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COP-30 AND THE FUTURE OF CLIMATE GOVERNANCE: BRAZIL'S ROLE IN THE TRANSITION TO SMART AND RESILIENT CITIES UNDER THE GIS CYCLE

COP-30 E O FUTURO DA GOVERNANÇA CLIMÁTICA: O PAPEL DO BRASIL NA TRANSIÇÃO PARA CIDADES INTELIGENTES E RESILIENTES SOB O CICLO GIS

LA COP-30 Y EL FUTURO DE LA GOBERNANZA CLIMÁTICA: EL PAPEL DE BRASIL EN LA TRANSICIÓN HACIA CIUDADES INTELIGENTES Y RESILIENTES BAJO EL CICLO GIS

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Ailton Ferreira Cavalcante[1]

ABSTRACT

The COP-30, to be held in Belém (Brazil), represents a milestone in global climate governance by placing the Amazon at the center of international decision-making on mitigation, adaptation, and climate justice. Considering the strategic relevance of the event and the institutional challenges related to Brazil's ability to implement its climate commitments, this study aims to examine how COP-30 may strengthen the transition towards smart and resilient cities, based on the theoretical framework of the GIS Cycle, Governance, Innovation, and Sustainability. The research adopts a qualitative approach grounded in documentary analysis of official national and international instruments, as well as recent Brazilian experiences involving digital and sustainable governance at the municipal level. The results demonstrate that Brazil has the potential to assume a leadership role in climate governance, provided that implementation, monitoring, and multilevel coordination capacities are reinforced. Additionally, the empirical focus on Belém and its strategic connection with Goiânia reveals opportunities to integrate climate diplomacy with local public policy. It is concluded that the GIS Cycle offers institutional conditions to transform climate ambition into concrete outcomes, enhancing the legacy of COP-30 for Brazilian territories and society.

Keywords: COP-30. Climate Governance. Smart Cities. Sustainability. GIS Cycle.

RESUMO

A realização da COP-30 na cidade de Belém (PA) representa um marco para a governança climática global, ao posicionar a Amazônia no centro das decisões internacionais sobre mitigação, adaptação e justiça socioambiental. Considerando a relevância estratégica do evento e os desafios institucionais brasileiros quanto à implementação de suas metas climáticas, este estudo tem como objetivo analisar em que medida a COP-30 pode impulsionar o país rumo à transição para cidades inteligentes e resilientes, tomando como referência o modelo do Ciclo GIS, Governança, Inovação e Sustentabilidade. Adota-se uma abordagem qualitativa, baseada em análise documental de instrumentos oficiais nacionais e internacionais, bem como de experiências recentes de governança digital e sustentável em

[1] Doctoral student in Public Administration. Instituto Brasileiro de Ensino, Desenvolvimento e Pesquisa (IDP).
E-mail: prof.ailton@hotmail.com Orcid: https://orcid.org/0009-0009-2386-1245
Lattes: http://lattes.cnpq.br/0389434047626666

municípios brasileiros. Os resultados evidenciam que o Brasil possui potencial para assumir papel de liderança na governança climática, desde que fortaleça as capacidades de implementação, monitoramento e coordenação multinível. Além disso, o estudo de Belém e suas conexões estratégicas com Goiânia revelam oportunidades de integração entre diplomacia climática e política pública local. Conclui-se que a consolidação do Ciclo GIS pode contribuir para transformar ambição em resultados concretos, ampliando o legado da COP-30 para o território e para a sociedade brasileira.

Palavras-chave: COP-30. Governança Climática. Cidades Inteligentes. Sustentabilidade. Ciclo GIS.

RESUMEN

La realización de la COP-30 en Belém (Brasil) constituye un hito en la gobernanza climática mundial, al situar a la Amazonía en el centro de las decisiones internacionales sobre mitigación, adaptación y justicia climática. Considerando la relevancia estratégica del evento y los desafíos institucionales relacionados con la implementación de los compromisos climáticos brasileños, este estudio tiene como objetivo analizar de qué manera la COP-30 puede impulsar la transición hacia ciudades inteligentes y resilientes, utilizando como referencia el modelo del Ciclo GIS, Gobernanza, Innovación y Sostenibilidad. La investigación adopta un enfoque cualitativo basado en análisis documental de instrumentos oficiales nacionales e internacionales, así como de experiencias recientes de gobernanza digital y sostenible en municipios brasileños. Los resultados muestran que Brasil puede asumir un papel de liderazgo en la gobernanza climática, siempre que fortalezca las capacidades de implementación, monitoreo y coordinación multinivel. Además, el análisis de Belém y su conexión con Goiânia revela oportunidades para integrar diplomacia climática y política pública local. Se concluye que la consolidación del Ciclo GIS puede transformar la ambición en resultados concretos, ampliando el legado de la COP-30 para el territorio y la sociedad brasileña.

Palabras clave: COP-30. Gobernanza Climática. Ciudades Inteligentes. Sostenibilidad. Ciclo GIS.

1 INTRODUCTION

Climate change is one of the main global challenges of the twenty-first century, with widely consolidated scientific evidence on its environmental, economic, and social impacts (IPCC, 2023). The intensification of extreme events, the threat to biodiversity, and the widening of socio-environmental inequalities demonstrate that the climate crisis cannot be addressed without robust governance mechanisms, based on mitigation, adaptation, and climate justice (Sachs, 2015; UNFCCC, 2022).

At the international level, the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change has established itself as the main multilateral negotiation forum for defining climate commitments, monitoring targets, and cooperation between countries (Hale, 2022; Bodansky, 2016). Since its creation in 1995, the COP has played a central role in the construction of agreements such as the Kyoto Protocol and the Paris Agreement, establishing emission reduction targets and financing instruments for the ecological transition.

The holding of COP-30 in Belém do Pará reflects the recognition that the Amazon is a key player in the global climate balance, not only for its biophysical regulatory function, but for its strategic role in the planetary agenda of emissions and land use, as shown by recent data from the *Climate Action Tracker* and the updated instruments of the Nationally Determined Contribution (NDC).

International climate governance and its national and local materializations today constitute a field of disputes, innovations, and reconfiguration of state capacities in the face of a crisis of a civilizational nature.

Brazil, the sixth largest emitter of greenhouse gases in the world and with almost half of its emissions linked to land use and change, occupies a unique position on the global climate agenda.

At the same time as it faces international pressures to reduce deforestation, the country has strategic opportunities to project itself as a global leader in the ecological transition, especially with the recent improvement of the national targets established in its updated Nationally Determined Contribution (NDC), which foresees a reduction of between 59% and 67% in emissions by 2035, with a focus on climate justice and clean development.

However, structural and institutional challenges persist, such as the mismatch between diplomatic ambition and operational capacity, the limitation of regulatory and technological

instruments, and the incomplete consolidation of the Brazilian Emissions Trading System (SBCE).

In this scenario, climate governance in Brazil lacks integrated mechanisms that ensure planning, execution, and continuous monitoring, especially at the municipal level, where the effects of the climate crisis are manifested more directly.

It is in this context that the importance of innovative models of public management capable of guiding climate policies with efficiency, social legitimacy, and institutional intelligence emerges. The GIS Cycle, Governance, Innovation and Sustainability, proposed in the author's previous theoretical development, represents a systemic approach that articulates public value, evidence-based decision-making, technological innovation and sustainable resilience as guiding principles of state action.

COP-30 constitutes a critical window: either Brazil consolidates a new cycle of climate governance, decentralized, digital and results-based, or the historic opportunity will be dispersed after the event, losing the potential for structural transformation.

In view of this, this article seeks to analyze how COP-30 can boost the Brazilian climate transition, focusing on the application of the GIS Cycle to the construction of smart and resilient cities, through an illustrative study of Belém (PA), host of the event, and strategic connections with Goiânia (GO), a municipality where concrete experiences of integrated and digital governance of urban planning are developed.

Thus, the central question that guides this investigation can be stated as follows: *How can Brazil transform the diplomatic protagonism of COP-30 into concrete results of climate governance in the territory, taking the GIS Cycle as a reference?*

To answer it, the study has the following objectives:

General Objective:

Analyze the possibilities of strengthening Brazilian climate governance from COP-30, based on the GIS Cycle model.

Specific Objectives:

a) Characterize Brazil's pre-COP-30 climate scenario and its institutional gaps;
b) Evaluate the construction of the climate agenda in Belém and the challenges of the post-event legacy;
c) Identify possible connections with smart governance experiences in Goiânia;
d) Propose strategic recommendations guided by the GIS Cycle.

This approach seeks to contribute to the theoretical and practical advancement of climate governance in the country, articulating global commitments with local capacities, so that the legacy of COP-30 goes beyond diplomatic discourses and becomes public innovation, urban sustainability, and environmental justice.

2 THEORETICAL FRAMEWORK

Confronting the climate crisis requires not only ambitious diplomatic commitments, but above all institutional capacity to implement effective public policies on a territorial scale. Understanding the conceptual foundations that structure this agenda is an indispensable condition for analyzing the challenges and opportunities facing Brazil in the context of COP-30.

In this sense, the theoretical framework presented aims to situate climate governance in the broader field of sustainable development, highlighting its multi-scalar nature and its intrinsic link with social justice, technological innovation, and urban resilience.

By examining the Brazilian regulatory framework, its operational gaps, and the strategic role of cities, especially in the Amazon, the text outlines the analytical bases necessary to understand why climate implementation must be territorialized, intelligent, and results-oriented. Finally, the GIS Cycle is introduced as an original Brazilian proposal for improving governance capabilities, capable of converting ambition into concrete deliveries and contributing to COP-30 leaving a lasting legacy in the country and in the world.

2.1 CLIMATE GOVERNANCE AS A PILLAR OF SUSTAINABLE DEVELOPMENT

Climate governance can be understood as the multi-scalar institutional arrangement that coordinates policies, actors, and instruments to mitigate greenhouse gas emissions and promote adaptation to the impacts of global warming (BODANSKY, 2016; BIERMANN et al., 2010). It is a field that involves both the international system and national and subnational governments and organized civil society, configuring itself as a challenge of polycentric governance (OSTROM, 2010), in which responsibilities, competencies and capacities must be distributed in a cooperative manner.

In the framework of sustainable development, Sachs (2015) and the IPCC (2023) emphasize that there is no effective climate action without socio-environmental justice, as the impacts of the climate crisis fall unequally on vulnerable populations. This reinforces the principle of "common but differentiated responsibilities", consolidated in multilateral

agreements since Rio-92 and deepened in the Paris Agreement (UNFCCC, 2015; HALE, 2022).

In Brazil, a previous study by the author shows that the climate normative framework is relatively sophisticated, but there are still relevant deficiencies in federative integration, implementation and monitoring of results, especially at the municipal scale, where climate impacts are felt directly and on a daily basis.

This asymmetry between normative ambition and real institutional capacity is pointed out by Osborne (2010) as a structural dilemma of collaborative governance: interdependent policies require technical, technological, and managerial capacities that are not always available in subnational entities.

From the point of view of the state of the art of governance, Klimanov (2021) and Peters (2022) indicate that successful climate governance systems have three essential characteristics:

Table 1

Structuring components of climate governance

Structuring element	Expected result
Multilevel coordination	Reduction of overlaps and regulatory gaps
Evidence-based governance	Continuous monitoring of policy effects
Adaptive and responsive capability	Quick fixes and institutional learning

Source: Author.

Brazil is in the process of consolidating these three key components of climate governance, multilevel coordination, evidence-based governance, and adaptive institutional capacity.

International examples demonstrate the relevance and feasibility of these elements: in the European Union, the existence of binding targets and sectoral climate plans ensures clarity of roles and responsibilities, strengthening climate governance and monitoring of results; New Zealand has an independent Climate Change Commission, responsible for establishing annual metrics and monitoring compliance with national targets, ensuring transparency and *accountability* on the decarbonization trajectory. In the Brazilian case, although the transition is underway, emerging initiatives indicate important advances, as is the case in Goiânia, where digital and integrated governance has been implemented that

articulates strategic planning, public budget, and performance indicators to guide decisions and monitor government deliveries.

These examples signal possible paths for strengthening climate governance in the country.

In summary, governing the climate is fundamentally transforming ambition into results, activating state and social capacities so that international goals materialize in the territory, a global requirement and a particularly Brazilian urgency.

2.2 BRAZILIAN CLIMATE POLICY: CLIMATE PLAN AND NDC

Brazilian climate policy is structured by international commitments signed under the United Nations Framework Convention on Climate Change (UNFCCC), with emphasis on the Paris Agreement, which requires countries to develop progressively more ambitious goals (UNFCCC, 2015; HALE, 2022).

It is noted that the country consolidated its Nationally Determined Contribution (NDC), updated in 2024, setting the goal of reducing between 59% and 67% of greenhouse gas emissions by 2035, with an emphasis on climate justice and clean development.

However, the Brazilian Emissions Trading System (SBCE), although innovative, still lacks a digital operational structure, transparency, and systemic oversight.

The state of the art demonstrates that climate goals are only effective when operated by intelligent governance systems, with continuous monitoring and accountability (HALE, 2022; MECKLING, 2021).

It must be considered that the national performance still has significant governance gaps. Brazil remains among the largest global emitters, with 2.5% of global emissions and high dependence on the land use and change sector (LULUCF), and its climate performance remains classified as insufficient to limit warming to 1.5°C.

This situation reinforces the IPCC's diagnosis (2023), according to which climate goals without the capacity for implementation, measurement, and accountability tend not to materialize.

From a regulatory point of view, there have been recent advances such as the creation of the Brazilian Emissions Trading System (SBCE) in 2024, with the aim of providing a carbon pricing mechanism. However, the operationalization of this system is still incipient, as it depends on digital infrastructure, methodological standardization, and inspection capacity that are not fully established (*Climate Transparency*, 2025).

In view of the facts, it is important to note that Brazil is in a paradoxical situation: it is simultaneously an environmental power and an institutional vulnerable, with high diplomatic ambition, but limited climate execution.

This asymmetry reflects what the literature calls *the implementation gap* (PETERS, 2022; MECKLING, 2021): well-designed policies, but with low operational governance, especially at the subnational level, where climate policy is carried out in a concrete way.

Despite having robust normative instruments, such as the Climate Plan, analyzed in detail by the author, municipalities lack technical and financial resources to carry out urban adaptation actions, prevention of extreme events and control of deforestation in their territories.

COP-30 represents a critical window for reviewing and strengthening national and local capacities, establishing stronger links between climate ambition and state capacity, a theme that the GIS Cycle seeks to structure in a systemic way.

2.3 SMART AND RESILIENT CITIES AS THE EPICENTER OF CLIMATE ACTION

Cities concentrate approximately 70% of global greenhouse gas emissions, in addition to being home to most of the world's population (UN-Habitat, 2020). For this reason, they become the operational center of contemporary climate governance: it is in urban territories that both impacts and responses to climate change manifest themselves in a direct, urgent, and unequal way (IPCC, 2023).

In this context, the concept of Smart City has evolved substantially in recent decades. From an initial eminently technological perspective, the current focus now considers the strategic and socially oriented use of technology, with a focus on quality of life and environmental sustainability (KOMNINOS, 2015; CARAGLIU; DEL BO; NIJKAMP, 2019). Thus, the smart city is, first and foremost, an ecosystem of public innovation, based on data, citizen participation, connectivity, and integrated urban planning.

At the same time, the advancement of the climate agenda reinforced the notion of urban resilience, defined as the ability to anticipate, absorb, and transform impacts associated with extreme events and chronic climate change, while maintaining the functionality of urban systems (MEEROW; NEWELL; STULTS, 2016). In this way, resilient smart cities constitute the new ideal of urban planning in the twenty-first century, combining technology, collaborative governance, and climate justice.

In the Brazilian case, emerging initiatives demonstrate the potential of municipal public innovation to address the climate emergency. Among them, processes that integrate strategic planning, results-oriented budgeting, and digital platforms stand out, strengthening the monitoring of indicators and popular participation. The experience of Goiânia, which articulates PPA, digital governance and institutionalized indicators in the GIS Cycle model, is a concrete example of this smart governance applied to the national context, at an advanced stage of implementation.

On the other hand, cities in the Amazon, such as Belém, host of COP-30, face additional challenges such as socio-environmental vulnerability, historical infrastructure deficits, and territorial inequality, but at the same time they have a unique opportunity to lead the global climate agenda, by transforming their geopolitical position into a bioeconomic power and an international laboratory for sustainable urban policies.

Thus, the city emerges as the main space where climate governance can cease to be a promise and become a reality, through innovation, technology, social participation, and adaptive resilience.

2.4 THE GIS CYCLE AS A BRAZILIAN INSTITUTIONAL INNOVATION FOR CLIMATE GOVERNANCE

In the field of climate governance, organizations such as the IPCC (2023), the OECD (2021), and UN-Habitat (2020) argue that States should adopt management models capable of articulating data science, social participation, federative coordination, and focus on results.

However, most of the widely disseminated methodologies were conceived in contexts historically different from the Brazilian one, with greater institutional stability and lower socioeconomic inequalities. This makes it necessary to develop approaches adapted to realities such as Latin America, marked by strong territorial heterogeneity and administrative weaknesses.

In this scenario, the GIS Cycle, Governance, Innovation and Sustainability, emerges as an original Brazilian contribution to the advancement of climate governance. Developed by the author as a systemic institutional architecture, the model seeks to overcome the fragmentation that historically separates planning, budgeting, technology, and monitoring, unifying these dimensions in a continuous process oriented to public value.

GIS proposes that public administration operates with ethics and social responsibility, permanent monitoring, sustainable innovation, and adaptive resilience, allowing climate policies to effectively convert into verifiable deliverables.

In addition to establishing new governance parameters, the GIS Cycle reinforces the need for the State to adopt decision-making mechanisms connected to society and based on evidence, expanding the government's capacity to correct course, anticipate risks, and respond in a coordinated manner to climate demands.

This perspective is convergent with contemporary international discussions on collaborative governance (OSBORNE, 2010) and polycentric governance (OSTROM, 2010), but incorporates the differential of a territorialized view of climate action.

The experience of Goiânia, which has been applying principles of the GIS Cycle in the development of its medium-term planning, illustrates the potential of the model as a tool for public transformation.

In this case, the articulation between planning, budget, popular participation and indicators has allowed greater precision in the prioritization of policies, conferring institutional intelligence to the urban climate management process.

This example demonstrates that GIS is not restricted to the theoretical field, constituting itself as an applicable and replicable method in different realities.

More than that, the GIS Cycle presents itself as an institutional innovation that offers Brazil a better capacity to align diplomatic ambition and territorial implementation, allowing commitments made in global arenas, such as COP-30, to generate concrete effects on people's lives.

For this reason, it is a strategic proposal both to strengthen municipal governance and to position the country as an international reference in integrated, inclusive and sustainable climate management models.

3 METHODOLOGY

The research adopts a qualitative approach, with an analytical and propositional character, centered on the evaluation of the role of COP-30 in strengthening Brazilian climate governance and in the formulation of the GIS-COP30 model.

The study is based on documentary analysis of national and international instruments, such as the NDC updated in 2024, climate monitoring reports, regulations on the sustainable transition, and institutional documents related to public governance and the GIS Cycle.

At the same time, a review of specialized literature on climate governance, smart cities, government innovation and urban resilience was carried out, in order to ensure alignment with the state of the art.

The analysis is organized in three stages: diagnosis of the pre-COP-30 climate scenario; evaluation of legacy opportunities associated with the event in Belém do Pará; and the proposal of the GIS-COP30 framework as an instrument for the local implementation of Brazilian climate goals.

In addition, the cases of Belém, due to their strategic role in COP-30, and Goiânia, due to the adoption of integrated digital governance practices, are examined. Thus, the methodology allows for the articulation of international commitments, national capacities, and municipal strategies aimed at climate action.

4 RESULTS AND DISCUSSION

Understanding Brazil's role in contemporary climate governance requires an analysis that goes beyond the normative dimension and considers the real capacity to implement public policies. After discussing, in the theoretical framework, the foundations of climate governance, national policy and the centrality of cities in the sustainability agenda, this section presents the findings of the research, structuring a critical reflection on the Brazilian situation on the eve of COP-30. The objective is to highlight how the country articulates, or fails to articulate, its diplomatic protagonism with the operational challenges of the territory, especially at the municipal level.

From this diagnosis, the transformative potential of COP-30 and its relationship with the institutional innovation proposed by the GIS Cycle are explored, demonstrating concrete paths for the consolidation of smart and resilient cities in Brazil. Thus, the results and discussions that follow make explicit the gap between ambition and state capacity, while pointing out strategies and opportunities to overcome it.

4.1 BRAZIL IN THE PRE-COP-30 CLIMATE SCENARIO: DIPLOMATIC AMBITION, LIMITED EXECUTION

Brazil occupies a strategic position in global climate governance as one of the main environmental powers on the planet, responsible for the largest tropical forest in the world and for relevant ecosystem services that regulate the regional and global climate. This role was reaffirmed in the last rounds of UNFCCC negotiations, with the update of the Nationally

Determined Contribution (NDC), which established the goal of reducing greenhouse gas emissions by 59% to 67% by 2035, incorporating principles of climate justice and sustainable transition.

However, the technical diagnosis shows dissonance between ambition and implementation. According to the *Climate Action Tracker*, Brazil remains among the largest global emitters, with approximately 2.5% of global emissions, and its level of commitment is still classified as "Insufficient" to limit global warming to 1.5°C.

This assessment stems from the country's persistent dependence on the land use and land use change (LULUCF) sector, associated with deforestation in the Amazon and Cerrado, as well as structural challenges in the energy, industry, and transport sectors.

Institutional analysis reinforces this asymmetry. Although Brazil has advanced in the modernization of regulatory instruments, as demonstrated by the creation of the Brazilian Emissions Trading System (SBCE), technical studies warn that the operationalization of this mechanism depends on robust digital infrastructure, methodological standardization, and inspection capacity that are still under development.

The picture is reinforced by the IPCC (2023), which states that climate policies only produce results when supported by continuous systems of monitoring, accountability, and evidence-based governance.

These gaps are accentuated at the subnational level, where climate impacts are manifested with greater intensity. Brazilian municipalities often lack specialized technical teams, adequate digital platforms, or financial resources to structure effective mitigation and adaptation actions, which limits the country's ability to meet international goals consistently across the territory.

Thus, the pre-COP-30 scenario reveals a paradox: Brazil has the best environmental conditions to lead the global climate transformation, but still finds it difficult to operate this leadership internally, especially in its municipal dimension. This finding reinforces the urgency of governance models that connect diplomatic ambition with local execution, which will be deepened in the following subsections.

4.2 NATIONAL CLIMATE GOVERNANCE GAPS

Despite relevant advances at the diplomatic and regulatory level, Brazilian climate governance still has structural limitations that hinder the execution of the goals established in the NDC and compromise the coherence between ambition and implementation. Such

gaps are manifested, above all, in the capacity for federative articulation, in the low degree of institutionalization of evidence-based management and in the territorial inequalities that mark municipal capacities.

The first gap concerns multilevel coordination. Although the federal government drives the international climate agenda, the execution of actions is predominantly local, especially in Brazil, where a large part of emissions is associated with territorial dynamics (land use, fires, disorderly urbanization). The lack of systematic cooperative arrangements between the Union, states and municipalities results in disjointed policies, with overlapping of actions and institutional vacancies.

Table 2

Gaps in Brazilian climate governance and their impacts on the territory

Governance Gap	Impact on the Territory
Insufficient federative coordination	Disconnection between national goals and municipal reality
Poor data governance	Lack of policy monitoring and remediation
Local climate finance gap	Difficulty in operationalizing plans and actions
Unequal socio-environmental vulnerability	Climate injustice and increased population risk
Limited institutional capacity in municipalities	Slowness and fragmentation of public enforcement

Source: Author.

A second weakness concerns technological and informational maturity. Climate governance requires systems capable of measuring emissions, modeling risks, monitoring targets, and assessing impact in a transparent and continuous way. However, many Brazilian municipalities still operate without data, without indicators and without integrated digital platforms, which compromises both the quality of decisions and accountability to society.

In addition, the challenge of climate finance remains, especially in municipal entities, which have low budgetary capacity to implement urban adaptation actions, green infrastructure, sanitation, sustainable mobility, and environmental enforcement. The absence of permanent financial mechanisms aggravates the dependence on sporadic transfers and isolated projects, making it difficult to continue policies.

Finally, socio-spatial inequalities, especially accentuated in the Amazon and urban peripheries, make climate justice an operational challenge. The most vulnerable populations are also the most exposed to extreme events, but less contemplated by investments and

resilient solutions. This asymmetry reveals that climate policy still does not reach those who need it most.

Given this scenario, it becomes evident that strengthening climate governance in Brazil requires investment in subnational state capacities, with a focus on technology, institutional intelligence, and social participation. COP-30 emerges as a strategic opportunity to review governance arrangements, modernize instruments, and foster territorial resilience, especially in the Amazon and in capitals with national prominence, such as Belém and Goiânia.

In summary, without local capacity to transform guidelines into concrete deliveries, Brazil runs the risk of remaining a potential climate power, but not in realization.

4.3 COP-30 AND THE AMAZONIAN LEGACY: THE ILLUSTRATIVE STUDY OF BELÉM (PA)

The choice of Belém do Pará as the host of COP-30 represents a historic milestone for climate governance by repositioning the Amazon as not only an environmental, but also a geopolitical, socioeconomic, and technological protagonist of the global ecological transition. The city, located at the interface between the urban and the forest, symbolizes both the challenges of Brazilian climate governance and its potential for leadership in sustainable development models.

In this context, the Amazon bioeconomy emerges as a strategic vector capable of combining biodiversity conservation with income generation, employment, and social inclusion. It is an economic paradigm based on the sustainable use of forest resources and on scientific-technological knowledge associated with sociobiodiversity, dialoguing with the care economy and with traditional knowledge that has historically sustained ways of life in the region. COP-30 offers a unique opportunity to structure clean production chains, value the standing forest and position the Amazon as a world hub for socio-environmental innovation.

However, for the bioeconomy to become a strategic reality and not just a discourse, it is essential to face structural deficits in the urban territory. Belém presents critical challenges in basic sanitation, mobility, drainage, housing, land regularization and waste management, factors that intensify vulnerabilities in the face of extreme events such as floods, heat islands and water contamination.

For these reasons, we understand that the legacy of COP-30 must include investments in resilient urban infrastructure, ensuring that climate adaptation advances in an integrated manner with the reduction of socio-spatial inequalities.

This dimension refers directly to climate justice. In the Amazon, traditional populations, indigenous people, quilombolas, riverside dwellers, and residents of urban peripheries are those who, in addition to contributing less to the climate crisis, suffer the most from its effects. Therefore, any policy linked to COP-30 must ensure effective social participation, fair sharing of economic benefits and protection of territories of community life. This implies recognizing that Amazonian climate governance cannot be built without the living Amazon and without the Amazonians.

The Belém study demonstrates that COP-30 is not just an event, but a turning point capable of redefining the Amazonian development model, expanding institutional, technological, and financial capacities for climate implementation. What is at stake is not the construction of an infrastructure for a meeting of heads of state, but the construction of permanent infrastructures for the future.

That said, the articulation between the Amazonian legacy and the innovative experiences of municipal governance already implemented in other Brazilian capitals, such as Goiânia, reveals ways to disseminate and accelerate the institutional strengthening necessary to achieve climate goals in the territory.

In summary, Belém becomes a showcase of the world, but it should, above all, become a reference for Brazil itself, inaugurating a new stage of national climate governance.

4.4 STRATEGIC CONNECTIONS WITH GOIÂNIA (GO)

The experience of Goiânia reveals relevant advances in strengthening municipal public governance through the integration between strategic planning, results-oriented budgeting, social participation and digital technologies. This perspective has allowed the municipality to structure a management model based on data, indicators and transparency, which positions it as a national reference in the practical application of instruments aimed at territorial climate action.

The implementation of integrated digital platforms, associated with the monitoring of government programs and projects, contributes to qualifying real-time decision-making, ensuring responsiveness and social control. Such mechanisms allow public managers to anticipate risks, monitor performance, and correct strategic directions, reducing waste,

increasing efficiency, and increasing the legitimacy of climate policies. The use of data thus becomes an essential institutional infrastructure, as recommended by international organizations for urban governance in the context of climate change (UN-Habitat, 2020; IPCC, 2023).

In addition to the technological dimension, Goiânia has sought to reinforce the democratic character of management by expanding mechanisms for citizen participation and social co-responsibility. This includes the active involvement of communities and local actors in defining public priorities, ensuring that government decisions reflect real needs of the territory. By bringing the decision-making process closer to the populations affected by the policies, it contributes to reducing inequalities and strengthening climate justice at the local scale.

The articulation between strategic planning, digital governance, budgeting, and social participation translates an advanced model of municipal management aligned with the requirements of the sustainable transition. These elements constitute fundamental pillars of the GIS Cycle, setting a concrete example of how climate governance can be institutionalized within the operational capacities of the Brazilian State, in a continuous and verifiable way.

This experience shows that strengthening local governance does not depend exclusively on large-scale structural transformations, but can be achieved through incremental, integrated, and intelligent institutional innovations. Goiânia's trajectory demonstrates feasible paths for other Brazilian cities, including Amazonian capitals such as Belém, to advance in the consolidation of governance systems capable of transforming climate goals into tangible results for the population.

In summary, the experience of Goiânia indicates that Brazil already has solid domestic references to subsidize the legacy of COP-30, supporting the construction of smart, resilient cities oriented towards sustainable public value.

4.5 GIS-COP30 FRAMEWORK: AN INTEGRATED MODEL FOR CLIMATE IMPLEMENTATION IN THE TERRITORY

The GIS-COP30 framework proposes an operational framework capable of connecting international climate commitments with the institutional reality of municipal governments, overcoming the gap between diplomatic ambition and public execution. Its design incorporates continuous flows of planning, monitoring, and social participation that ensure adaptive and responsive governance, driven by data and sustainable public value.

Figure 1

GIS-COP30 cycle: integrated climate governance model

Source: Author.

It is a multi-scale model, which recognizes the different levels of responsibility of climate governance: the environmental diplomacy of the Union, the regulatory and coordinating attributions of the states, and the implementation of policies at the municipal level, where environmental and social impacts are directly manifested. By positioning the municipality as a protagonist agent of climate implementation, GIS-COP30 reinforces the principle defended by the IPCC (2023) that climate resilience is built "from the bottom up", in permanent interaction with national capacities.

The operation of the model is structured in five integrated axes, organized in a cycle format fed back by an operational flow:

1. Local Climate Strategic Planning - Establishes objectives and priorities based on territorial diagnoses and alignment with national (NDC) and global (SDG, Paris) goals.
2. Data Governance and Analytics - Collection and processing of environmental, social, and economic data to inform decisions, monitor emissions, and anticipate risks.
3. Green Budget and Sustainable Finance – Direct linkage between climate goals and resource allocation, including climate fundraising and internationalized partnerships.

4. Social Participation and Climate Justice - Expansion of democratic control and co-production of solutions, ensuring equitable distribution of benefits and protection of vulnerable populations.
5. Monitoring, Transparency and Learning Cycle - Continuous indicators, auditing of results and institutional learning, allowing quick adjustments and maintaining public accountability.

The articulation of these elements transforms GIS-COP30 into an institutional infrastructure for climate implementation, capable of generating verifiable improvements in people's lives. Its originality consists in bringing the climate to the center of public governance, linking environmental policies to city management, in sanitation, mobility, housing, land use and government digitalization.

The model was designed to be replicable, adaptable to different municipal realities and applicable especially in regions with strong socio-environmental inequality, such as the Amazon. In this way, it constitutes an unprecedented Brazilian contribution to strengthening the capacities to implement the Paris Agreement, expanding the legacy of COP-30 and positioning the country as an international reference in the construction of smart, resilient cities committed to sustainable public value.

Finally, GIS-COP30 represents the operational link between climate geopolitics and municipal public management, converting global commitments into concrete and permanent actions in the territory.

5 CONCLUSION

COP-30 represents a historic opportunity to reposition Brazil as a protagonist of international climate governance, aligning its expressive diplomatic ambition with the capacity for territorial implementation, especially at the municipal level, where climate action gains concreteness. The present study demonstrated that the country has exceptional environmental conditions and important geopolitical capital, reinforced by the commitment made in the NDC 2024, but still faces structural limitations that prevent the full achievement of its objectives, among which the following stand out: weaknesses in federative coordination, low technological maturity, insufficiency of local climate financing, and socio-spatial inequalities that unevenly affect the distribution of risks and benefits of the green transition.

The article presented the GIS Cycle as a Brazilian institutional innovation, capable of linking planning, public budgeting, climate data, social participation and continuous monitoring, structuring the implementation of smart and resilient climate policies in the territories. The experiences analyzed, Belém as an Amazon showcase for COP-30 and Goiânia as a national reference in integrated digital governance, show that strengthening municipal capacity is a strategic condition for global goals to be converted into positive results for the most vulnerable populations, as advocated by international organizations such as IPCC (2023) and OECD (2021).

Despite its contributions, it is recognized that the study has methodological and empirical limitations. Concentrating the analysis on a municipal illustrative study reduces the comparative scope and requires additional tests in different Brazilian socio-environmental contexts, considering realities with less administrative capacity. In addition, political dimensions of the climate transition, such as institutional resistance, asymmetries in federative cooperation, and veto behaviors, require future analytical expansion, especially in the interactions between the Union, states, and municipalities.

Another central challenge that requires deepening is climate financing, an indispensable element for cities to implement urban adaptation actions, green infrastructure, environmental sanitation, sustainable mobility, and territorial monitoring programs. The consolidation of the Brazilian Emissions Trading System (SBCE), combined with the expansion of financial instruments such as international funds (GCF, GEF), *green bonds*, carbon credits and Brazilian sustainable taxonomy, is a decisive component for the economic viability of the transition.

The future research agenda foresees the preparation of a new article aimed exclusively at the analysis of climate financing mechanisms and their role in municipal governance, focusing on the operationalization of SBCE, innovative partnerships, and the strengthening of subnational capacities to capture, manage, and account for climate resources. It is expected that such developments will increase the empirical robustness of the GIS-COP30 model and contribute to guide its large-scale application.

In summary, COP-30 should not only be a diplomatic milestone, but an institutional watershed, capable of territorializing, digitizing, and democratizing climate action in Brazil. The strengthening of local state capacities, articulated with the GIS Cycle, makes it possible to transform international commitments into concrete policies oriented to sustainable public

value, ensuring that the country advances from potential climate power to climate leadership in realization.

5.1 FINAL CONSIDERATIONS AND CLIMATE TRANSFORMATION AGENDA

COP-30 inaugurates a decisive phase for Brazil to convert its diplomatic recognition into effective climate governance, structured in robust municipal capacities and guided by sustainable public value. The implementation of the GIS Cycle, by articulating planning, technology, financing, and social participation, demonstrates that it is possible to transform global goals into verifiable results in the territory, especially in cities that face deep socio-environmental inequalities and greater exposure to climate risks. The continuity of this research will seek to mature local climate financing instruments and strengthen the application of the GIS-COP30 model in different realities, contributing to the legacy of COP-30 being lasting, inclusive and territorialized. In short, it is about ensuring that the Brazilian climate transition is not only necessary, but inevitable, prioritizing social justice, institutional innovation, and urban resilience.

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