mining, energy, and infrastructure projects, which can turn settlements into 'sacrifice zones,' intensifying social, environmental, and climate vulnerabilities.

Incorporating a decolonial perspective makes clear that these injustices cannot be attributed solely to administrative inefficiency; they also stem from the reproduction of colonial logics that have historically tied economic exploitation to environmental degradation and the dehumanization of marginalized groups. Epistemicide, as conceptualized by Sueli Carneiro, exposes the deeper dimension of this process, whereby the epistemologies of communities are denied, sustaining the hegemony of dominant cultural narratives. Thus, social participation and prior, free, and informed consultation must be reaffirmed not only as legal instruments but also as political and epistemic tools, creating space for the recognition of settled communities' worldviews.

Effective institutional safeguards are essential to ensure that decisions affecting settler communities are democratically legitimate. INCRA must not authorize, approve, or endorse mining, energy, or infrastructure projects in agrarian reform settlements without fully guaranteeing the resident communities' right to effective social participation and prior, free, and informed consultation, a measure essential to protecting agrarian reform from external capture and upholding its core purpose: to promote social justice, safeguard territories, and strengthen democracy.



Biomes and Ways of Resisting Deforestation

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BETWEEN SETBACKS AND RESISTANCE: THE CERRADO, DEMOCRACY, AND THE ROLE OF THE PUBLIC PROSECUTOR'S OFFICE

BY DANIELA HAUN DE ARAÚJO SERAFIM¹⁵⁸

The Cerrado, Brazil's second-largest biome, covers roughly a quarter of the country and is recognized as the most biodiverse savanna on the planet. Known as the “water tower of Brazil” for harboring the headwaters of major South American river basins, it plays a strategic role not only in maintaining biodiversity but also in regulating climate and hydrological systems on a continental scale. Despite its ecological importance and its support for key economic activities – such as livestock farming, energy production, and mining – the biome has often been overlooked in terms of legal protection, receiving less legislative and institutional attention than the Amazon¹⁵⁹.

Deforestation in the Cerrado does not merely reduce biodiversity; it profoundly alters the region's hydrological and climatic regimes. Vegetation loss diminishes soil water infiltration and impairs aquifer recharge, weakening the biome's ability to regulate rainfall cycles. This degradation fosters longer droughts, concentrated rainfall, and soil erosion, increasing socio-environmental vulnerability. Studies indicate that, at times, the rate of vegetation loss in the Cerrado exceeds that observed in the Amazon, with direct consequences for extreme weather events, water security, agriculture, and human livelihoods¹⁶⁰.

At the state level, Goiás illustrates the legislative fragilities undermining the Cerrado's protection. Rather than strengthening enforcement and preventive mechanisms, the state enacted Law N° 21,231/2022, which introduces the Environmental Declaration of Property (DAI) as a means of regularizing environmental liabilities¹⁶¹. Under the guise of administrative simplification, this law establishes a self-declaration mechanism that bypasses mandatory technical review and allows for generic remedies, such as natural regeneration. In practice, it risks legalizing past deforestation and, more worryingly, incentivizing future clearing by signaling that any infractions can potentially be regularized. Far from ensuring effective restoration of degraded areas, the DAI places the responsibility on landowners to

158 Prosecutor at the Goiás Public Prosecutor's Office, coordinating the Environment, Urban Planning, and Cultural Heritage Unit. Holds a Master's degree in Law and Public Policy from the Federal University of Goiás (UFG).

159 KLINK, Carlos A.; MACHADO, Ricardo B. Conservation of the Brazilian Cerrado. *Megadiversidade*, [s.l.], vol. 1, n° 1, pp. 147-155, 2005.

160 SANTOS, Carla Rodrigues; VENDRUSCULO, Laurimar Gonçalves; ZOLIN, Cornélio Alberto. Ecosystem Services in Brazilian Biomes: A Systematic Review. *Boletim Goiano de Geografia*, [s.l.], vol. 43, pp. 5-7, 2023.

161 GOIÁS. Law N° 21,231 of Jan. 10, 2022. Addresses the regularization of environmental liabilities on rural and urban properties, forest compensation, and compensation for damages due to unauthorized removal of native vegetation. *Official Gazette of the State of Goiás*: Supplement, Goiânia, Jan. 10, 2022. Available at: https://legisla.casacivil.go.gov.br/pesquisa_legislacao/104746/lei-21231. Accessed on: Sept. 15, 2025.

determine the adequacy of rehabilitation, creating opportunities for continued environmental harm and loss of ecosystem services. In a context already marked by intense pressure on native vegetation, such regulatory solutions weaken oversight and contravene the constitutional principle of full remediation, effectively institutionalizing environmental setbacks.

The Public Prosecutor's Office, constitutionally tasked with defending the legal order and collective interests, plays a vital role in environmental protection amid increasingly intense climate change. Its functional independence and institutional legitimacy enable it not only to take repressive measures against environmental offenses but also to drive structural transformations that help society adapt to evolving climate realities, integrating environmental, social, and economic dimensions.

In this context, the Public Prosecutor's Office of Goiás (MPGO) has stood out for implementing structuring initiatives. The Water Commitment Program (Programa Compromisso Hídrico) brings together multiple actors to address water security and climate resilience; the Ser Natureza Service has become a tool of socio-environmental justice, protecting springs and watersheds; tools such as Valora and E-Report (E-Relatório) allow for the scientific quantification and valuation of environmental damages; and GAEMA operates in a specialized and integrated manner to combat illegal deforestation and wildfires.

Together, these initiatives demonstrate how the MPGO seeks to move beyond merely reacting to infractions, fostering governance and cooperative approaches that encourage behavioral change, more consistent public policies, and production practices adapted to the region's climatic realities.

Protecting the Cerrado, especially in Goiás, requires strong and responsive governance that goes beyond simply regularizing environmental liabilities. Conserving biodiversity and water resources must be part of a democratic management model that connects the State, civil society, the productive sector, and traditional communities, promoting sustainable and adaptive practices. This article critically examines the current situation of the biome, the legal and institutional challenges in Goiás, and the Public Prosecution Office of the State of Goiás (MPGO)'s role as a key actor in intergenerational environmental protection.

The Cerrado in the national and international context

The Cerrado stands out as one of the most complex and diverse biomes on the planet. It is estimated to contain over 7,000 species of vascular plants, about 44% of which are endemic, making it the most biodiverse tropical savanna in the world. This richness extends to its fauna, with more than 830 bird species, around 200 mammals, and hundreds of reptiles, amphibians, and fish. Beyond its intrinsic ecological value, the Cerrado plays a vital role in regulating continental water systems, serving as a major aquifer recharge zone and sustaining eight of Brazil's twelve main river basins. As Klink and Machado (2005) point out, "the Cerrado is the main recharge area for the Guarani Aquifer and for the major South American river basins."¹⁶²

¹⁶² KLINK, Carlos A.; MACHADO, Ricardo B. Conservation of the Brazilian Cerrado. *Megadiversidade*, [s.l.], vol. 1, n° 1, pp. 147-155, 2005, 149 p.

This natural heritage also supports Brazil's economy. The Cerrado produces over 40% of the country's grains and around 55% of its cattle, serving as a foundation for food security and the national trade balance. It is also crucial for energy generation, since much of Brazil's hydroelectric power relies on waters originating in its headwaters. This interconnection underscores the Cerrado's dual role: a source of biodiversity and ecosystem services, and a socio-economic pillar of both national and international importance¹⁶³.

Yet, the biome is facing mounting threats. Over half of its original vegetation has already been cleared, primarily for pastures and monocultures. This human pressure has led to habitat fragmentation, the loss of ecosystem services, and significant greenhouse gas emissions. According to the World Economic Forum (2024), in 2023 alone "7,800 km² of the Cerrado were converted, a 43% increase from the previous year, in contrast to a 62% drop in deforestation in the Amazon."¹⁶⁴ These figures underscore a stark paradox: while the Amazon garners greater regulatory and international attention, the Cerrado continues to be treated as an available agricultural frontier, despite its vital role in continental water security and climate stability.

Understanding the Cerrado's role nationally and globally means recognizing the tension between its ecological importance and the historical neglect it has faced. Protecting this biome is not just an environmental necessity – it is essential for sustaining agriculture, energy production, and quality of life throughout Brazil.

Looking at the Cerrado from both national and international perspectives requires more than acknowledging its strategic value: it calls for a rethink of how Brazilian society interacts with this unique ecosystem. Decades of fragmented public policies and permissive regulations have left the Cerrado in a secondary position compared to the Amazon, creating an environmental liability that is hard to reverse. Continuing unchecked agricultural expansion without sustainable practices threatens not only biodiversity and water security but also the medium- and long-term stability of Brazil's economy.

A fundamentally different and urgent approach is required. The Cerrado can no longer be regarded as a mere agricultural frontier; it must be recognized as an essential ecological heritage, whose preservation is critical for Brazil to honor its international climate and biodiversity commitments. Moreover, this is a constitutional obligation: Article 225 of the 1988 Federal Constitution¹⁶⁵ entrusts both public authorities and society with the responsibility to protect and safeguard the environment for present and future generations. Neglecting this duty compromises the legal foundations of Brazil's democratic state and disregards the intergenerational responsibility entrusted to all.

163 PEREIRA, Flávia; RODRIGUES, Felipe. Ecological and Economic Importance of the Cerrado for Global Biodiversity. In: *The Cerrado in Focus*. Goiânia: Editora Científica, 2024, pp. 38-40.

164 WORLD ECONOMIC FORUM. The Cerrado: Production and Protection. Collaboration with Systemiq. Geneva: WEF, 2024, p. 5.

165 BRAZIL. Constitution (1988). Constitution of the Federative Republic of Brazil, 1988. Brasília, DF: Federal Senate, 1988. Available at: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Accessed on: Sept. 15, 2025.

In its latest Nationally Determined Contribution (NDC) submitted to the United Nations Framework Convention on Climate Change, Brazil committed to reducing net greenhouse gas emissions by 59% to 67% by 2035 relative to 2005 levels – a target that hinges directly on halting deforestation across the country’s biomes¹⁶⁶. Consequently, preserving the Cerrado is not merely a local environmental concern; it is pivotal to meeting Brazil’s obligations under the Paris Agreement and achieving the Sustainable Development Goals (SDG 13 – Climate Action; SDG 15 – Life on Land). As preparations for COP30 progress, monitoring will focus both on forest degradation and emissions from the conversion of native vegetation, underscoring the Cerrado’s strategic significance for Brazil’s global climate policy.

Reversing this long-standing neglect requires political courage, strengthened environmental governance, and active social engagement. Practices of production, consumption, and land management must be transformed, recognizing that safeguarding the Cerrado is not an obstacle to development, but a prerequisite for ensuring it is equitable, responsible, and sustainable. Only in this way can part of the historical debt be addressed and a renewed relationship with the biome established – grounded in respect, accountability, and the enforcement of constitutional mandates that guarantee a healthy environment as a fundamental right for all.

Goiás and the Cerrado’s sustainability crisis

Despite the technological advances implemented in recent years by Goiás’s environmental agency – such as digital management systems, remote monitoring, and integrated data platforms, which represent significant innovations enhancing oversight efficiency and transparency¹⁶⁷ – the state’s situation still reveals deep structural weaknesses in both the regulatory framework and the exercise of environmental enforcement authority. While these innovations are valuable, they cannot be assessed in isolation from the sensitive and specific requirements that ensure effective environmental protection. Goiás also stood out as one of the first states to adopt environmental licensing legislation characterized by excessive flexibility and procedural simplification¹⁶⁸, setting precedents that have since been consolidated nationally with the approval of a federal licensing law¹⁶⁹ containing

166 BRASIL. Ministério do Meio Ambiente e Mudança do Clima. Brasil entrega à ONU nova NDC alinhada ao Acordo de Paris. Nov. 13, 2024. Available at: <https://www.gov.br/mma/pt-br/assuntos/noticias/brasil-entrega-a-onu-nova-ndc-alinhada-ao-acordo-de-paris>. Accessed on: Sept. 18, 2025.

167 SEMAD-GO reports on digital platforms (e.g., Sistema Ipê, Integra, etc.) – official source from the Secretariat, available at: <https://goias.gov.br/meioambiente/>.

168 GOIÁS. Law N° 20,694 of Dec. 26, 2019. Sets general rules for environmental licensing in the State of Goiás and other provisions. Goiânia: Casa Civil/GO, 2019. Regulated by Decree 9,710 of Sept. 3, 2020. Available at: <https://legisla.casacivil.go.gov.br/api/v2/pesquisa/legislacoes/100893/pdf>. Accessed on: Sept. 18, 2025.

169 BRAZIL. Law N° 15,190 of Aug. 8, 2025. Establishes the General Environmental Licensing Law and related provisions. *The Union Official Gazette* (Diário Oficial da União), Brasília, DF, Aug. 8, 2025.

equally weak and permissive provisions. This trajectory reflects a concerning trend: the institutionalization of regulatory fragility as a model of environmental governance, at the expense of prevention, precaution, and full remediation of environmental damage.

While the State has invested in tools to modernize environmental management, recent legislation reveals a trend toward regulatory weakening that undermines effective oversight. Law N° 21,231/2022¹⁷⁰, by establishing the Environmental Property Declaration (DAI) as the central instrument for regularization, reduced environmental accountability to a self-declaratory, administrative logic, weakening the public authorities' enforcement capacity and creating room to legalize past deforestation. Moreover, the state law extended the temporal framework for regularizing liabilities to December 27, 2019, far beyond the date established by federal legislation (July 22, 2008)¹⁷¹. This clearly violates the principle prohibiting environmental rollback. In addition, provisions that prevent the use of information contained in the DAI in sanctioning procedures further dilute civil and administrative liability and conflict with the logic of strict liability and full damage remediation. Rules on environmental compensation have also been relaxed, allowing solutions disconnected from the ecological equivalence of the degraded area, in breach of the Forest Code and the National System of Protected Areas¹⁷². These concerns are not mere perceptions; they represent real legal risks that weaken environmental governance in the state.

This situation worsened with the enactment of Law N° 22,017/2023¹⁷³, which reinforced the flexibilization measures already established in the previous law and was later challenged in the Supreme Federal Court through a concentrated constitutional review (ADI 7438)¹⁷⁴. By prioritizing procedural simplification over substantive protection, these laws send a misleading message to society: that environmental violations can later be legalized through weak self-regulation mech-

Available at: <https://legislacao.presidencia.gov.br/atos/?tipo=LEI&numero=15190&ano=2025&data=08/08/2025&ato=653QTWq5UNZpWTO05>. Accessed on: Sept. 18, 2025.

170 GOIÁS. Law N° 21,231 of Jan. 10, 2022. Governs the regularization of environmental liabilities on rural and urban properties, forest compensation, and compensation for damages caused by unauthorized removal of native vegetation. *The Official Gazette of the State of Goiás: Supplement* (Diário Oficial do Estado de Goiás: suplemento), Goiânia, Jan. 10, 2022. Available at: https://legisla.casacivil.go.gov.br/pesquisa_legislacao/104746/lei-21231. Accessed on: Sept. 15, 2025.

171 BRAZIL. Law N° 12,651 of May 25, 2012. Establishes rules for the protection of native vegetation. Brasília: Presidency of the Republic, [2012]. Available at: https://www.planalto.gov.br/ccivil_03/_ato2011-2014/2012/lei/l12651.htm. Accessed on: Sept. 18, 2025.

172 BRAZIL. Law N° 9,985 of Jul. 18, 2000. Regulates art. 225, §1, items I, II, III, and VII of the Federal Constitution, establishes the National System of Conservation Units, and other provisions. Brasília: Presidency of the Republic, [2000]. Available at: https://www.planalto.gov.br/ccivil_03/leis/l9985.htm. Accessed on: Sept. 18, 2025.

173 GOIÁS. Law N° 22,017 of Jun. 6, 2023. Amends provisions of Law N° 21,231 of Jul. 19, 2022, and other provisions. Goiânia: Casa Civil, [2023]. Available at: https://legisla.casacivil.go.gov.br/pesquisa_legislacao/107233/lei-22017. Accessed on: Sept. 18, 2025.

174 SUPREME FEDERAL COURT (STF). Direct Action of Unconstitutionality (ADI) 7438. Rapporteur: Justice Cristiano Zanin. Brasília, DF, 2023. Available at: <https://portal.stf.jus.br/processos/detalhe.asp?incidente=6723987>. Accessed on: Sept. 18, 2025.

anisms. Such political and legislative choices not only violate the constitutional principles of precaution, prevention, and full reparation but also erode public trust in environmental governance, which should stand as a model of responsibility and balance.

Over the past decades, Goiás' economic growth has been largely driven by agribusiness, which makes up a significant portion of the state's GDP and ranks it among Brazil's top producers of grains and beef¹⁷⁵. Yet this economic boom has put the Cerrado under intense pressure: expanding monocultures and pastures have accelerated deforestation, fragmented habitats, and depleted vital ecosystem services, threatening both climate resilience and water security¹⁷⁶. The challenge, then, is not to question the sector's socioeconomic importance, but to acknowledge that its sustainability depends on public policies that harmonize production with conservation – without which the very natural resources supporting agriculture are at risk.

Unplanned urban expansion is an increasing pressure across Goiás. Rapid growth of cities and the spread of rural subdivisions – often for recreational use – encroach on Permanent Preservation Areas, fragment ecological corridors, and strain territorial management¹⁷⁷. The lack of integrated planning between urban and environmental policies drives native vegetation loss, soil sealing, and strain on water and sanitation systems, heightening flood, erosion, and heat risks. This unchecked growth is a key factor in the Cerrado's sustainability crisis, extending degradation beyond the established urban areas.

In this context, Goiás faces a structural paradox: while it stands out nationally and internationally as an agricultural powerhouse and growth hub, the State undermines its own natural foundation through permissive regulations and unsustainable land-use patterns. Continuing down this path threatens not only the integrity of the Cerrado but also the water, energy, and food security that depend on it¹⁷⁸. Addressing this challenge requires robust environmental governance that integrates production, conservation, and urban planning, while reinforcing the strategic role of the Public Prosecutor's Office and civil society in defending the public interest and ensuring intergenerational protection of the biome.

175 IBGE – Brazilian Institute of Geography and Statistics. Regional Accounts of Brazil: Agribusiness Share in Goiás' GDP. Available at: https://goias.gov.br/imb/wp-content/uploads/sites/29/2024/01/Boletim_012_2023_produto_interno_bruto_dos_municipios_goiianos_consolidado_2021.pdf. Accessed on: Sept. 18, 2025.

176 MAPBIOMAS. Cerrado Deforestation Report (Recent Years). Available at: <https://alerta.mapbiomas.org/relatorio>. Accessed on: Sept. 18, 2025.

177 PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF GOIÁS (MPGO). MPGO Takes Legal Action Against Developers for Unauthorized Land Subdivision in the Rural Area of Senador Canedo. Goiânia: MPGO, 2023. Available at: <https://www.mpggo.mp.br/portal/noticia/mpgo-aciona-loteadores-por-parcelamento-clandestino-do-solo-em-zona-rural-de-senador-canedo>. Accessed on: Sept. 18, 2025.

178 WORLD ECONOMIC FORUM. The Cerrado: production and protection. Geneva: World Economic Forum, 2024. Available at: https://www3.weforum.org/docs/WEF_Sustainable_Transition_Cerrado_2024_PR.pdf. Accessed on: Sept. 18, 2025.

The Brazilian Public Prosecutor's Office: independence, and socio-environmental transformation in the Cerrado

The Brazilian Public Prosecutor's Office holds a unique position within the global democratic landscape. While serving as the guardian of legal order and the Constitution, it also acts as a staunch defender of fundamental rights, including the right to an ecologically balanced environment, guaranteed under Article 225 of the Federal Constitution¹⁷⁹. Its functional independence, administrative autonomy, and institutional legitimacy make it one of the country's most respected institutions, able to engage effectively with both civil society and the branches of government. This innovative model offers inspiration for other nations, combining oversight and regulatory powers with a mission to drive structural change for the collective good.

Environmental protection is a key focus of the Public Prosecutor's Office. In a megadiverse country like Brazil, where biomes such as the Amazon and Cerrado are vital for global climate stability, its actions extend beyond national borders, becoming a reference in promoting climate justice. The Brazilian Association of Members of the Public Prosecutor's Office for the Environment (ABRAMPA) unites prosecutors nationwide, organizing congresses, technical studies, and national coordination, keeping the institution at the forefront of pressing environmental debates¹⁸⁰.

Beyond its role in enforcing environmental accountability, the Public Prosecutor's Office also serves as a key facilitator. Its social credibility and independence allow it to bridge divergent interests, connecting public agencies, the private sector, universities, traditional communities, and civil society organizations. This coordinating role is essential to tackling the complex challenges of the climate agenda, which demand multi-sectoral and interinstitutional solutions. At a time when the world seeks ways to mitigate the impacts of climate change, the voice of the Brazilian Public Prosecutor's Office stands out as a pillar of democratic stability, legal coherence, and the advancement of consistent public policies.

At the state level, the Public Prosecutor's Office of Goiás (MPGO) has been actively developing initiatives that respond to the urgent climate agenda, while consolidating experiences that combine legal rigor, interinstitutional coordination, and collective action. The *Compromisso Hídrico* Program, for instance, brings together more than forty partner institutions around a common goal: climate resilience and water security. The program is structured around strategic pillars – prevention, alliances, transparency, and intergenerational responsibility – and is implemented through concrete projects¹⁸¹.

179 Art. 225 (BRAZIL. Constitution (1988). Constitution of the Federative Republic of Brazil of 1988. Brasília, DF: Federal Senate, 1988. Available at: https://www.planalto.gov.br/ccivil_03/constitucao/constitucao.htm. Accessed on: Sept. 15, 2025).

180 ABRAMPA – Brazilian Association of Members of the Public Prosecutor's Office for the Environment. Institutional. Porto Alegre: Abrampa, 2024. Available at: <https://abrampa.org.br/>. Accessed on: Sept. 19, 2025.

181 PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF GOIÁS. *Compromisso Hídrico* Program:

In the Cerrado, where the impacts of environmental degradation affect society as a whole through biodiversity loss, water scarcity, and intensified climate change, the Public Prosecutor's Office's role goes beyond addressing isolated offenses. Its strength also lies in bringing together diverse actors – public agencies, the private sector, academia, traditional communities, and civil society – to develop structural, solution-oriented initiatives. Many of these efforts do not yield immediate results but pave the way for profound, long-lasting changes capable of transforming socio-environmental realities.

Notable projects include *Hidrodiálogo*, which brings together municipal master, watershed, and sanitation strategies to prevent conflicts and promote integrated solutions aimed at adaptation and disaster prevention; *Cidade Viva* and *Impulso Cidades-Esponja*, which implement nature-based solutions for urban water and stormwater management while supporting cities' adaptation to the new climate regime; *Legado Sustentável*, focused on valuing cultural heritage as a strategy for adaptation and prevention; and *manTER Natureza*, which expands the established *Serviço Ser Natureza* initiative, dedicated for over 17 years to protecting springs and permanent preservation areas, consolidating itself as a true instrument of socio-environmental justice¹⁸².

These initiatives were never developed in isolation; they engaged nearly 42 partner institutions, spanning public agencies, the private sector, universities, and civil society organizations. This pluralistic collaboration ensured that democratic deliberation shaped the design of each initiative, aligning the proposals with the perspectives and collective commitment of all stakeholders involved. From inception, this approach has enhanced governance responsiveness and interinstitutional coordination, critical elements in establishing these efforts as enduring institutional commitments rather than transient government projects. Collectively, these experiences highlight the MPGO's capacity to transcend a reactive posture, positioning itself as a catalyst for structural public policies and ensuring that socio-environmental commitments are institutionalized for the long term, beyond the tenure of any single administration.

The state of Goiás, located in the heart of the Cerrado – a biome known as Brazil's 'water cradle' for hosting the headwaters of South America's major river basins – faces immense challenges. Its territory is under intense economic pressure: the expansion of agriculture and livestock production, the unchecked growth of urban subdivisions (including rural recreational estates), and recent legislative setbacks reflected in permissive norms that weaken environmental licensing all threaten biodiversity, undermine water security, and erode quality of life. These pressures expose institutional weaknesses in environmental oversight and the urgent need to strengthen governance. Despite this, the MPGO has sought innovative, coordinated responses. Its initiatives are complemented by technological tools such as Valora and E-Relatório, which quantify environmental damage and

climate resilience and water security. Goiânia: MPGO, 2023. Available at: <https://www.mppo.mp.br/portal/conteudo/compromisso-hidrico>. Accessed on: Sept. 19, 2025.

182 PUBLIC PROSECUTOR'S OFFICE OF THE STATE OF GOIÁS. Ser Natureza Service: good practices in water and environmental protection. Goiânia: MPGO, 2022. Available at: <https://www.mppo.mp.br/portal/conteudo/servico-ser-natureza>. Accessed on: Sept. 19, 2025.

support reparatory actions, as well as the specialized work of the Special Environmental Action Group (Gaema), tackling deforestation, illegal fires, and other recurring threats across the state¹⁸³.

The experience of Goiás shows that even amid intense economic and political pressures, the Public Prosecutor’s Office can play a genuinely transformative role

By bringing institutions together and fostering collective action, the MPMGO has become a decisive force in protecting the Cerrado and advancing Brazil’s international climate commitments. Its work – rooted in constitutional principles, responsibility toward future generations, and a capacity for innovation – has made the institution a national benchmark in socio-environmental advocacy.

At COP30, the Brazilian Public Prosecutor’s Office – and particularly that of Goiás – reaffirms its independence and its strength as a guardian of democracy and environmental justice. The Cerrado, Brazil’s water-rich and biodiverse heartland, cannot remain overlooked in global climate policies. Giving it visibility means acknowledging its strategic importance to the planet’s ecological balance and to the very survival of millions of people.

More than isolated efforts, the initiatives led by the MPMGO embody lasting institutional commitments – turning dialogue into enduring public policy and embedding water and climate resilience at the foundation of a modern, solutions-oriented environmental governance framework¹⁸⁴.

Final Considerations

The Cerrado is one of the planet’s most strategic biomes – both for its extraordinary biodiversity and for its role as the cradle of the waters that sustain South America’s major river basins. Yet despite its central importance, it remains largely invisible, too often relegated to the margins of national and international environmental agendas. A critical look at the situation in Goiás and across Brazil reveals that the expansion of the agricultural and livestock frontier, the spread of unplanned urban subdivisions – including rural plots converted into leisure estates – and legislative rollbacks reflected in increasingly permissive norms that relax environmental licensing and compliance form a triad of threats steadily eroding the biome’s ecological integrity. This reality affects not only the fauna and flora, but also directly compromises water security, climate stability, long-term agricultural productivity, and the quality of life of local com-

183 CNMP – National Council of the Public Prosecutor’s Office. The Public Prosecutor’s Office and the defense of the Cerrado. Brasília, DF: CNMP, 2022. Available at: https://www.cnmp.mp.br/portal/images/Publicacoes/documentos/2022/O-MINISTRIO-PUBLICO-E-A-DEFESA-DO-CERRADO_padronizado-2.pdf. Accessed on: Sept. 18, 2025.

184 UN – United Nations. Sustainable Development Goals. New York: UN, 2015. Available at: <https://brasil.un.org/pt-br/sdgs>. Accessed on: Sept. 19, 2025.

munities – generating cumulative impacts that will weigh on both present and future generations.

The analysis presented in this article underscores that the sustainability crisis in the Cerrado extends beyond environmental concerns, encompassing profound institutional and political dimensions. Permissive legislation – including laws that extend amnesty for past deforestation or introduce self-declaratory instruments lacking technical rigor – conveys a troubling message that environmental degradation can be tolerated. Such regulatory choices erode public trust in institutions and undermine Brazil’s international commitments, particularly under the Paris Agreement and the Sustainable Development Goals. They also compromise the legitimacy of local public policies, which should be grounded in responsible and effective climate governance. Accordingly, the Cerrado must be recognized not merely as a repository of biodiversity, but as a fundamental pillar of national sovereignty, whose degradation poses serious risks to productive systems, energy infrastructure, water security, and the very foundations of socio-environmental democracy.

In this context, the Public Prosecutor’s Office of Goiás (MPGO) emerges as a strategic player. Its constitutional role goes beyond filing lawsuits, encompassing the extrajudicial defense of diffuse rights, the promotion of collaborative solutions, and the shaping of more robust public policies. The experience of the *Programa Compromisso Hídrico* (Water Commitment Program), which brings together over forty public, private, academic, and community institutions, demonstrates the MPGO’s capacity to transform fragmented agendas into lasting institutional commitments. Initiatives such as *Hidrodiálogo*, *Cidade Viva*, *Impulso Cidades-Esponja*, *Legado Sustentável*, and *manTER Natureza* embody this collective effort, translating the principle that climate adaptation requires local, nature-based solutions built through social participation into concrete action. By taking on this leading role, the Public Prosecutor’s Office not only supervises but also proposes, mediates, integrates, and innovates, establishing itself as a guardian of democracy and socio-environmental justice.

The call to action is clear: it is urgent to overcome the normative and institutional weaknesses that continue to undermine environmental governance in Goiás and across Brazil. Achieving this requires strengthening three key pillars. The first is legislative harmonization, ensuring that state laws do not roll back the advances of federal legislation, particularly the Forest Code. The second is the institutional strengthening of the environmental agency, providing the technical, human, and financial resources necessary to address complex socio-environmental challenges. The third is recognizing the Cerrado as a priority in national and international agendas, with visibility and funding proportional to its ecological and climatic significance. This tripartite approach can be propelled by the firm and coordinating role of the Public Prosecutor’s Office, which, by defending the Constitution and fundamental rights, helps ensure that the environmental agenda does not remain subject to government cycles but is established as a lasting state commitment.

The key takeaway from these reflections is the urgent need to establish a sustainability model that unites production and conservation, overcoming the false dichotomy that has historically pitted economic development against environmental protection. Implementing sustainable farming, planned urban development, resilient sanitation systems, and effective environmental compensation is

both possible and increasingly critical to balance societal needs with the preservation of natural heritage. This requires socio-environmental justice – respecting indigenous peoples and traditional communities, reducing inequalities in access to land and water, and ensuring that vulnerable populations have a voice in decision-making. It also demands intergenerational protection, as every hectare of preserved Cerrado safeguards not only biodiversity but also the future for the children who will inherit this territory.

The Cerrado can no longer remain a sacrificial biome, overlooked in global climate policies. Its protection is vital not only for the continent's water and energy security and for Brazil's fulfillment of its international commitments, but also for safeguarding life in all its richness and diversity. The Brazilian Public Prosecutor's Office, particularly in Goiás, has shown that vulnerabilities can be transformed into bold, innovative action, giving voice to a biome long silenced. By placing the Cerrado at the forefront of environmental debates, the MPRO affirms its constitutional mandate, its institutional independence, and its pivotal role as a catalyst for structural change. More than a guardian of legality, the Public Prosecutor's Office stands as a guardian of hope, reminding us that the future remains within reach for those willing to protect, to dialogue wisely, and to act decisively in defense of the common good.

CAATINGA AT RISK: VULNERABILITY AND RESILIENCE

BY ALDELEINE MELHOR BARBOSA¹⁸⁵ AND CARLA ZO Aid ALVES DOS SANTOS¹⁸⁶

The Caatinga biome has often been portrayed narrowly through narratives of drought and poverty, largely due to its water scarcity and unique edaphoclimatic adaptations. Yet far from being a desert, this exclusively Brazilian ecosystem is a seasonally dry savanna of immense ecological and socioeconomic importance. Its rich biodiversity and essential ecosystem services highlight the need to reassess its strategic role in both the Brazilian and global environmental agenda, particularly in the face of climate change.

Because the impacts of the climate crisis transcend borders, protecting the Caatinga, like all Brazilian biomes, is vital not only for safeguarding the climate system but also for ensuring the survival of communities whose livelihoods depend on its resources. However, degradation driven by unsustainable development threatens both the integrity of the Caatinga and the resilience of the people who call it home.

This article aims to move beyond the reductionist view of the Caatinga's ecological and social attributes, emphasizing its strategic and indispensable role in addressing climate change and advancing sustainable development in Brazil. It highlights the importance of protecting the biome, stressing both the critical role of enforcement and the leadership required from institutions such as the Public Prosecutor's Office to combat illegal deforestation and ensure a safer future for the Caatinga and its communities.

The Caatinga and its importance

The Caatinga is a uniquely Brazilian biome, present in 10 states and covering approximately 11% of the national territory, 844,453 square kilometers, concentrated mainly in the Northeast. It spans Alagoas, Bahia, Ceará, Pernambuco, Maranhão, Paraíba, Rio Grande do Norte, Piauí, Sergipe, and northern Minas Gerais, the only state in the Southeast where the biome occurs (Figure 1).

¹⁸⁵ Public Prosecutor at the Public Prosecutor's Office of Sergipe, Director of the Environmental Operational Support Center and of the unit for the protection of the right to the integrity of the climate system, specialist in Public Law and in Neuroscience and Conflict Resolution (FMP).

¹⁸⁶ Forestry Engineer, PhD in Development and Environment, Environmental Analyst at the Public Prosecutor's Office of Sergipe – GAEMA.

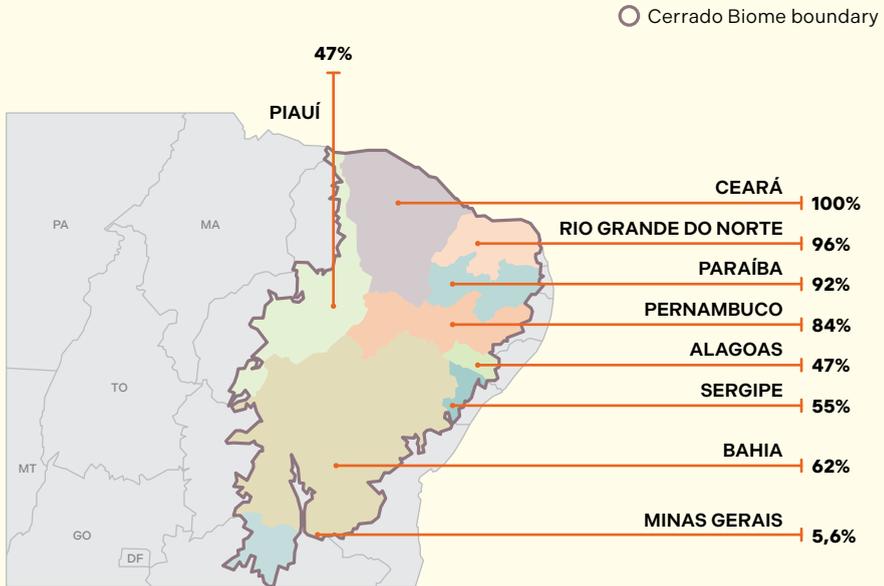


Figure 1: Caatinga Biome. States included in the biome and their percentage of territorial distribution, 2025. Source: ABRAMPA – Brazilian Association of Members of the Public Prosecutor’s Office for the Environment

Physiographically, the Caatinga is divided into eight major ecoregions: Chapada Diamantina Complex, Campo Maior Complex, Ibiapaba-Araripe Complex, Northern Sertaneja Depression, Southern Sertaneja Depression, São Francisco Dunes, Borborema Plateau, and Raso da Catarina¹⁸⁷. This division underscores the remarkable environmental heterogeneity that makes the biome unique worldwide. The Chapada Diamantina, in particular, has one of the highest rates of endemism¹⁸⁸. Ecoregional classification is a valuable tool for environmental management and conservation, as it reflects the ecological diversity of a given area. The Caatinga’s distinctive vegetation, composed of numerous species adapted to water scarcity, plays a critical role in soil protection, water conservation, and erosion control, acting as a natural barrier against desertification.

The Caatinga’s fauna is highly diverse and well adapted to arid conditions, with many endemic species. Approximately 178 species of mammals, 591 birds,

¹⁸⁷ VELLOSO, A.L, SAMPAIO, E.V.S.B.; PAREYN, F. (ed.). *Ecoregiões propostas para o bioma Caatinga*. The Nature Conservancy do Brasil. Recife: Associação Plantas do Nordeste, 2002.

¹⁸⁸ BRAZIL. Ministry of the Environment and Climate Change. 2024. Action Plan for the Prevention and Control of Deforestation and Burning in the Caatinga – PPCaatinga. (Consultation). Available at: Governo Federal – Participe + Brasil – Action Plan for the Prevention and Control of Deforestation and Burning in the Caatinga – PPCaatinga.

177 reptiles, 79 amphibians, 241 fish, and 221 bees¹⁸⁹ have been recorded in the biome. An estimated 15% of these animals and 33% of its vegetation are endemic, occurring nowhere else in the world.

The biome also demonstrates unique resilience strategies. Research by Embrapa (Brazilian Agricultural Research Corporation) identified the bacterium *Bacillus subtilis*, which helps plants grow even under water scarcity. This discovery led to the development of Hydratus, an innovative bioproduct designed to protect crops during drought while stimulating growth¹⁹⁰.

Research behind Hydratus found that the microorganism produces phytohormones that alter root morphology, making roots stronger and more robust. This enables plants to absorb more water and nutrients, increasing their resistance to drought. The launch of Hydratus is particularly significant in the context of climate change, as rising temperatures and irregular rainfall undermine agriculture. It offers a technology to help mitigate drought impacts that threaten crop productivity and health⁶.

Beyond its remarkable biodiversity, the Caatinga also plays a critical role in carbon sequestration, acting as a carbon sink even during dry seasons¹⁹¹, when vegetation sheds its green biomass to conserve water.

Nearly a decade of research has shown that the Caatinga sequesters an average of 527 grams of carbon per square meter, or 5.2 tons per hectare, each year. This makes it one of the most effective carbon sinks among the world's dry forests, according to a study led by the National Observatory on Water and Carbon Dynamics in the Caatinga Biome (OndaCBC), which compared the biome with 30 other dry regions worldwide¹⁹².

The biological adaptations of Caatinga plants are crucial for retaining rainwater in the soil, ensuring survival and sustaining the water cycle in an environment of low humidity and irregular rainfall. These adaptations support groundwater recharge and help maintain the flow of intermittent rivers.

Studies also show that rainfall, even in small amounts, is the main driver of carbon exchange, as it stimulates plant growth and increases the biome's capacity to absorb CO₂¹⁹³.

In addition to its ecological role, the Caatinga's native vegetation sustains important aspects of the regional economy. At the same time, these uses exert pressure on the biome, particularly through firewood as the primary energy source and

189 BRAZIL. Ministry of the Environment and Climate Change. 2025. Data on the Caatinga. Available at: <https://antigo.mma.gov.br/biomas/caatinga.html>.

190 EMBRAPA. 2025. Bacterium from the Caatinga becomes a natural input to protect crops from drought. Available at: <https://www.embrapa.br/busca-de-noticias/-/noticia/102094505/bacteria-da-caatinga-vira-insumo-natural-para-protoger-plantacoes-da-seca>.

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

192 Seasonal variation in net ecosystem CO₂ exchange of a Brazilian seasonally dry tropical forest. *Revista Scientific Reports. Nature*. The study was conducted in partnership with professors, researchers, and students from UFRN, UFCG, UFPE, UFOPA, ICMBio, and the National Institute for the Semi-Arid Region (INSA).

193 Ibid.

the extraction of a wide variety of non-timber products from its socio-biodiversity, which also reflect the region's strong cultural identity.

The region's low Human Development Index reflects challenges often associated with drought, fragile physiographic conditions, poverty, and other inequalities. Yet, contrary to common perceptions, the Caatinga holds unique attributes of immeasurable value for environmental balance, biodiversity conservation, and the livelihoods of local communities¹⁹⁴.

According to Aldrin Perez Marin, researcher at the National Institute for the Semi-Arid Region (INSA), its most significant socioeconomic potential lies in the use of native fruits, ornamental plants, and medicinal species, key sources of income for local communities¹⁹⁵.

Despite this ecological and social importance, the Caatinga is among the most degraded and least protected biomes in Brazil. This reality calls for urgent and targeted strategies to ensure its protection.

Deforestation in the Caatinga has accelerated due to multiple pressures on native vegetation. From 2022 to 2023, the rate rose by 43.4%, driven primarily by livestock and agriculture. More recently, renewable energy projects have also become a significant driver, with deforestation from this sector increasing by 24% in the same period, equivalent to the loss of more than 4,302 hectares¹⁹⁶.

In 2023, deforestation alerts rose by 34.7% compared to 2022, totaling 18,835 alerts versus 13,985 the previous year. The pace reached 23 hectares per hour, or an average of 552.6 hectares cleared per day (MapBiomias, 2024).

In 2024, MapBiomias recorded a slight improvement: 17,835 alerts, down from 18,835 in 2023, representing a 13.4% reduction in deforestation across the biome¹⁹⁷.

Despite the progress observed in 2024, deforestation continues to exert intense pressure on native vegetation. This calls for greater attention both to illegal (unauthorized) clearing and to stricter oversight of Authorizations for Vegetation Suppression (AVSs).

A Technical Note issued by ABRAMPA stresses the need to improve procedures for granting AVS in the Cerrado, Caatinga, Amazon, Pantanal, and Pampa. It highlights that a significant share of vegetation clearings has taken place outside the law, without proper prior review by competent authorities, resulting in misuse and poor implementation of the instrument¹⁹⁸.

194 BRAZIL. Ministry of the Environment. Inputs for the development of the Action Plan for the Prevention and Control of Deforestation in the Caatinga. Brasília, 2011.

195 EMBRAPA. Mudanças Climáticas. Available at: <https://www.embrapa.br/busca-de-noticias/-/noticia/88549836/em-quase-uma-decada-anualmente-caatinga-retirou-da-atmosfera-52-t-de-carbono-por-hectare>.

196 MAPBIOMAS. Relatório Anual do Desmatamento no Brasil 2023. São Paulo, Brasil – MapBiomias, 2024, 154 p. Available at: <http://alerta.mapbiomas.org>.

197 MAPBIOMAS. Relatório Anual do Desmatamento no Brasil 2024. São Paulo, Brasil – MapBiomias, 2025, 209 p. Available at: <http://alerta.mapbiomas.org>.

198 ABRAMPA – Brazilian Association of Environmental Public Prosecutors. Technical Note: on the need to improve procedures related to authorizations for native vegetation suppression in the Cerrado, Caatinga, Amazon, Pantanal, and Pampa biomes. 2024.

Protecting the Caatinga also requires identifying and publicly disclosing priority areas for conservation and restoration, strengthening the management of existing protected areas, and expanding the network, particularly through the creation of new areas under strict protection.

According to the National Register of Protected Areas (CNUC, the acronym in Portuguese), less than 10% of the Caatinga biome is currently protected, about 2% under strict protection and 7% under sustainable use (CNUC, 2025). This level of coverage is far from sufficient to meet global biodiversity targets or to ensure the sustainable use of the biome's resources¹⁹⁹.

This gap highlights the State's failure to meet conservation commitments and safeguard the Caatinga's unique biodiversity. Limited legal protection not only leaves the biome vulnerable to degradation but also weakens its resilience to growing climate and human pressures.

Preserving the Caatinga must also be seen as a climate adaptation strategy, essential for combating desertification and water scarcity. Its role as a natural carbon sink, provider of critical ecosystem services, and source of livelihoods for local communities makes its protection indispensable.

The role of the Public Prosecutor's Office in protecting the Caatinga

Despite its ecological significance, the Caatinga remains one of Brazil's most degraded and least protected biomes. Deforestation, driven primarily by agricultural expansion, is now compounded by new pressures such as large-scale renewable energy projects. The pace of this advance calls for immediate, coordinated, and integrated responses.

Beyond illegal deforestation, weak oversight of Authorizations for Vegetation Suppression (AVS) further aggravates the situation. AVS are often issued on inadequate grounds or with insufficient data, and when suppression, whether authorized or not, proceeds without effective enforcement, it undermines the very purpose of environmental regulation.

Resolution CONAMA N° 510, enacted on September 15, 2025, establishes technical criteria, validity conditions, transparency, integration, and disclosure requirements for the issuance of Authorizations for Vegetation Suppression (AVS) on rural properties. By imposing stricter standards, this instrument is expected to improve the management of vegetation suppression in Brazil²⁰⁰.

Protecting the Caatinga requires multisectoral coordination between government institutions and civil society. In this context, the Public Prosecutor's Office has a critical role as both guardian and catalyst for change, particularly through

¹⁹⁹ BRAZIL. Ministry of the Environment and Climate Change. National Register of Protected Areas – CNUC. Dashboard. 2025.

²⁰⁰ BRAZIL. National Council for the Environment (CONAMA). Resolution N° 510 of September 15, 2025. Establishes technical criteria, validity conditions, transparency, integration, and disclosure requirements for the issuance of Authorizations for Native Vegetation Suppression (AVS) on rural properties, and other provisions.

preventive action in the extrajudicial sphere to ensure the effectiveness of environmental law.

A notable example of this approach is the Preventive Integrated Inspection Program (FPI) of the São Francisco River, created in 2002 in Bahia and later expanded to Sergipe, Alagoas, Pernambuco, and Minas Gerais. The program brings together more than 90 institutions, among them state and federal Public Prosecutor's Offices, labor and accounts prosecutors, police forces, environmental and water authorities, health and cultural heritage agencies, agricultural defense bodies, professional councils, civil society organizations, as well as the São Francisco River Basin Committee and the Peixe Vivo Agency, working in coordinated fashion to strengthen environmental protection²⁰¹.

The FPI Program assesses, integrates, and promotes the implementation of multiple public policies, including those related to water resources, environment, sanitation, solid waste, environmental education, climate change, agroecology, and fauna.

Its 8th edition, held in 2025 in Sergipe's Lower São Francisco region, focused on the Caatinga biome. Flora inspections identified several irregularities, including the suppression of native vegetation without authorization, illegal logging, damage to legal reserves and permanent preservation areas, unlicensed agricultural activities, and sites at risk of desertification²⁰².

Key findings from the operation include: over 640 hectares of Caatinga inspected; 100% of detected deforestation carried out without AVS; inconsistencies in 100% of CARs (Rural Environmental Registry, Federal Law N^o 12,651/2012) reviewed; and maize monoculture identified as the main driver of deforestation in 45% of the areas.

Data from this edition of the FPI clearly show the advance of unauthorized deforestation in the Caatinga biome. Inspection teams identified several areas of clearing that had not yet been registered on monitoring platforms such as MapBiomass and Brasil MAIS, highlighting the rapid pace of forest loss.

The findings also underscore the need to strengthen mechanisms for granting agricultural credit and insurance, restricting access to these benefits for rural producers involved in illegal deforestation, even in cases where no formal environmental embargo has yet been issued.

This concern is heightened by the fact that only a small share of identified deforestation cases result in accountability. It is therefore essential that the rural credit system adopt preventive criteria and be integrated with monitoring and alert platforms, preventing credit and agricultural insurance from becoming indirect drivers of deforestation. Without such safeguards, these instruments risk enabling cultivation in environmentally fragile areas with low agricultural suitability, where crop failures are frequent due to the severe edaphoclimatic constraints of the Caatinga.

In this scenario, the Public Prosecutor's Offices play a vital role in strengthening enforcement against illegal deforestation in the Caatinga. Through extrajudi-

201 FPI SERGIPE. National Coordination. Available at: fpisaofrancisco.inf.br.

202 FPI SERGIPE. Environmental Inspection Report. Preventive Integrated Inspection, 8th Edition. Sergipe, Apr. 10, 2025

cial and judicial actions, they can curb forest loss by holding offenders accountable and ensuring that the costs of environmental degradation are internalized, thereby deterring further destructive practices.

They can also act proactively to foster public policies that promote conservation and the sustainable use of the Caatinga. This includes demanding more effective enforcement mechanisms, improving the management and expansion of protected areas, and defining priority zones for restoration.

Responding to rising deforestation, ABRAMPA launched the *Caatinga Resiste* project, an initiative that unites Public Prosecutor's Offices from nine states with environmental agencies to intensify enforcement, improve transparency in forest data, and strengthen monitoring through satellite alerts. The project will use MapBiomass Alerta, cross-referencing data from the Rural Environmental Registry (CAR) and Authorizations for Vegetation Suppression (AVS) to detect and prevent irregularities. It also seeks to advance the restoration of priority areas and combat desertification in critical semi-arid regions, where the biome faces mounting pressures from climate change, agricultural expansion, and renewable energy projects²⁰³.

Climate justice and the Caatinga

The link between climate justice and the Caatinga biome has long been overlooked in climate change discussions. Nationally, there is still little recognition of its role in protecting the climate and sustaining the communities that depend on it. Protecting the Caatinga is not only about conserving biodiversity, but also a matter of social and environmental justice.

The biome is home to populations that have historically contributed minimally to greenhouse gas emissions, yet they are among the most directly impacted by climate change. Rising temperatures, prolonged droughts, and irregular rainfall undermine agriculture, reduce water availability, and threaten the food sovereignty of communities whose livelihoods rely on its resources.

The Caatinga is home to 94 quilombola territories spanning 550,000 hectares and about 45 Indigenous peoples occupying 140,000 hectares²⁰⁴. Advancing climate justice requires recognizing these communities, their traditional knowledge, and their management practices. Preserving the biome is not only about conserving nature and curbing illegal deforestation but also about ensuring that these populations can continue to live with dignity on their lands.

Indigenous, quilombola, and riverine communities must therefore be central to the design and implementation of public policies for adaptation and resilience. True climate justice demands that solutions be built *with* and *for* those who live in

203 ABRAMPA. 2025. Available at: <https://abrampa.org.br/novo-projeto-da-abrampa-vai-foretalecer-protacao-do-semiarido-brasileiro/>.

204 NATIONAL INSTITUTE FOR THE SEMI-ARID REGION – INSA. The role of research and networked action in protecting the world's most biodiverse semi-arid region, 2025. Available at: <https://www.gov.br/insa/pt-br/assuntos/noticias/dia-da-caatinga-o-papel-da-pesquisa-e-das-coes-em-rede-na-protacao-da-regiao-semiarida-com-maior-biodiversidade-do-mundo>.

and depend on the biome. This means upholding their right to adapt in fair, equitable, and inclusive ways, with access to resources, technologies, and knowledge.

Public policies must prioritize access to social technologies that enable people in the semi-arid region to live sustainably with its conditions, such as cisterns, reservoirs, and seed banks for traditional varieties. They should also advance the restoration and conservation of native vegetation through reforestation with native species and sustainable management practices, extending beyond efforts to curb desertification.

Equally essential are water security and food sovereignty, ensuring access to safe drinking water while promoting sustainable and agroecological farming that respects local autonomy. Finally, policies should press for resources and investments that address vulnerability and drive the transition toward sustainable development models for the Caatinga.

Final considerations

The destruction of the Caatinga, driven by large-scale agribusiness and, more recently, the expansion of renewable energy projects without comprehensive impact assessments, has heightened the biome's vulnerability.

Deforestation undermines ecosystem resilience and accelerates desertification, a process that depletes soils, displaces families, deepens poverty, and fuels migration.

The Public Prosecutor's Office has a vital role in prevention, from demanding effective mitigation of social and environmental impacts from large projects to holding those responsible for illegal deforestation and environmental harm accountable. Its actions include monitoring restoration efforts, prioritizing the recovery of degraded areas, and supporting impacted communities.

Strengthening environmental governance at the state and municipal levels across the Caatinga biome is an important step toward raising protection standards and reducing impacts on the region.

Ultimately, defending and protecting the Caatinga is a clear expression of climate justice: ensuring that the burdens of the climate crisis do not fall disproportionately on those who have contributed least to it, while advancing solutions built with and for the communities whose survival depends on this biome.

Preserving the Caatinga is not only a matter of climate justice but also a strategy for adaptation and mitigation. With its capacity for carbon sequestration and its resilience in sustaining ecosystems under water scarcity, the biome provides natural solutions to today's climate challenges.

A climate-focused approach also opens new opportunities, such as carbon credit markets for conserved areas of the Caatinga and the valorization of socio-biodiversity products and services. Embedding these perspectives into public policy, alongside the active role of the Public Prosecutor's Office, can position the Caatinga as a priority in Brazil's national environmental agenda.

Regional Challenges, Global Impacts

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THE FPI PROGRAM IN ADDRESSING CLIMATE EMERGENCIES IN THE SÃO FRANCISCO RIVER BASIN

BY LUCIANA ESPINHEIRA DA COSTA KHOURY²⁰⁵, EDVALDA PEREIRA TORRES LINS AROUCHA²⁰⁶ AND ÂNGELA PATRÍCIA DEIRÓ DAMASCENO²⁰⁷

The struggle to protect the São Francisco River Basin has a long history and brings together the coordinated efforts of many partners through the Integrated Preventive Inspection Program (FPI) – including public agencies, civil society organizations, public prosecutors’ offices, the São Francisco River Basin Committee, police forces, and universities.

The basin faces multiple sources of degradation that affect both the quantity and quality of its waters, alter local climate conditions, and are themselves influenced by productive activities. The FPI’s integrated and continuous approach makes it possible to act systemically, addressing the basin as a whole.

The FPI Program, launched in the state of Bahia in 2002, has since expanded to Alagoas (2014), Sergipe (2016), Minas Gerais (2017), and Pernambuco (2018), with plans to extend to Goiás and the Federal District, thereby encompassing the entire basin. Today, more than one hundred partner institutions collaborate under the Program, which has already conducted over seventy-five field operations across the São Francisco River Basin.

This article examines the Program’s systemic approach and its contribution to addressing climate emergencies.

As part of the FPI, activities include environmental inspections across different productive sectors, socio-environmental education initiatives, and assessments of public policies. The joint work of competent agencies in integrated inspections allows for a more complete understanding of local realities, helping identify better ways for enterprises and productive activities to adopt more sustainable practices. The Program has also placed growing emphasis on socio-environmental education and is therefore considered a socio-educational initiative. It

205 Environmental Prosecutor. Master’s degree in Law (Federal University of Bahia – UFBA); Specialist in Urban and Environmental Law (Higher School Foundation of the Public Prosecutor’s Office of Rio Grande do Sul); Regional Environmental Prosecutor of Paulo Afonso; Coordinator of the São Francisco River Basin Defense Unit and of the FPI Program; Coordinator of the Bahia Forum on Combating the Impacts of Agrochemicals, GMOs, and for Agroecology (FBCA); Manager of the *Ecological Municipality Project*; and member of the Agrarian and Land Affairs Unit of the Public Prosecutor’s Office of Bahia.

206 Pedagogue. Ph.D. in Agroecology and Territorial Development; M.Sc. in Human Ecology and Environmental Management; founder of AGENDHA; ecofeminist; agroecological educator; professor and researcher in the Department of Indigenous Peoples, Traditional and Peasant Communities at the State University of Bahia (UNEB) – DCT, Campus XXVI, Jeremoabo/BA; member of the National Commission for Combating Desertification (CNCD) at the Ministry of the Environment and Climate Change; and Advisor to the FPI Program.

207 Sociologist. Ph.D. in Sociology; M.Sc. in Environmental Engineering; Postdoctoral Research. Fellow in Water Management and Regulation (PROFÁGUA – Federal University of Bahia); and Advisor to the FPI Program.

aims to raise public awareness by encouraging people to reflect on their individual and collective practices and decisions, and to think critically about the paths they wish to pursue.

The FPI operates across its three main biomes – Caatinga, Cerrado, and Atlantic Forest – as well as the estuarine ecosystem at its mouth. In recent years, with a focus on Brazil’s dry, semi-arid²⁰⁸, and arid subregions, the most vulnerable populations – traditional communities and the poorest groups – have been the hardest hit. The impacts are particularly severe for women and girls, as they are amplified across environmental, sociopolitical, socioeconomic, and cultural dimensions.

When it was first created through a partnership between the Public Prosecutor’s Office of the State of Bahia (MPBA) and the Regional Council of Engineering and Agronomy of Bahia (CREA-BA), the FPI Program involved only a few institutions and focused solely on protecting the natural environment. Over time, as the concept of environmental protection came to include multiple dimensions – labor, cultural, and built environments – the program’s scope expanded. Dozens of public institutions and civil society organizations joined, and the FPI has since become an essential tool for socio-environmental assessment across the Basin.

The FPI carries out a comprehensive assessment of the Basin’s socio-environmental conditions, identifying noncompliance with environmental legislation, water resource management, land use and occupation, public health, and professional regulations. Based on these findings, administrative, civil, and criminal measures are taken to stop ongoing damage, correct irregularities, and prevent future harm – especially through socio-educational initiatives targeting the local population.

The Program aims to improve both the environmental quality of the Basin and the well-being of its communities. Over time, in constant dialogue with society and informed by practical experience, the FPI has become a socio-educational initiative supporting the 18 Sustainable Development Goals (SDGs)²⁰⁹. It has steadily expanded its structured, ongoing efforts – offering guidance, lectures, and workshops – through an eco-pedagogical, socio-environmental, and agroecological approach across formal, non-formal, and informal educational settings in Brazil.

In today’s Brazilian context, it is essential to promote discussions on the climate crisis, emergencies, and resilience, emphasizing the educational, socio-environmental, economic, and climate vulnerabilities of traditional peoples, communities, and other marginalized populations. These groups are disproportionately affected, reflecting a clear pattern of socio-environmental and climate injustice (Khoury, 2025)²¹⁰.

208 In Brazil’s semi-arid region live approximately 31 million people—about 15.3% of the country’s population—making it the most densely populated semi-arid region in the world. Within this territory are found around 80% of all quilombola communities in Brazil, with the State of Bahia hosting the largest number of quilombola communities and the second largest Indigenous population in the country. (IBGE, 2022)

209 The 18th Sustainable Development Goal (SDG 18) – “Ethnic-Racial Equality”—was announced in September 2023 by President Luiz Inácio Lula da Silva, during the opening of the 78th session of the United Nations General Assembly.

210 KHOURY, L. E. C. *In Search of Socio-environmental Justice in the São Francisco River Basin*.

The situation is particularly aggravated for those already affected, especially Black, quilombola, Indigenous, and other women from traditional communities, as they experience amplified vulnerabilities that increase their risk of social exclusion.

In Bahia, according to the Superintendency of Economic and Social Studies (BAHIA, 2025)²¹¹, women aged 25 and over have higher educational attainment, yet their earnings remain lower than those of men. In 2023, the average real income from their main employment was BRL 1,935, compared with BRL 2,052 for men and the state average of BRL 2,004 for individuals of the same age. When race and gender are considered together, the analysis reveals compounded vulnerabilities for Black women in the labor market. Their average real income (BRL 1,742) represents only 58.2% of what White men earn (BRL 2,991) in the same age group. White women earn BRL 2,749 on average, while Black men earn BRL 1,845. These figures highlight that in Bahia, racial disparities have a stronger impact on earnings than gender alone.

The policy for living with the semi-arid and arid regions, which covers a large part of the basin, places particular emphasis on access to the “five waters”²¹² (for consumption, production, livestock, climate control, and care), supported by social movements. These waters are affected by climate emergencies and the overuse of São Francisco River resources by agribusiness.

The situation in the Basin is concerning due to the multiple impacts from various enterprises, including the disappearance of springs, deforestation of recharge areas, destruction of riparian forests, contamination from intensive pesticide use, the invisibility and limited regularization of traditional peoples’ and communities’ territories, restricted access to technical assistance and rural extension, loss of biodiversity, and soil productivity decline, exacerbated by the extensive monocultures of soy, cotton, and corn in the Cerrado, and sugarcane in the lower São Francisco region.

Desertification is already evident in regions of the Basin, particularly in municipalities in northern Bahia, affecting rural women the most – farmers, extractivists, artisanal fishers, indigenous women, quilombolas, floodplain dwellers, “geraizeiras,” spiritual healers, terreiro practitioners, among others. These groups experience the greatest impacts of climate change, including losses in employment and income, worsening labor conditions, and food insecurity. “Unequal access to economic resources means that when climate patterns change, affecting infrastructure and public services, women are less able to adapt their livelihoods, recover, and rebuild.”²¹³

Conhecimento Edições, 2025.

211 BAHIA. Superintendence of Economic and Social Studies of Bahia (SEI). SEI Highlights the Challenges Faced by Women in Balancing Professional Work with Domestic and Care Responsibilities. 2025. Available at: <https://www.ba.gov.br/sei/noticias/2025-03/4289/dia-internacional-da-mulher-sei-destaca-dificuldades-das-mulheres-para>.

212 A term commonly used by social movements advocating for water access to refer to five key reservoirs or the five primary uses of water resources.

213 UN Women Brazil. 15 Years, 15 Facts: Challenges and Solutions for Gender Equality. 2023. Available at: <https://www.onumulheres.org.br/noticias/15-anos-15-fatos-desafios-e-solucoes-pa>

Mitigating policies, programs, and projects are crucial for traditional peoples and communities. For women and girls within these groups, such initiatives are even more vital, providing not only the means to sustain their livelihoods but also the support needed to recover and rebuild – a fundamental human right.

The FPI works to address this reality as a permanent, ongoing program with cyclical and interactive evaluation and monitoring. Macro-territorial field assessments are carried out in stages specific to each region. Each stage is organized into three distinct phases: Planning, Field Implementation, and Follow-up. The program's activities include environmental inspections, environmental education, and public policy assessments.

In the Planning phase, the team determines which actions to carry out, selects the municipalities to visit, and identifies the key socio-environmental issues, establishing priorities and strategies tailored to local realities.

In the Field Implementation phase, multidisciplinary teams²¹⁴ carry out coordinated actions across various areas, including pesticide impact monitoring; mining; rural properties and flora, overseeing deforestation, water use, and pesticide application; fauna; fish farming and aquaculture; basic sanitation, covering solid waste management, water supply, and sewage; cultural heritage, inspecting historic, archaeological, and speleological sites; traditional peoples and communities, assessing land tenure, certification, sanitation, and local conflicts; and municipal environmental management, evaluating local environmental systems. Additional teams handle communication, overall coordination, socio-environmental and agroecological education, dam monitoring, social mobilization, situation room operations, and any other functions required by the Program.

All teams operate from a socio-educational perspective. On average, twenty-five teams participate in each Field Implementation phase in Bahia. At the end of each phase, public hearings are held to present the results, gather community input, and jointly develop solutions, thereby strengthening the program's transparency and legitimacy.

The Follow-up phase takes place after the fieldwork is completed. It focuses on monitoring the actions implemented, consolidating results, and ensuring that each participating agency adopts the necessary measures. When needed, additional institutions are brought in to support the implementation of essential public policies. This phase guarantees continuity through consistent monitoring and the enforcement of administrative, extrajudicial, or judicial actions (civil and/or criminal).

The Program's systemic approach across the Basin recognizes that all its activities, to varying degrees, directly or indirectly influence climate-related dynamics, as established by Law Nº 12.187/2009. However, some of FPI's actions directly aim to address climate emergencies.

As is well known, climate change is driven by multiple factors, including vegetation removal, intensive livestock and agricultural practices, and solid waste disposal, among others. FPI actively tackles many of these issues directly.

ra-a-igualdade-de-genero/.

214 At each stage, some teams step back while others are formed in response to the specific needs of the São Francisco region.

Teams monitoring deforestation – whether rural property teams in Bahia or flora teams in Alagoas and Sergipe – work to prevent illegal deforestation and restore areas where vegetation has been removed.

The basic sanitation teams work directly to ensure proper solid waste management and to eliminate open-air dumps. In Alagoas and Sergipe, with strong support from the FPI, all open-air dumps in the states have already been closed.

Another key effort contributing to the fight against climate change involves monitoring agricultural and livestock activities to ensure they comply with environmental regulations.

Similarly, the extraction of native wood for charcoal production and ceramics – both subject to ongoing FPI monitoring – is addressed through inspections, guidance for regularizing ceramic enterprises, and the promotion of alternative energy sources.

In the same way, the FPI’s diagnostic work with traditional peoples and communities on land regularization – and the pursuit of such regularization – plays a crucial role in tackling climate emergencies, since these territories are among the most ecologically intact, as scientifically confirmed (Khoury, 2025).

The FPI Program, as a socio-educational initiative, embraces the principle that “to be dialogical is to commit oneself to the constant transformation of reality” (Freire, 1977, p. 43)²¹⁵. In line with this, many of its activities are educational in nature, covering the impacts of deforestation, pesticide use, soil degradation, climate change, desertification, wildlife removal, and a wide range of other awareness-raising and formative actions.

Educational activities take place across multiple fronts, including community initiatives, technical courses, schools, fairs, media outreach, and other initiatives. Special emphasis is given to women who live with constant climate-related challenges, acting as key agents in the revival of agroecological practices – including forage-based agroforestry systems – blending their ancestral knowledge with scientific understanding, and building networks and partnerships to address climate injustices. Although the program is not exclusively directed at women, this focus highlights one of the key vulnerability markers, calls for prioritized attention, and illustrates the wide-reaching impact of the FPI Program.

Additionally, structured “formal” environmental education is carried out in each municipality of the São Francisco River Basin in Bahia.

Environmental education, according to Loureiro (2004)²¹⁶, is an approach that develops within education itself, emerging from the interaction between various pedagogical traditions and ecological thought, both of which take environment and nature as their central categories. In this context, the term “environmental” is used to highlight aspects historically neglected by traditional educational practices – particularly those related to the understanding of life and nature.

It also seeks to critically reveal the divisions imposed by capitalist modernity and by an analytical, linear, and non-dialectical paradigm that fragments econom-

215 FREIRE, Paulo. *Extension or Communication?* 3rd ed. Rio de Janeiro: Paz e Terra, 1977.

216 LOUREIRO, C. F. B. Transformative Environmental Education. In: LAYRARGUES, P. P. (coord.). *Identities of Brazilian Environmental Education*. Brasília: Ministry of the Environment (MMA), 2004.

ic activity (and others) from social totality, splitting society from nature, mind from body, matter from spirit, and reason from emotion, among other socio-environmental dimensions.

From this perspective, FPI's structuring action consists in assessing municipal education and environmental departments to determine whether national, state, and local legislation on environmental education policies and programs is being effectively implemented. "A structuring public policy is one that emerges through the active participation of the community it serves; works to strengthen that community and sustain its ongoing processes; maintains dialogue with other initiatives already taking place in the territory; embraces the inclusion of diverse people, environments, and interests; and seeks outcomes that are both lasting and equitable."²¹⁷

From this perspective, FPI's structuring action consists in assessing municipal education and environmental departments to determine whether national, state, and local legislation on environmental education policies and programs is being effectively implemented.

In line with this perspective, the Departments of Education and Environment are interviewed and guided both during the diagnostic phase and in the social feedback and workshop sessions held at each stage of the FPI.

Working in synergy, they are also consulted and advised on the implementation of the guideline²¹⁸ established by Law Nº 14,926/2024, which stipulates that, starting in 2025, Brazilian schools – at both the basic and higher education levels – must include in their curricula the themes of climate change and biodiversity protection.

Beyond schools, activities are also carried out in rural and urban communities, as well as in academic settings and the media. "Thus, since there is no single form or exclusive model of education, schools are not the only spaces where it takes place (...). Contemporary transformations have reinforced the understanding of education as a multifaceted phenomenon that unfolds in many settings – both institutional and informal – and through a variety of approaches."²¹⁹

Beyond schools, activities are also carried out in rural and urban communities, as well as in academic settings and the media.

For these reasons, the Socioeducational Program is engaged in an ongoing process of reflection and renewal, marked by continuous adjustments and a clear political commitment to remain comprehensive, structuring, critical, revolutionary, experiential, continuous, and ever-evolving.

The program as a whole highlights popular mobilization, active participation, and social oversight, promoting access to information and the recognition of

217 MORIMOTO, I. A. *Law and Environmental Education: Stimulating Critical Participation and the Effective Application of Regulations Aimed at Environmental Protection in Brazil*. 2014. 500 f. Doctoral dissertation. Graduate Program in Environmental Science (PROCAM), University of São Paulo, São Paulo, 2014.

218 BRAZIL. Amends Law Nº 9,795 of Apr. 27, 1999, to ensure attention to climate change, biodiversity protection, and socio-environmental disaster risks and vulnerabilities within the scope of the National Environmental Education Policy.

219 FRISON, Lourdes Maria Bragagnolo. O pedagogo em espaços não escolares: novos desafios. *Ciência*, Porto Alegre, nº 36, pp. 87-103.

diverse forms of knowledge as key elements for collective decision-making and the co-creation of public policies that address the needs of each territory in defense of its waters and its people.

The strengthening of collegiate bodies that bring together representatives from civil society, public authorities, and water users extends beyond dialogue with river basin committees, fostering greater integration among public policies and ensuring effective social oversight throughout the formulation, implementation, evaluation, and monitoring stages.

This understanding of the Program as an environmental and agroecological socioeducational initiative is consistent with the perspective of Biasoli and Sorrentino (2018, p. 5), who state that such initiatives “are structuring in nature, generating permanent plans and programs while fostering the creation and consolidation of administrative and operational mechanisms, thereby contributing to monitoring and evaluation processes.”

There is an urgent need to integrate a socio-environmental and climate justice perspective, focusing on four key areas.

First, recognizing rights, ancestral and ethnocultural knowledge, and women’s other forms of knowledge is essential – especially for populations facing intersecting forms of discrimination – as this strengthens climate resilience.

Second, a fair redistribution of economic resources is needed to ensure that women have access to opportunities that enable their participation in agroecological transitions and their related processes.

Third, the active participation of vulnerable groups in climate decision-making processes is vital for promoting justice and accountability, as well as for shaping more inclusive and effective public policies.

Finally, the principles and dimensions of feminist climate justice highlight the importance of reparations, reaffirming the Global North’s historical responsibility for greenhouse gas emissions and the need for climate financing that reaches the communities most affected by the crisis – ensuring that losses and damages, both economic and socio-environmental, are properly addressed, as illustrated by Brazil’s marco temporal case, which threatens 133 Indigenous territories that have yet to be demarcated.

Rooted in these strengths, the FPI, as a socioeducational program, has been confronting the catastrophic impacts of the climate crisis through affirmative actions implemented before, during, and after each stage of its work. These efforts have yielded significant and lasting results, earning the program recognition through the 2024 Innovare Award²²⁰, in the Public Prosecutor’s Office category.

At each stage, the FPI brings together approximately 250 professionals who embody ongoing struggle and celebrate collective achievements. About half of the participants are women, and during the socioeducational events and public hearings for social feedback, much of the audience²²¹ is also composed of women – those who, “like a river born from others, know how to move forward together,

220 The Innovare Award aims to identify, publicize, and promote practices that contribute to improving the justice system in Brazil.

221 The public hearings held at the end of each FPI stage bring together an average of 400 participants.

becoming and extending themselves in others, and finding their way to the great waters of the endless ocean” (Mello, 1984)²²².

This river and its tributaries flow into others as expressions of nature’s resistance and generosity, reminding us that “tomorrow is not for sale” (Krenak, 2020)²²³, and that the strength of the waters must continue to inspire more people to fight for dignity and access to essential rights – those that sustain their ways of life and strengthen climate resilience while confronting socio-environmental and climate injustice throughout the São Francisco River Basin.

222 MELLO, Thiago de. Like a River. In: MELLO, Thiago de. *Mormaço na Floresta* [Haze in the Forest]. Rio de Janeiro: Civilização Brasileira, 1984.

223 KRENAK, Ailton Alves Lacerda. *Tomorrow Is Not for Sale*. São Paulo: Companhia das Letras, 2020.

THE INSTITUTIONAL ROLE OF THE MPPI IN ERADICATING OPEN-AIR DUMPS: PROGRESS, CHALLENGES, AND CLIMATE OUTLOOK

BY ÁUREA EMÍLIA BEZERRA MADRUGA²²⁴

The contemporary environmental crisis demands consistent and coordinated responses that bring together institutional and social mechanisms to preserve ecosystems and safeguard the fundamental rights of present and future generations. Among the many drivers of environmental degradation, the inadequate management of solid waste stands out, a challenge that becomes even more acute in historically marginalized regions such as the State of Piauí.

The persistence of open-air dumps, which remain in hundreds of Brazilian municipalities despite more than a decade of the National Solid Waste Policy (Law Nº 12,305/2010) and over forty years since the enactment of the law criminalizing conduct that “endangers human, animal, or plant health, or aggravates an existing hazardous situation” (Article 15 of Law Nº 6,938/1981), reveals not only the State’s failure to ensure adequate sanitation services but also a direct violation of the fundamental right to an ecologically balanced environment (Article 225 of the Federal Constitution).

In the specific case of Piauí, a State that encompasses remarkable natural and cultural heritage sites such as the Parnaíba Delta and Serra da Capivara National Park, the persistence of open-air dumps poses serious threats to biodiversity, water resources, public health, and overall quality of life. The environmental degradation caused by improper waste disposal extends beyond local pollution, producing global repercussions through methane (CH₄) emissions. According to an official United Nations (UN) report, methane is one of the most potent greenhouse gases, with a far greater impact than carbon dioxide. Over a 20-year period, its global warming potential can be up to 80 times higher than that of CO₂, underscoring the severity of its uncontrolled release and the urgent need for public policies and environmental strategies aimed at its mitigation²²⁵.

The solid waste issue must also be understood through the lens of environmental justice. Poor and marginalized communities are disproportionately affected by the impacts of open-air dumps, facing severe health risks and environmental

224 State Prosecutor of Piauí; Coordinator of the Operational Support Center for Environmental Protection at the MPPI; Master’s in the Social Function of Law from FADISP – Faculdade Autónoma de Direito; Specialist in Public Law from Faculdade Damásio de Jesus; Specialist in Environmental and Urban Law from the Higher School Foundation of the Public Prosecutor’s Office of Rio Grande do Sul (FMP); Specialist in Consensus-Building Methods and Neuroscience from the same institution (FMP); Certified by the “Harvard Negotiation Project,” held at the Harvard Faculty Club in Cambridge, United States; Executive Training in Negotiation from Fundação Getúlio Vargas (FGV); Regional Director for the Northeast Region of the Brazilian Association of Members of the Public Prosecutor’s Office for the Environment (ABRAMPA); and Collaborating Member of the Environmental Commission of the National Council of the Public Prosecutor’s Office (CNMP).

225 Available at: <https://www.unep.org/pt-br/noticias-e-reportagens/reportagem/emissoes-de-meta-no-estao-impulsionando-mudanca-climatica-veja>.

degradation in their territories. At the same time, many of these communities depend economically on the collection of recyclable materials.

Therefore, any policy designed to eradicate open-air dumps must integrate measures for the socioeconomic inclusion of waste pickers, supporting their organization into cooperatives, ensuring access to sorting and composting infrastructure, and promoting income-generation initiatives.

Legal and institutional foundations of waste management

The challenge of solid waste management in Brazil is firmly grounded in a complex legal and institutional framework that brings together constitutional provisions, infraconstitutional laws, international treaties, and structural public policies. This framework defines not only the duties of the State and private sector but also the shared responsibility of society to prevent and mitigate the environmental impacts resulting from the generation and improper disposal of waste.

The 1988 Federal Constitution marks the cornerstone of this protection. Article 225 enshrines the right of all individuals to an ecologically balanced environment as a third-generation fundamental right, extending its protection to present and future generations. By assigning both the government and society the duty to defend and preserve the environment, this provision introduced a transformative perspective in Brazilian law, grounded in the principle of intergenerational solidarity, which transcends individual interests and binds society as a whole to the cause of environmental protection.

In the specific area of solid waste management, the Constitution also establishes obligations derived from the distribution of environmental competences (Article 23, VI and VII), assigning to the Union, the States, the Federal District, and the Municipalities the duty to protect the environment and combat pollution in all its forms. It further entrusts local governments with the provision of public sanitation services (Article 30, V and IX), within which proper waste management is a fundamental component.

The key legal milestone, however, is the National Solid Waste Policy (Law Nº 12,305/2010), which introduced a comprehensive and modern framework. By expressly prohibiting, in Article 47, item II, the open-air dumping of untreated waste, the legislator broke with the previously implicit approach that had dominated waste policy, reaffirming the imperative to transition toward environmentally sound and sustainable practices, even though the open disposal of waste had been classified as an environmental crime since 1981. This provision should be understood as more than a mere prohibition: it serves as a true catalyst for transforming municipal waste management, requiring public administrators to adopt modern technical solutions such as properly licensed sanitary landfills, sorting and composting centers, and other technologies that promote waste recovery and reduce the volume of material sent for final disposal.

In the same vein, Article 54 of the National Solid Waste Policy set forth a clear and progressive timeline for the environmentally sound final disposal of residual waste (defined in Article 3, item XV, of Law Nº 12,305/2010, as “solid waste that, after all technically and economically feasible treatment and recovery processes have been exhausted, can only be managed through environmentally appropriate

final disposal”). The original deadline was December 31, 2020, later extended by Law N° 14,026/2020, which established differentiated timelines based on population size and regional characteristics: until 2021 for state capitals and metropolitan regions; until 2022 for municipalities with more than 100,000 inhabitants or located near international borders; until 2023 for medium-sized cities with populations between 50,000 and 100,000; and until 2024 for small municipalities with fewer than 50,000 inhabitants. This graduated approach reflects a deliberate effort to balance the environmental imperative with the socioeconomic and administrative realities of each federative entity, acknowledging existing disparities while maintaining the overarching goal of eliminating open-air dumps throughout the country.

It is important to emphasize that Article 54 goes beyond merely setting deadlines: it conditions their fulfillment on the existence of planning and financial sustainability instruments, such as municipal or intermunicipal integrated solid waste management plans and fee mechanisms that ensure the system’s economic viability, in accordance with Article 29 of Law N° 11,445/2007 (the Sanitation Law). In doing so, the legislator established an inseparable link between the elimination of open-air dumps, proper planning, and fiscal responsibility, ensuring that waste management policy would not remain an abstract legal mandate but a concrete and lasting obligation. The combination of these provisions reflects a public policy orientation that connects the constitutional duty to protect the environment (Article 225 of the 1988 Federal Constitution) with the administrative accountability of public officials, imposing not only the duty to act but also the duty to plan, structure, and guarantee the necessary means for effective solid waste management.

It is equally relevant to note that, even before the explicit prohibitions introduced in 2010, the maintenance of open-air dumps was already implicitly forbidden under Brazilian law, constituting an unlawful, and, in some circumstances, criminal, practice. The National Environmental Policy (Law N° 6,938/1981) laid the groundwork for Brazil’s environmental protection framework, establishing fundamental principles such as the *polluter pays* principle and introducing regulatory instruments designed to hold those responsible for environmental damage accountable. Within this framework, the indiscriminate disposal of waste in open-air dumps, causing soil, water, and air pollution as well as public health risks, constitutes a harmful act subject to administrative, civil, and criminal liability.

This framework was significantly strengthened by Law N° 9,605/1998 (Environmental Crimes Law), which explicitly classified the improper disposal of waste as a crime of pollution. Article 54, paragraph 2, item V, establishes a prison sentence of up to five years for anyone who causes pollution resulting from the disposal of solid waste in violation of legal or regulatory requirements. Moreover, paragraph 3 of the same article potentially extends liability to public officials who, through omission, fail to take preventive measures in the face of serious or irreversible risks to human health or the environment, thus holding not only private actors but also public authorities accountable for tolerating the persistence of open-air dumps. In addition, Article 68 of the same law criminalizes the failure to fulfill essential environmental obligations, establishing liability for public administrators who neglect their legal duties of environmental protection.

Therefore, even before the National Solid Waste Policy (PNRS) explicitly prohibited open-air dumps, the practice was already incompatible with Brazil’s legal

framework, as it violated environmental protection duties and, in certain cases, constituted an environmental crime subject to criminal, civil, and administrative penalties. This reinforces the understanding that Law N° 12,305/2010 did not create an entirely new prohibition, but rather codified and systematized an obligation already derived from the Constitution and prior infraconstitutional norms, giving it greater clarity, coherence, and legal force.

At the international level, it is also worth emphasizing that treaties such as the United Nations Framework Convention on Climate Change (1992), the Kyoto Protocol (1997), and the Paris Agreement (2015) have elevated the issue of solid waste management beyond the domestic sphere. Brazil has made concrete commitments to “reduce the country’s net greenhouse gas emissions by between 59% and 67% by 2035, compared to 2005 levels.”²²⁶ Achieving these targets will depend on the implementation of effective policies to reduce methane emissions, a gas with extremely high global warming potential, released in significant quantities through the decomposition of organic matter in open-air dumps.

In light of this legal framework, the continued existence of open-air dumps, beyond violating the PNRS and the fundamental right to an ecologically balanced environment, may also constitute a breach of Brazil’s international obligations, creating a legal, economic, and political liability of significant magnitude.

Zero Dumps Project: origins, structural challenges, and outlook

Addressing the long-standing legacy of open-air dumps in Piauí remains one of the greatest challenges in the State’s environmental policy. For decades, urban solid waste has been disposed of precariously and without technical oversight in open areas scattered across Piauí’s 224 municipalities. This situation has led to cumulative environmental damage – such as soil contamination, pollution of surface and groundwater, greenhouse gas emissions, and the proliferation of disease vectors – while deepening social inequalities by relegating waste pickers to degrading and unsafe working and living conditions.

In response, the Public Prosecutor’s Office of the State of Piauí (MPPI) has taken on a strategic role by combining its constitutional mandates of oversight, promotion of public policies, and protection of collective rights with an innovative approach centered on interinstitutional collaboration. The objective is not merely to enforce compliance, but to build structural and sustainable solutions capable of transforming local realities and overcoming the technical, financial, and political barriers that have historically obstructed the elimination of open-air dumps.

In this context, the Operational Support Center for Environmental Protection (CAOMA), coordinated by the State Prosecutor who authors this article, with the decisive contribution of the Prosecutor General of Justice of the MPPI, Cláudia Seabra (2025–2027), and her predecessor, Cleandro Moura (2021–2025), has served as the central coordinating body of the institution’s environmental agenda. By

²²⁶ Available at: <https://www.gov.br/mma/pt-br/assuntos/noticias/brasil-entrega-a-onu-nova-ndc-alinhada-ao-acordo-de-paris>.

providing technical and legal support to local Prosecutor's Offices, promoting consistency in legal interpretation, fostering cooperation, and driving strategic initiatives, CAOMA has offered the institutional foundation for the creation of the Zero Dumps: for a Cleaner Piauí Project.

Launched in 2021, the project emerged from a key institutional partnership among the MPPI, the State Court of Accounts (TCE-PI), the State Secretariat for the Environment and Water Resources (SEMARH), and the Labor Prosecutor's Office (MPT). Its design was based on the diagnosis that municipal fragmentation represented one of the main obstacles to implementing environmentally sound waste solutions: small municipalities, with limited revenues and scarce technical staff, were unable to sustain their own sanitary landfills. Zero Dumps was therefore structured around the principle of regionalizing waste disposal, demonstrating the feasibility of establishing properly licensed sanitary landfills in strategic hubs – such as those currently operating in Água Branca (Piauí), Buriti dos Lopes (Piauí), Altos (Piauí), Francisco Santos (Piauí), and Salitre (Ceará) – integrated with transfer stations that enable neighboring municipalities to dispose of their waste efficiently.

Another strategic pillar of the project is the socioeconomic inclusion of waste pickers, historically marginalized and subjected to precarious and unsafe working conditions. Encouraging their formal organization into cooperatives and associations not only ensures labor and social security protections but also empowers them as central agents in the recycling process, transforming a condition of vulnerability into one of income generation, dignity, and active citizenship.

Furthermore, the promotion of permanent environmental education programs is a vital condition for transforming consumption patterns, encouraging waste separation at the source, and fostering a culture of shared responsibility. Continuous environmental education, directed at schools, communities, and public administrators, reinforces the preventive dimension of environmental management and strengthens social adherence to public policies.

This model, already successfully implemented in States such as Alagoas, Paraíba, Pernambuco, and Sergipe, used as benchmarks for sharing socioeconomic and geographic similarities with Piauí, has been accompanied by a hybrid prosecutorial strategy. On one hand, the use of extrajudicial instruments such as recommendations, Conduct Adjustment Agreements (CAAs), and Non-Prosecution Agreements (ANPPs) has expedited the closure of open-air dumps without the need for lengthy litigation. On the other, the Public Prosecutor's Office has maintained the option of judicial measures, including civil lawsuits, enforcement actions, and the accountability of negligent public officials. In this way, the MPPI has skillfully balanced mediation and coercion, combining institutional diplomacy with the possibility of judicial enforcement.

Specifically regarding the CAAs and ANPPs executed by the MPPI, these instruments include a robust set of clauses aimed at improving municipal solid waste management. The main obligations include the definitive closure of existing open-air dumps and the preparation of a Degraded Area Recovery Plan (PRAD) to ensure the environmental restoration of these sites. They also require the proper disposal of urban and healthcare waste in duly licensed sanitary landfills, in compliance with environmental legislation. Additionally, the agreements call for the implementation of selective waste collection, alongside the organization

and formalization of waste pickers' cooperatives or associations, promoting social inclusion and strengthening the circular economy. Another key provision requires municipal governments to propose local legislation establishing fees for solid waste management services, thereby ensuring the financial sustainability of the system.

Progress is clear: in 2019, Teresina was the only municipality in the entire State with a licensed sanitary landfill. Today, 49 municipalities have closed their open-air dumps and adopted environmentally sound final disposal solutions. This marks an undeniable qualitative leap, though still insufficient when compared to the challenge of achieving full compliance across Piauí's 224 municipalities.

Despite these advances, significant challenges persist. Data from the State Court of Accounts (TCE-PI), presented in the technical study *Diagnosis of Municipal Public Cleaning Services*, indicate that 83.5% of municipalities still lack selective waste collection, and 71% have not implemented community environmental education programs, both in clear noncompliance with the National Solid Waste Policy (PNRS). The remaining open-air dumps continue to operate without impermeabilization, leachate drainage, or gas capture systems, constituting administrative violations and, in some cases, environmental crimes.

The main obstacles can be summarized in four key dimensions:

- ▶ **Financial** – limited budgetary capacity and the absence of user fees for waste management services compromise the economic and financial sustainability of the system.
- ▶ **Technical** – shortage of sanitation engineers, environmental technicians, and trained waste management professionals in municipal administrations.
- ▶ **Political** – reluctance among mayors and local councils to prioritize investments in this area, given the perception of limited short-term electoral gains.
- ▶ **Cultural** – lack of community engagement and of a widespread culture of waste separation at the source.

Thus, more than a program to curb environmental violations, the Zero Dumps Project serves as an institutional laboratory for environmental governance, where law, technical expertise, and public policy interact in the pursuit of innovative and inclusive solutions. Its success will be measured not only by the closure of open-air dumps but also by its capacity to build a lasting public policy framework that integrates environmental justice, public health protection, and climate change mitigation.

Looking ahead to the medium and long term, the Zero Dumps Project points toward a new phase marked by structural advances and the expansion of its institutional and climate relevance. Central to this next stage is the full integration of municipalities and the possible establishment of regional consortia, key conditions for achieving universal coverage, eliminating fragmented initiatives, and securing economies of scale that enhance the efficiency of waste management.

In parallel, the implementation of forty transfer stations, identified in the scientific study *Diagnosis of the Challenges Faced by Municipalities for the Environmentally Sound Final Disposal of Solid Waste*, conducted by the TCE-PI, will be crucial to enable reverse logistics and streamline waste transport to regional landfills. This effort, combined with the expansion of a network of duly licensed landfills, will help fill territorial gaps and reinforce environmental safety across the State.

Finally, it is important to underscore Piauí's alignment with international climate change mitigation commitments, with particular emphasis on combating methane (CH₄), a greenhouse gas whose global warming potential is approximately eighty times greater than that of carbon dioxide over a twenty-year period, released in large quantities through the decomposition of organic matter in open-air dumps.

These guidelines position the Zero Dumps Project not merely as a State sanitation policy, but as a pioneering initiative within the global climate agenda, one that unites environmental justice, institutional innovation, and intergenerational responsibility.

Final considerations

The improper management of solid waste remains one of the most pressing environmental challenges in both Piauí and Brazil, extending far beyond a legal violation to generate profound social, economic, and climatic consequences.

Even so, the experience consolidated through the Zero Dumps Project demonstrates unequivocally that concrete progress is achievable when technical planning, interinstitutional cooperation, social inclusion, and the proactive engagement of the Public Prosecutor's Office and its institutional partners align around shared goals.

More than ending the unlawful and unconstitutional practice of open-air dumps, the consolidation of this policy represents a civilizational milestone for the State. It embodies the practical realization of Article 225 of the Federal Constitution, giving tangible effect to the fundamental right to an ecologically balanced environment and ensuring the protection of public health, biodiversity, and water resources. However, the closure of open-air dumps must not be seen as an end in itself. It should instead be understood as an opportunity to transform a historical environmental liability into a catalyst for technological innovation, the strengthening of the circular economy, the promotion of social justice through the inclusion of waste pickers, and the fulfillment of Brazil's international commitments on climate change mitigation.

BUILDING JURISDICTIONAL REDD+ IN THE STATE OF PARÁ: THE ROLE OF THE PUBLIC PROSECUTOR'S OFFICE IN INTERINSTITUTIONAL GOVERNANCE

BY HERENA NEVES MAUÉS CORRÊA DE MELO ²²⁷

This article analyzes the theoretical categories of interinstitutional public governance, social participation, and climate justice, drawing on the role of the Public Prosecutor's Office in shaping the Jurisdictional REDD+ System in the State of Pará. It aims to assess how social participation contributes to the realization of the policy's intended benefits. Beyond functioning as a financial mechanism for environmental conservation, the system also offers an alternative pathway for safeguarding rights and promoting climate justice.

We begin by outlining perspectives on climate change, climate justice, traditional peoples, forest conservation, and Jurisdictional REDD+. We then explore the theoretical insights derived from COGES-CLIMA meetings, which bring together concepts of interinstitutional governance. In this context, the Public Prosecutor's Office is presented not only as a legal guardian but also as a facilitator and catalyst of public policy.

According to the IPCC Fifth Assessment Report (AR5 ²²⁸, climate change refers to alterations in the state of the climate that can be detected, for example, through statistical analyses of changes in the mean and/or variability of climate characteristics, persisting over decades, centuries, or longer. These changes may result from natural internal processes or external factors, including solar cycles, volcanic eruptions, or ongoing anthropogenic modifications to the atmosphere or land use.

The United Nations Framework Convention on Climate Change (UNFCCC)²²⁹, established in 1992, recognizes climate change as alterations resulting directly or indirectly from human activities, distinguishing anthropogenic from naturally driven changes. "Global warming" is one effect of climate change, but not the only one, reflecting the gradual increase in global surface temperature caused by human emissions of greenhouse gases (IPCC, 2015)²³⁰.

227 Public Prosecutor of the State of Pará; PhD in Sustainable Development of the Humid Tropics (NAEA/UFPa); PhD in Administration – Strategic Management for Sustainability (PPAD/UNAMA); Master's in Socio-environmental Human Rights and the Amazon (PPGD/UFPa); Specialist in Environmental Management (NUMA/UFPa).

228 INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE. Climate Change 2014: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change. Lisbon: Portuguese Institute for Sea and Atm.

229 BRAZIL. United Nations Framework Convention on Climate Change (UNFCCC), Decree N° 2,652, 1998.

230 INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE. Climate Change 2014: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change. Lisbon: Portuguese Institute for the Sea and Atmosphere, I.P., 2014.

Human activities – industrial, agricultural, aviation-related, or large-scale infrastructure projects – contribute to these changes, which can have far-reaching consequences. Given the social and economic factors that differentiate individuals, communities, and nations, issues of mitigation, resilience, and survival must be addressed through approaches that promote effective climate justice.

Climate justice entails recognizing social and racial inequalities in shaping the impacts of climate change, particularly on the most vulnerable, who are least responsible for the crisis. It seeks to ensure that their rights and interests are respected and safeguarded in decision-making processes.

Climate change – through droughts, floods, and rising temperatures – disproportionately affects economically vulnerable populations, including Indigenous peoples, traditional communities, and urban slum residents, who often live in high-risk areas with limited access to basic public services, deepening socio-environmental inequalities.

Among the pillars of climate justice, equitable redistribution of goods, resources, and services is crucial. The main drivers of climate change – companies, industries, or states through their infrastructural actions – must compensate for the damage caused to those most affected, ensuring that vulnerable groups, who contribute least to climate change, are not disproportionately impacted.

The concept of environmental racism, introduced by Benjamin Franklin Chavis and Robert Bullard (2000)²³¹, highlights how Black communities and other marginalized populations are disproportionately affected by environmental harm. Other key pillars of climate justice include effective social participation²³², accountability of states and corporations, and the protection of rights.

Social participation involves incorporating affected communities into decision-making for mitigation, environmental protection, ecosystem restoration, and differentiated land use, drawing on their experiences and knowledge.

Developed countries – historically the largest polluters – and major corporations must take greater responsibility for climate change mitigation and adapta-

231 CARVALHO, Diana; SCHMIDT, Fernanda (2020), *Environmental Racism: Why Some Communities Are More Affected by Environmental Problems? The Future Depends on Ending Inequality*. Available at: <https://www.uol.com.br/ecoa/reportagens-especiais/racismo-ambiental-comunidades-negras-e-pobres-sao-mais-afetadas-por-crise-climatica/#cover>. Accessed on: Feb. 12, 2025.

232 A decentralized public management model, according to Buarque (1999), would encourage the involvement of social actors, initiating political re-education within a society largely unaware of its participatory power, which had been suppressed for years. Through a new perspective on a management practice that stimulates the population to co-create public policies with the State, modifications in the country's political production could be harmonized, consolidating democracy (MELO JUNIOR, 2020). The 1988 Republican Constitution brought significant transformations to Brazilian society, including advancing the longstanding public demand for greater societal participation in decision-making and policy management, particularly through legal instruments such as the Free, Prior, and Informed Consultation of traditional peoples and communities provided for in ILO Convention 169, incorporated into Brazilian law by Decree N° 5,051 of Apr. 19, 2004. Interpreting the proposed reforms in light of the constitutional text enabled society to exercise principles of participation, represent plural societal interests in policy-making, and establish protocols for oversight and implementation of these policies, including through other oversight bodies such as Public Prosecutor Offices. Inclusive practices began to be encouraged, ranging from the establishment of partnerships with civil society to contribute to the formulation, execution, and monitoring of public interventions.

tion, while safeguarding fundamental human rights, such as access to adequate housing, sanitation, and food security.

Requiring that more developed countries – historically the largest polluters – and major corporations take greater responsibility for remediation and finance climate change mitigation and adaptation is essential. This also entails safeguarding fundamental human rights, including access to adequate housing, sanitation, and food security, while tackling the climate crisis, which underpins the last two pillars discussed above.

In this context, an analysis of the Pará region in the Amazon²³³ reveals that climate protection efforts – designed on the basis of global research – must directly consider local socio-environmental realities. This highlights the crucial relationship between traditional peoples and communities²³⁴ and the implementation of a jurisdictional REDD+ system.

The construction of the Jurisdictional REDD+ System in the State of Pará

Jurisdictional REDD+ – the acronym for Reducing Emissions from Deforestation and Forest Degradation + – is a mechanism for forest and carbon conservation applied at an administrative level, such as states or countries. The system provides financial compensation based on measured outcomes in forest conservation, greenhouse gas emission reductions, or actual decarbonization, generating credits that can be purchased by countries or companies unable to meet their environmental targets.

The underlying goal of these financial incentives is to foster a socio-economic balance that respects the values, traditions, and knowledge of forest peoples, thereby promoting effective climate justice. Revenue from credit sales should be reinvested in actions that prioritize sustainable development within the jurisdiction, creating a continuous cycle of protection for forests, wetlands, rivers, and other carbon-storing natural resources.

233 Authors such as Hilton Silva and Cristina Adams emphasize that there is no single “caboclo culture,” but rather multiple cultures, histories, and identities that make up the Amazon, highlighting the region’s sociocultural diversity.

234 Definitions from the National Policy for the Development of Traditional Peoples and Communities (Article 3, Decree N° 6,040/2009):

I– Traditional Peoples and Communities: culturally distinct groups that identify as such, with their own forms of social organization, who occupy and use territories and natural resources to sustain their cultural, social, religious, ancestral, and economic practices, drawing on knowledge, innovations, and practices developed and passed down through tradition.

II– Traditional Territories: areas necessary for the cultural, social, and economic continuity of traditional peoples and communities, whether used permanently or temporarily. For Indigenous and quilombola communities, these areas are defined in accordance with Articles 231 of the Constitution and 68 of the Act of Transitional Constitutional Provisions, as well as other relevant regulations.

III– Sustainable Development: the balanced use of natural resources aimed at improving the quality of life of the current generation while ensuring the same opportunities for future generations.

► Objectives and guidelines for the operation of the Jurisdictional REDD+ System

The primary objective of the Jurisdictional REDD+ System is to reduce greenhouse gas (GHG) emissions from deforestation, forest degradation, and other natural ecosystems, such as mangroves and water bodies, whose functions can generate carbon credits. The financialization of nature serves as a tool for climate justice, while equitable benefit-sharing among traditional peoples and communities, agrarian reform settlers, extractivists, riverine populations, and agribusiness producers is essential. This balance ensures conservation of natural resources alongside livelihoods that guarantee access to goods and public services.

The system enables the State of Pará to receive financial compensation for emissions reductions, with revenues shared among participants, thereby reinforcing genuine public policy²³⁵. Achieving this requires a legal-institutional framework that ensures legal certainty in the implementation of REDD+ policies.

Mechanisms must be established to ensure REDD+ becomes a long-term state policy rather than a short-lived management action or a mere vehicle for government financialization that fails to meet social objectives, which could jeopardize local communities. Strengthening interinstitutional governance is also critical to guarantee participation from diverse sectors of society.

Tailored safeguards²³⁶ are essential to protect the livelihoods of traditional communities. A core premise of the Jurisdictional REDD+ System is the establishment of socio-environmental safeguards that secure fundamental, social, and collective rights, enable local participation, and ensure fair benefit-sharing.

Substantial work remains, beginning with the recognition of local knowledge and a comprehensive inventory of traditional agro-food, extractive, and productive practices, in order to develop dynamic and genuinely participatory safeguards. This is crucial to prevent the system from functioning as a contemporary enclosure or causing forced displacement during its implementation.

For the system to generate carbon credits with high social and environmental integrity and market credibility, community engagement is essential. Respecting self-determination and social organization minimizes territorial conflicts. The construction of the Jurisdictional REDD+ System (SJREDD+) is therefore grounded

235 Government actions and programs, grounded in law and constitutional principles, address societal issues and fundamental rights. They guide State activity in sectors such as health, education, security, and the environment, translating collective aspirations into practice. Core elements include the State's role, the public interest, constitutional and legal guarantees, managed financial resources, and the full policy cycle: problem identification, policy formulation, implementation, monitoring, and evaluation.

236 REDD+ safeguards were defined under the UNFCCC as general guidelines to be observed by all countries seeking to implement REDD+. During the Cancun COP in 2010, it was established that REDD+ initiatives must respect seven basic safeguards, known as the "Cancun Safeguards," which are: a) alignment between national and international forest policies; b) transparent and effective governance structures; c) respect for the knowledge and rights of Indigenous Peoples and Other Traditional Communities (IPOCs); d) full and effective participation of stakeholders; e) conservation of forests and biodiversity; f) addressing the risk of reversal (ensuring permanence); and g) reducing the risk of leakage (or displacement).

in the active participation of Indigenous peoples, quilombolas, extractivists, riverine populations, and other traditional communities. Participation mechanisms include Free, Prior, and Informed Consultations (FPICs), which are discussed in more detail below.

► **State Climate Change System Management Committee (COGES-CLIMA):**
public space for diversity and collective construction?

Among the key institutional structures involved in establishing the Jurisdictional REDD+ System in the State of Pará is COGES-CLIMA, an advisory, deliberative, and normative body linked to the State Secretariat for Environment, Sustainability, and Climate (SEMAS). Its mandate is to implement the State Climate Change Policy while ensuring active participation from traditional communities and family farmers. Additional functions include coordinating members of the State Climate Change System (SEMUC) and promoting the inclusion of Indigenous peoples, quilombolas, traditional communities, and family farmers in environmental and climate policy development (SEMAS, 2025).²³⁷

The Committee functions as a collegial body within SEMUC, with 20 permanent seats representing Indigenous peoples, quilombolas, traditional communities, and family farmers, thereby ensuring socially diverse participation. SEMAS coordinates the Committee, which was established by State Law Nº 9,048 of Apr. 29, 2020 and is governed by a decree and internal regulations. Its structure also includes technical chambers that support both management and normative activities.

The involvement of the Agrarian Prosecutor's Office of Western Pará – which covers approximately half of the state (1.2 million km²), including 40% of Pará's forests within quilombola and extractivist territories – originated from demands by Indigenous and quilombola collectives. These groups questioned the alleged sale of carbon credits announced by the state government under the Jurisdictional REDD+ system, which would, in principle, cover the entire territory of Pará.

Following this, the MPPA began attending COGES-CLIMA meetings and issued an administrative recommendation for additional informational sessions with communities that still had questions after territorial workshops conducted by NGOs supporting the State of Pará. The MPPA also emphasized that such workshops cannot replace Free, Prior, and Informed Consultations (FPICs) under ILO Convention 169²³⁸, given the long-term (30–50 years) implications for land use and territorial conservation.

For this study, eight COGES-CLIMA meeting minutes from 2024–2025 were reviewed, and two Consultations with Quilombola and Extractivist Peoples in Western Pará were attended. Additionally, three dedicated meetings were held be-

237 STATE SECRETARIAT FOR ENVIRONMENT AND SUSTAINABILITY (SEMAS/PA). Normative Instruction SEMAS Nº 1, of Jan. 20, 2025. Available at: <https://www.semas.pa.gov.br/legislacao/files/pdf/617208.pdf>. Accessed on: Sept. 1, 2025.

238 BRAZIL. Decree Nº 5,051 of Apr. 19, 2004. Enacts ILO Convention 169 on Indigenous and Tribal Peoples.

tween the Secretaries of Environment, Climate, and Sustainability and the Public Prosecutor's Office to align policies and recommend normative adjustments for the Pará State Climate Change Forum (COGES-CLIMA). One joint meeting addressed benefit-sharing percentages and clarified operational procedures under the international ART-TREES standards²³⁹, which will guide carbon credit measurements within the Jurisdictional REDD+ system.

The next section presents the research findings, drawing on content analysis, with participatory engagement identified as a central factor in ensuring effective social participation.

Discussion of findings participation and governance in support of climate justice in the development of the Jurisdictional REDD+ System in the State of Pará

The grounded theory methodology, as proposed by Barney Glaser and Anselm Strauss in *The Discovery of Grounded Theory*²⁴⁰, focuses on symbolic relationships, the roles of social actors, and their engagement with the phenomena studied, framed within both theoretical and scientific-empirical perspectives.

At the hermeneutic core of the research, scientific activity is understood in relation to both theoretical and experiential dimensions, with epistemology providing the lens for examining the phenomenon's underlying structure.

The study examines the relationship between the State and traditional communities in the sustainable use of territory, aiming for climate-conscious development with minimal impact on local populations. Communities perceive the jurisdictional REDD+ system as largely external to their daily lives, yet capable of securing long-neglected social and collective rights through their own self-determination.

The Public Prosecutor's Office must act as a driver of public policy to ensure it benefits the intended recipients, with a clear understanding of socio-regional realities and responsible public management. Simultaneously, it must oversee processes involving land regularization, territorial planning, environmental preservation, and, above all, the dignified support of indigenous peoples and traditional communities in the Pará Amazon.

239 The ART TREES Standard (REDD+ Environmental Excellence Standard) is a high-quality, voluntary global standard for generating carbon credits from REDD+ (Reducing Emissions from Deforestation and Forest Degradation) programs at jurisdictional and national levels. It establishes rigorous procedures for quantifying, monitoring, reporting, and verifying (MRV) greenhouse gas (GHG) reductions and removals, emphasizing environmental and social integrity. Maintained by ART (Architecture for REDD+ Transactions), the standard seeks to ensure permanence of reductions, transparency, and compliance with the environmental and social safeguards of the Paris Agreement (STATE OF ACRE, 2024). Available at: <https://agencia.ac.gov.br/governo-do-acre-apresenta-documento-para-obtencao-de-padrao-de-excelencia-em-geracao-de-creditos-de-carbono-de-alta-integridade>. Accessed on: Sept. 29, 2025.

240 GLASER, B., & STRAUSS, A. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New York: Aldine Transaction.

As with any public policy, state decisions must include social participation, enabling meaningful input through dialogical processes, with interinstitutional governance serving to democratize rights and knowledge. Territories are thus understood as extensions of both life and the human body, linking housing and food rights to agriculture, extractivism, and other land uses.

Based on observations of its meetings, COGES-CLIMA functions as a permanent forum bringing together dozens of public agencies across all three levels of government, along with representatives of NGOs and leaders from Indigenous, agro-extractive, agrarian reform, and quilombola communities. It acts as the main driver of discussions, coordination, and actions on climate protection in the State. Democratization emerges from this participatory process, which can be understood as a theoretical concept derived from observing the public space created for inclusive engagement.

Considering Brazil as a Democratic State under the Rule of Law implies a political organization – or a non-authoritarian practice – that engages society in all its forms. Here, the State refers to a historically and politically constituted entity, whose emergence and functioning are shaped by specific periods and circumstances.

It is important to understand the current theoretical context of the State and its institutions, which are interconnected and cannot be seen as a single, monolithic entity. One must consider the State's multiple roles and its interactions with society. The State, in fact, reflects the complexity of social relations, which, due to their diversity and interconnections, are constantly evolving.

In this context, State power, as a transcendent force capable of intervening across different spheres, becomes a site of competition among actors seeking to assert their perspective and establish their authority as legitimate.

As noted above, the complexity of State action sustains the collective belief that the State can reconcile competing interests in pursuit of the common good, continuously reinforcing the symbolic power of this constructed entity²⁴¹.

A shift was observed in the relationships between the State and society, reflecting advances in public governance perspectives and the interconnections illustrated in Figure 1.

241 BOURDIEU, Pierre. *On the State*. São Paulo: Companhia das Letras, 2014.

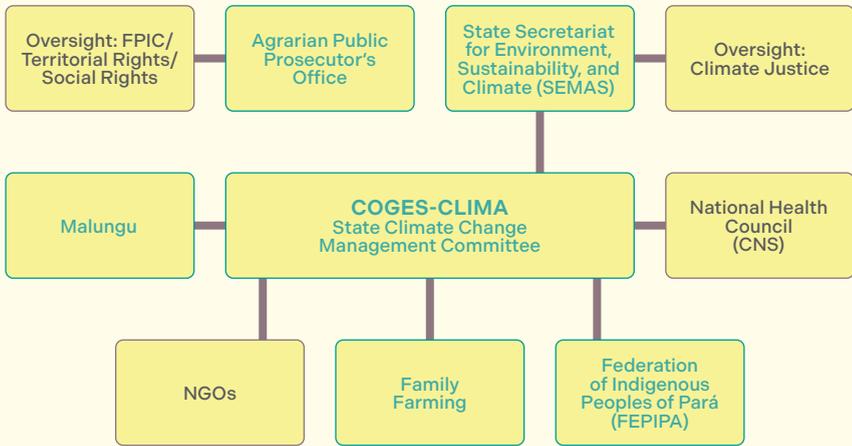


Figure 2: Created by the author (2025)

It is worth noting that the Agrarian Public Prosecutor's Office in Pará has specific duties to promote both the human and social rights of rural communities, as interpreted from Articles 127 and 6 of the 1988 Federal Constitution.

Public sector governance is understood as a set of leadership, strategy, and control mechanisms implemented to guide management, shape public policies and deliver services in the public interest (TCU, 2014).²⁴² Governance emerged when organizations shifted from being solely owner-managed to relying on third-party administration.

In the debate on public versus private sector governance, Pat Barrett (BARRETT, 2001, p. 6)²⁴³ highlights that the public sector bears greater responsibilities to Parliament and taxpayers, with citizens' and stakeholders' expectations for accountability and transparency exceeding those in the private sector. MELLO (2006, p. 11)²⁴⁴ distinguishes corporate governance from public governance, the latter involving the acquisition and distribution of power by society. Public gov-

²⁴² BRASIL. Tribunal de Contas da União. Referencial básico de governança aplicável a órgãos e entidades da administração pública/Tribunal de Contas da União. Versão 2 – Brasília: TCU, Secretaria de Planejamento, Governança e Gestão, 2014. 80 p.

²⁴³ BARRETT, Pat. 2001. 'Governance and Compliance.' Presentation to the Public Risk Conference, Brisbane, 29-31 May. McPHEE, Ian. 2001. 'Strategies for Better Governance.' Address to the PSMPC Conference on Corporate Governance, Aug. 17.

²⁴⁴ MELLO, Gilmar Ribeiro de. *Corporate Governance in the Brazilian Federal Public Sector*. 2006. Master's thesis (Master in Controllorship and Accounting) – School of Economics, Administration and Accounting, University of São Paulo, São Paulo, 2006. doi:10.11606/D.12.2006.tde-28072006-093658. Accessed on: Aug. 28, 2023.

ernance structures primarily aim to achieve outcomes through consensus, improving public services and enhancing overall quality of life and human dignity²⁴⁵. For Timmers (2000, p. 9)²⁴⁶, public governance aims to establish safeguards that enable political objectives, while interinstitutional governance focuses on securing legal, political, and financial guarantees to ensure effective implementation of public policies.

In Brazil, Decree N° 9,203/2017²⁴⁷ defines public governance as the set of leadership, strategy, and control mechanisms guiding management to steer public policies and deliver services in the public interest.

The Jurisdictional REDD+ System in Pará is grounded in the principle that legal and constitutional interpretation should primarily serve its beneficiaries. Guided by Article 3 of the 1988 Federal Constitution, which seeks to reduce social and regional inequalities, the system promotes these rights through a public space for participatory, interinstitutional governance.

This study contributes to public policy implementation, positioning interinstitutional governance and social participation as foundations for participatory engagement.

Final considerations

The COGES-CLIMA meetings serve as a space for dialogue between society and the public sector, enabling participatory oversight of public policy. The knowledge, culture, and practices of traditional communities and indigenous peoples of the Pará Amazon must be fully considered in policy design, particularly through safeguards that ensure meaningful social sustainability.

COGES-CLIMA acts as a public forum connecting the State and society, including the Agrarian Public Prosecutor's Office, which, while mainly supervisory, can recommend policy improvements. It also brings together public managers, family farmers, indigenous and agro-extractive leaders, NGOs, and universities.

Interinstitutional governance in the public sphere fosters civil society participation, strengthens democracy across policy levels, and guarantees access to social rights (Article 6, Federal Constitution of 1988)²⁴⁸.

245 Encompasses the exercise and guarantee of fundamental rights for all individuals, including life, liberty, access to health care, education, housing, work, a balanced environment, and the protection of physical and psychological integrity, as well as the right to autonomy. Human dignity is the foundation upon which just and equitable societies are built.

246 TIMMERS, Hans. *Government Governance: Corporate Governance in the Public Sector, Why and How?* In: 9th fee Public Sector Conference. Netherlands, 2000.

247 The principles of public governance, according to Article 3 of Decree N° 9,203 of Nov. 22, 2017, are: responsiveness; integrity; reliability; regulatory improvement; accountability and responsibility; and transparency. All these principles are directly linked to management, control, oversight, and the responsibility of public officials or managers, ensuring the delivery of results through social objectives aimed at human dignity.

248 Federal Constitution of the Federative Republic of Brazil, 1988. Brasília, DF: Presidency of the Republic. Available at: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Accessed on: Sept. 30, 2025.

This dialogue and deliberation space fosters interaction between the State and society, ensuring the inclusion of Indigenous peoples, quilombolas, riverine, and other traditional communities²⁴⁹. According to Gohn (2004, p.10)²⁵⁰ the public sphere perspective is key to understanding civil society's engagement in public spaces, illustrating its practical application (Habermas, 2003)²⁵¹.

Laville (2006)²⁵² highlights that building the Public Space involves more than rational participation: citizens also mobilize emotions, turning previously private matters into public demands. Public action, the author notes, reflects democratic solidarity – distinct from charity or philanthropy – and is legally protected.

The 1988 Federal Constitution emphasizes social participation, enabling citizens to engage in public affairs through deliberative, parity-based policy councils at the municipal, state, and federal levels. Gohn (2004) sees these councils as key channels for public involvement in the “public good.”

249 Traditional populations: Culturally distinct groups that recognize themselves as such, with their own social organization, occupying and using territories and natural resources to sustain their cultural, social, religious, ancestral, and economic activities, drawing on knowledge and practices transmitted through tradition (Article 3, I, Decree N° 6,040/2007).

250 GOHN, M. G. M. Empowerment and community participation in social policies. *Saúde e Sociedade*, v. 13, n° 2, pp. 20-31, May-Aug. 2024.

251 HABERMAS, Jürgen. *Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*; translated by Flávio R. Kothe. Rio de Janeiro: Tempo Brasileiro, 2003. 398 p.

252 LAVILLE, J. J. “Public Action and Economy: An Analytical Framework.” In: FRANÇA FILHO, Genauto; LAVILLE, J. J.; MEDEIROS, Alzira; MAGNEN, J. P. (eds.). *Public Action and the Solidarity Economy: An International Perspective*. Porto Alegre: Editora da UFRGS, 2006. pp. 21-37.

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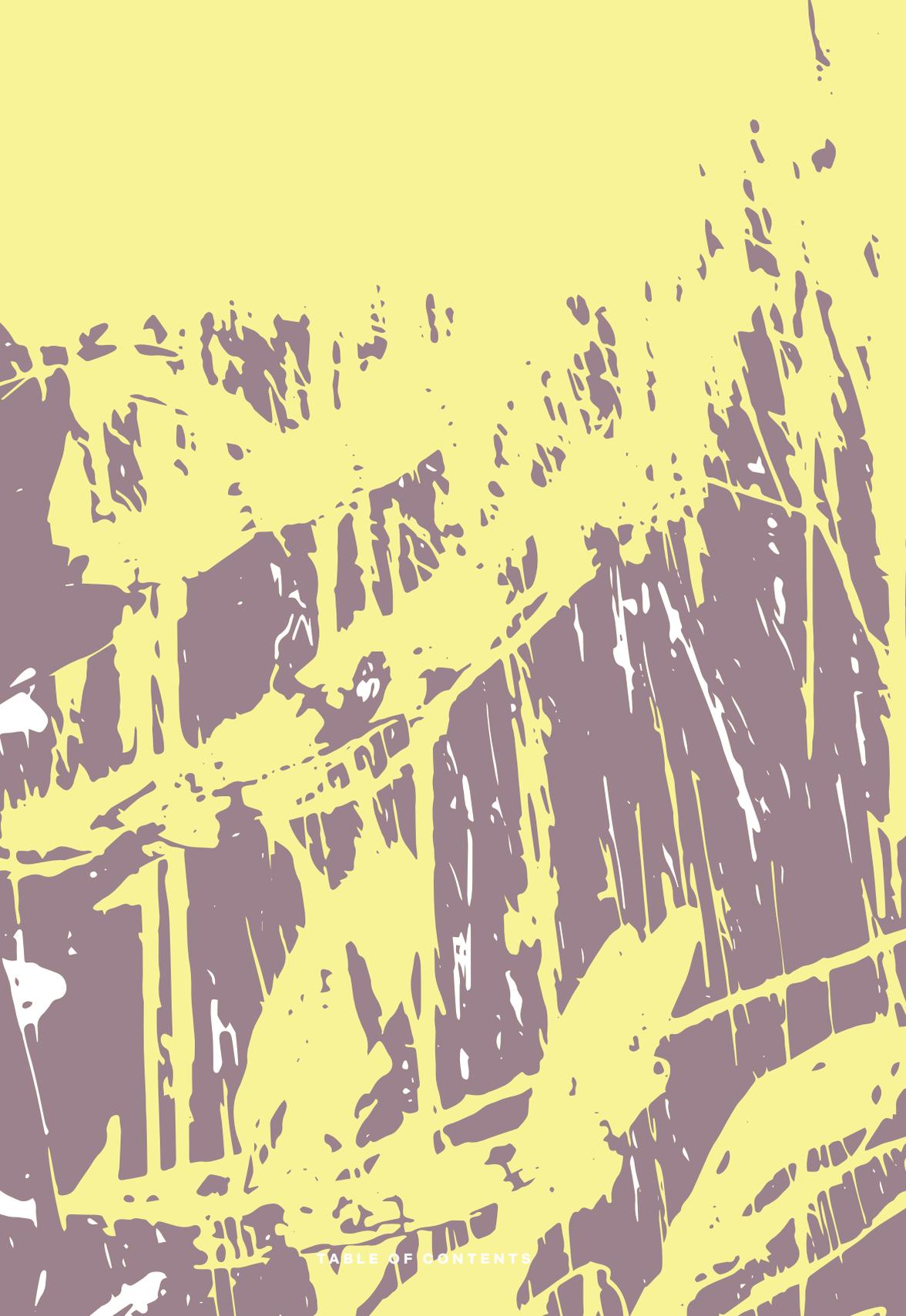


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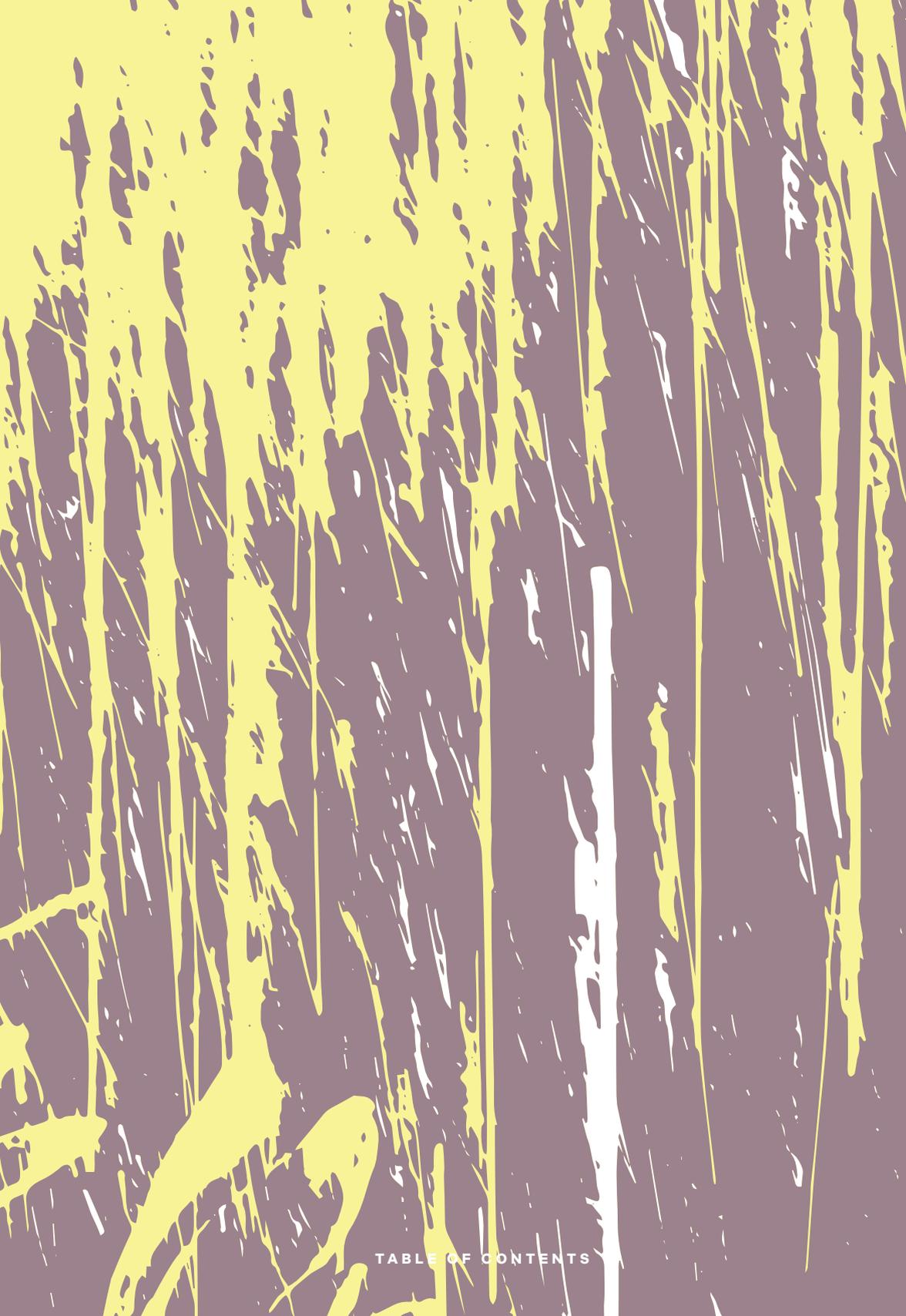


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