

# FOR INCLUSIVE CLIMATE ACTION AND A BRAZILIAN FRAMEWORK OF NATURE-BASED SOLUTIONS



**PATHWAYS TO REDUCING  
URBAN, RURAL, AND FOREST  
VULNERABILITIES THROUGH  
TRADITIONAL KNOWLEDGE**

# Introduction

As the climate crisis intensifies and deepens structural inequalities, there is an urgent need to consolidate a uniquely Brazilian concept of Nature-based Solutions (NbS) that reflects the country's territorial, social, and cultural realities. While the internationally recognized definition endorsed by the United Nations provides an important reference point, it must be expanded in light of the 1988 Federal Constitution, as well as the principles of human rights and climate justice. Such an approach must integrate traditional knowledge and recognize the immense diversity of Brazil's biomes and populations—drawing on the past to shape responses to the future.

This document presents guidelines for developing a national NbS framework grounded in a strong legal foundation and attentive to the intersections of race, ethnicity, gender, and territory. It aims to support public policies that are durable, inclusive, and environmentally effective.

# Why Do We Need A Brazilian Concept Of Nature-Based Solutions?

As defined at the 5th session of the United Nations Environment Assembly (UNEA 5.2, Nairobi, 2022), Nature-based Solutions (NbS) are: “actions aimed at protecting, conserving, restoring, and sustainably managing natural or modified terrestrial, freshwater, coastal, and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits”<sup>1</sup>.

While this definition is comprehensive in identifying the range of challenges that NbS can address to generate positive impacts, it requires further expansion to reflect Brazil’s specificities.

Brazil’s continental scale and geographic diversity encompass a wide range of biomes increasingly threatened by human activity. Simultaneously, the country remains one of the most unequal in the world, ranking sixth globally according to the Gini Index<sup>2</sup> in 2023. In this context, climate and socioenvironmental strategies must prioritize the traditional knowledge of peoples and communities who have adapted to their natural environments for millennia, ensuring that NbS also contributes to dismantling socioeconomic inequality.

Brazil holds a millennia-long tradition of forest management and agricultural practices, spanning from the Amazon—the world’s largest rainforest—to the southern Pampas. These legacies are deeply embedded in the practices of Indigenous peoples, quilombola communities and traditional populations. Developing a Brazilian concept of Nature-based Solutions (NbS), therefore, requires grounding the framework in the collective experiences of those who directly depend on the country’s rivers, soils, coastlines, mountains, climate, fauna, and flora. Furthermore, such a concept must account for urban realities, where gray infrastructure predominates but continues to rely on ecosystem services.

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<sup>1</sup> <https://www.unep.org/topics/nature-action/nature-based-solutions/overview-nature-based-solutions>

<sup>2</sup> <https://world-populationreview.com/country-rankings/gini-coefficient-by-country>

Incorporating a Brazilian concept of Nature-based Solutions (NbS) into legal frameworks is essential to underpin public policies for climate adaptation. Law No. 14,904/2024, which establishes guidelines for national climate adaptation plans, already lists NbS among its policy instruments. As this law is slated for regulation via a forthcoming Presidential Decree, it is imperative that this decree formally adopt a Brazilian concept of NbS to ensure its effective application in the design and implementation of climate adaptation strategies.

Alternatively, the National Congress could advance an ordinary legislation to codify this concept, with explicit references to Law No. 14,904/2024 and its regulatory framework. Such legislative action would provide a robust legal foundation for the application of the concept within national climate policy, ensuring legal certainty, institutional stability, and long-term resilience regardless of political cycles.

Advocating for a Brazilian concept of Nature-based Solutions as a legal and political strategy for climate justice—particularly for historically marginalized and vulnerable groups—is firmly grounded in the 1988 Federal Constitution. Article 225 recognizes the right of all citizens to an ecologically balanced environment as a common good and essential to a healthy quality of life.

This provision imposes a dual duty upon the State and society to protect and preserve the environment for present and future generations, reinforcing the need to translate this constitutional mandate into effective public policies.

**“People are forced to choose between starving or surviving by eating animals that are completely contaminated, from territories that are also fully contaminated, where it is no longer possible to grow food and where life itself has been depleted. This destruction in the name of profit denies us the right to a healthy environment. If we cared—if profit were not placed above life and all forms of life, because everything in the environment is alive—then I believe we would truly be ensuring the right to the environment.”<sup>3</sup>**— Ingrid Sateré Mawé, first Indigenous city councilor of Florianópolis (Sateré Mawé/Sahu-Apé people, Middle Amazon River)

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<sup>3</sup> Source: Interview for the Collaborative Action Platform – Brazil, October 17, 2025.

This statement highlights the urgent necessity for a development model that prioritizes life and ecological balance.

Implementing Nature-based Solutions as public policy, therefore, must transcend the mere replication of international frameworks. It must be deeply rooted in Brazil's socio-territorial realities, ensuring that the benefits derived from these solutions, including environmental protection, water security, food sovereignty, and climate risk mitigation, are distributed equally across all territories and populations.

# Nbs As A Resilient Strategy In The Context Of Climate Emergency And Injustice

In urban environments, the implementation of green corridors along avenues and cycling routes—integrated with native species suited to local soil and climate conditions—effectively mitigates noise pollution and urban heat island effects. Beyond promoting active mobility, these solutions complement existing urban infrastructure and foster connectivity between public squares and parks. While integrating these corridors into consolidated urban areas may present logistical challenges, the resulting social and environmental benefits make such efforts worthwhile.

Effective implementation requires prior mapping, potential land acquisition processes conducted in full compliance with human rights standards, and robust public–private partnerships. Setting equitable shading targets is essential to mitigate disparities in urban canopy coverage and promote territorial justice. An equitable distribution of green infrastructure significantly improves air quality, reduces noise pollution, lowers urban temperatures, and fosters both human health and biodiversity.

In high-traffic areas or spaces dedicated to sports and leisure, biodigester septic systems offer a decentralized alternative to conventional sewage networks. These systems prevent soil and groundwater contamination, enable wastewater reuse for irrigation, and operate within a circular economy framework where organic waste is converted into energy and nutrients to sustain green areas, also contributing to carbon sequestration. In the context of a circular economy, the concept of “waste” does not truly exist, as everything can be reused — a principle that is even more evident in nature.

Brazil has established significant experience with rain garden technologies—shallow, vegetated depressions about 30 cm deep designed to absorb and retain stormwater through layers of gravel, sand, and fertile substrate. These are low-cost, highly efficient solutions that help reduce flooding in critical urban areas.

Another key typology is the bioswale—a vegetated drainage channel designed with engineered curves to attenuate water flow. This allows gradual infiltration into the soil and promotes aquifer recharge. Bioswales are relatively inexpensive to install and maintain, and they effectively delay stormwater runoff, preventing systemic overload in conventional drainage networks.

Together with other Nature-based Solutions, these strategies drive the “renaturalization” of urban environments by increasing soil permeability, reducing flood risks, fostering biodiversity and public health, and enhancing urban landscapes.

In rural contexts, NbS can mitigate flooding and erosion while preventing the siltation of water supply reservoirs, thereby reducing the reliance on intensive chemical treatment for water potability. In industrial parks, often situated in peri-urban or rural zones, constructed wetlands can treat industrial effluents and acid mine drainage.

These systems, composed of specific hydrobotanical species, produce water suitable for irrigation while returning organic matter to parks and green areas within their own industrial plants or rural spaces, thereby generating circularity in organic materials.

Wildfires represent one of Brazil's most severe environmental threats, intensified by prolonged droughts, rising temperatures, and shifting land-use patterns.

Beyond causing biodiversity loss and carbon emissions, these events disproportionately affect vulnerable populations whose livelihoods and food security are tied to natural ecosystems. Often intentional, these fires are further exacerbated by droughts that are becoming increasingly frequent in the Amazon.

**“We are witnessing significant climate changes. In our region, two very painful moments were the major droughts — this year and the one two years ago. The image that affected me most was the number of dead fish. It was not even the hardship of seeing our relatives isolated without water that struck me the hardest. What brought me to tears was seeing so many fish struggling in hot mud without oxygen. I look at this now with great concern, because these environmental changes will affect both our generation and the generations to come.**”

**Imagine a future where there are not enough fish. These have been two consecutive years of losses, and nature itself is beginning to lose its ability to regenerate quickly in the face of these recurring events.”<sup>4</sup>**

— Vanda Witoto, Witoto people, Upper Solimões River region

The Alter do Chão Fire Brigade (Pará) serves as a critical model of civil society engagement, nationally recognized for its Integrated Fire Management (IFM) framework and capacity-building programs for local brigades. Operating across an area exceeding 1.2 million hectares, this initiative bridges traditional knowledge with technical expertise to mitigate wildfire risks and empower local leadership.<sup>5/6</sup>

Integrated Fire Management (IFM), coordinated by IBAMA and ICMBio, is another example of a public policy grounded in Nature-based Solutions (NbS). By recognizing the traditional and cultural use of fire, IFM incorporates prescribed and controlled burning as an ecological tool to reduce fuel loads and prevent uncontrolled wildfires. By doing so, this approach avoids the criminalization of ancestral practices and ensures the meaningful participation of local communities in territorial planning, fostering equity and respect for local knowledge.

Brazil’s democratic framework offers robust participatory governance mechanisms that extend beyond electoral processes. Mechanisms such as public policy councils, public hearings, and national thematic conferences — such as the National Climate Conference — together with instruments like the National Climate Plan, provide channels for civic participation. When integrated with legal mandates, these processes help reduce vulnerabilities, lower public expenditures related to disaster relief, and address territorial inequalities.

Furthermore, social housing initiatives must incorporate climate-adaptation measures such as natural ventilation and lighting, cool and green roofs, and permeable courtyards, all of which enhance structural resilience and living conditions. Housing projects should prioritize space for community gardens, fruit trees, and shaded, multi-use, multi-generational areas. In quilombola and Indigenous communities, NbS principles must be applied through a lens of cultural sensitivity, acknowledging that many of these strategies are, in fact, foundational to ancestral knowledge. Such interventions expand access for low-income communities to thermal comfort, lower energy costs, reduced food insecurity, and stronger social cohesion.

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<sup>4</sup> Source: Interview for the Collaborative Action Platform – Brazil, October 17, 2025.

<sup>5</sup> [brigadadealter.org.br](http://brigadadealter.org.br)

<sup>6</sup> [ipe.org.br](http://ipe.org.br)

## Practical Recommendations For Advancing Participatory Democracy For Climate Justice And Human Rights

The Rio-92 Earth Summit marked a major milestone in the global environmental agenda by consolidating the concept of sustainable development<sup>7</sup>. Principle 4 of the Rio Declaration on Environment and Development<sup>8</sup> states that “environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.” This principle highlights the interdependence of economic development, social equity, and environmental protection—the core foundation of both environmental law and human rights.

Nature-based Solutions (NbS) provide concrete responses to several of the 17 Sustainable Development Goals (SDGs)<sup>9</sup> established by the United Nations in 2015 under the 2030 Agenda. Particularly relevant are SDG 6 (Clean Water and Sanitation), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), and SDG 15 (Life on Land). Additionally, SDGs 18 (Ethnic-Racial Equality) and 20 (Rights of Indigenous Peoples and Traditional Communities)—voluntary goals proposed by Brazil—further reinforce the interconnections between the right to an ecologically balanced environment, the fight against racism, and the protection of the rights of Indigenous peoples and traditional communities, especially in the context of environmental racism.

The effective implementation of NbS, however, requires cross-cutting and intersectoral public governance involving sectors such as environment, housing, sanitation, infrastructure, civil defense, disaster risk management, social assistance, labor, and education. Such institutional coordination is essential to ensure integrated public policies guided by the principle of the State's socioenvironmental role and by the effective protection of fundamental rights.

Adopting Nature-based Solutions in the context of the climate emergency represents a concrete pathway for safeguarding the constitutional right to an ecologically balanced environment, which is inextricably linked to the principle of human dignity. Both are fundamental rights and internationally recognized human rights. Protecting the environment is therefore not merely a technical or environmental measure, but a legal and ethical responsibility

<sup>7</sup> <https://www.gov.br/mma/pt-br/noticias/eco-92-consolidou-o-conceito-de-desenvolvimento-sustentavel-ao-mundo-diz-secretario-de-mudanca-do-clima-do-mma>

<sup>8</sup> <https://cetesb.sp.gov.br/proclima/wp-content/uploads/sites/>

<sup>9</sup> <https://www.gov.br/mma/pt-br/noticias/eco-92-consolidou-o-conceito-de-desenvolvimento-sustentavel-ao-mundo-diz-secretario-de-mudanca-do-clima-do-mma>

shared by the State and society, essential for advancing social justice, intergenerational equity, and the protection of populations most vulnerable to climate impacts.

Inter-municipal cooperation is also crucial, as rivers and watersheds connect territories and link actions across jurisdictions. Such collaborations should be supported by state and federal governments, given the scale of the challenges involved and the value of knowledge exchange among public officials, particularly where municipalities share the same biome and face similar technical obstacles.

Ensuring participatory processes, including public hearings, councils, and meaningful participation in decision-making bodies, is equally vital. These mechanisms ensure accountability and strengthen the shared commitment of both governments and communities to the implementation of agreed-upon actions.

The principle that “we only care for what we know” highlights the importance of environmental education and communication. Public awareness regarding trees, rivers, and green spaces is a key tool for engagement and the protection of natural assets.

However, many public institutions still face technical capacity gaps when developing projects capable of accessing financing. Experiences from universities and municipalities such as Unicamp, Campinas, Santos, and São Paulo demonstrate the potential of academic partnerships to develop indicators, monitor benefits, and train public servants. Programs such as “Green Resilient Cities,” “Living Periphery,” and “Green Resilient Peripheries,” led by the Ministry of the Environment and Climate Change, are specifically designed to address these gaps.

For NbS to achieve lasting impact, they must be institutionalized through municipal, state, and federal laws and planning frameworks, with clearly defined binding targets aligned with the principles of legality, social participation, and environmental justice.

Financing for climate action can originate from multiple sources, including environmental compensation mechanisms, the National Climate Change Fund, municipal funds, public budgets, and support from international organizations. Yet beyond securing financial resources, it is crucial to rethink the purpose of public budgets: they must function as strategic instruments for addressing structural inequalities, placing climate injustice at the center of budgetary decision-making.

To achieve this, climate budgeting should be integrated into multiyear planning instruments and annual budget laws, supported by coordinated action among government departments to overcome the sectoral fragmentation that often characterizes public administration. These budgets must ensure transparency, public oversight, and accountability in the allocation of resources for Nature-based Solutions (NbS).

An equitable climate budget must also incorporate an intersectional perspective, sensitive to gender, race<sup>10</sup>, ethnicity, and socioeconomic status. Women, Black populations, quilombola communities, Indigenous peoples, and residents of peripheral areas are disproportionately affected by the climate crisis. Rio de Janeiro, the first Brazilian city to adopt a cross-cutting climate budget, offers a significant example of progress; however, these practices must be expanded across other jurisdictions to ensure that society can effectively monitor the scale and allocation of NbS funding.

According to the United Nations Framework Convention on Climate Change (UNFCCC), financing for Nature-based Solutions (NbS) must triple by 2030 (based on 2022 levels)<sup>11</sup>. Beyond environmental benefits, NbS serve as catalysts for local green jobs, strengthening rural and urban economies while expanding income opportunities.

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<sup>10</sup> <https://atendodascandidatas.org/guia-orcamentos-sensiveis-a--genero-e-raca/>

<sup>11</sup> <https://unfccc.int/news/finance-for-nature-based-solutions-must-triple-by-2030>

# Conclusion

While the international concept of Nature-based Solutions provides an essential reference point, it must be reframed through the lens of Brazil's social, environmental, legal, and cultural specificities. This requires acknowledging the country's territorial diversity, deep social inequalities, and the ancestral knowledge of Indigenous peoples and traditional communities.

NbS are far more than mere ecological approaches; they are vital instruments for advancing climate justice and expanding equitable access to fundamental rights such as sanitation, housing, food security, water, health, and general well-being. Their implementation must cut across urban, rural, and forest policies, with applications ranging from social housing and risk-prone areas to traditional territories, industrial zones, and river basins.

Beyond fostering climate resilience, NbS strengthen communities, generate green jobs, mitigate public expenditures, and reinforce the principle of human dignity enshrined in Brazil's 1988 Federal Constitution.

Furthermore, nature-based infrastructure can cost up to 50% less<sup>12</sup> than equivalent gray infrastructure while requiring lower maintenance and offering superior long-term performance. Natural systems such as mangroves, reefs, wetlands, and riparian forests can replace or complement conventional infrastructure, significantly reducing public spending, restoring ecosystems, and securing a pathway for climate justice.

Institutionalizing a Brazilian concept of NbS is therefore essential. This can be achieved through a Presidential Decree regulating Law No. 14,904/2024 and through strategic coordination with the National Congress to incorporate this framework into federal legislation, ensuring legal certainty, legitimacy, and institutional continuity. Likewise, the governance of these policies must be participatory, intersectoral, and territorially grounded, ensuring broad engagement with organized civil society, the lived experiences of communities, and the needs of the most vulnerable territories.

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<sup>12</sup> <https://www.iisd.org/articles/nature-based-infrastructure>

Public authorities at all levels are therefore called upon to take a leading role in shaping and implementing a Brazilian framework for Nature-based Solutions. This effort requires decisive legislative action, federal coordination, investment in technical capacity-building, the promotion of qualified spaces for social participation, and the formal recognition of ancestral and community knowledge.

Ultimately, adopting and institutionalizing a Brazilian concept of Nature-based Solutions represents a civilizational choice. By recognizing nature as a strategic ally rather than a barrier, Brazil can build a more just, resilient, and sustainable future for both present and future generations.

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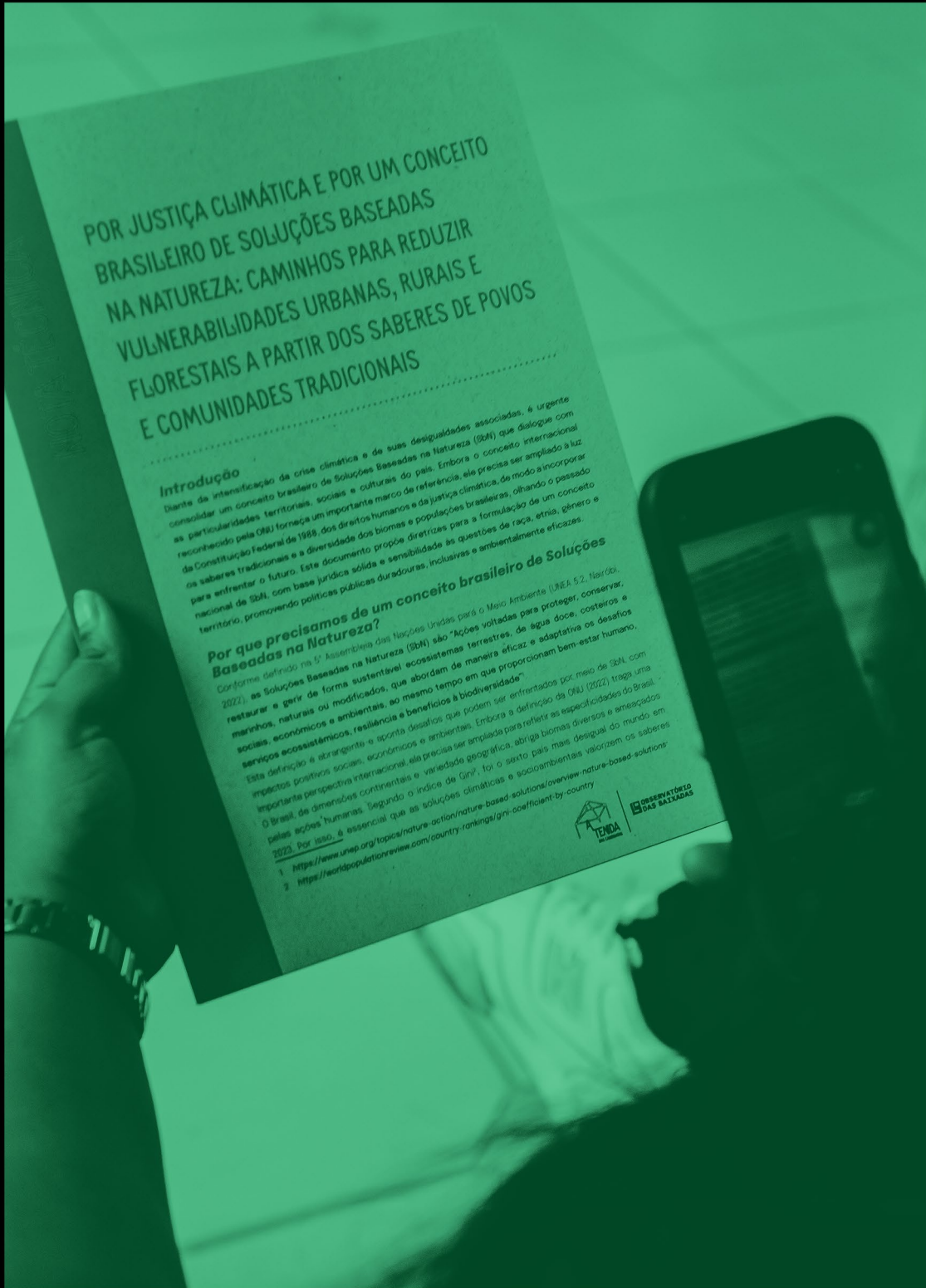
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# POR JUSTIÇA CLIMÁTICA E POR UM CONCEITO BRASILEIRO DE SOLUÇÕES BASEADAS NA NATUREZA: CAMINHOS PARA REDUZIR VULNERABILIDADES URBANAS, RURAIS E FLORESTAIS A PARTIR DOS SABERES DE POVOS E COMUNIDADES TRADICIONAIS

## Introdução

Diante da intensificação da crise climática e de suas desigualdades associadas, é urgente consolidar um conceito brasileiro de Soluções Baseadas na Natureza (SbN) que dialogue com as particularidades territoriais, sociais e culturais do país. Embora o conceito internacional reconhecido pela ONU forneça um importante marco de referência, ele precisa ser ampliado à luz da Constituição Federal de 1988, dos direitos humanos e da justiça climática, de modo a incorporar os saberes tradicionais e a diversidade dos biomas e populações brasileiras, olhando o passado para enfrentar o futuro. Este documento propõe diretrizes para a formulação de um conceito nacional de SbN, com base jurídica sólida e sensibilidade às questões de raça, etnia, gênero e território, promovendo políticas públicas duradouras, inclusivas e ambientalmente eficazes.

## Por que precisamos de um conceito brasileiro de Soluções Baseadas na Natureza?

Conforme definido na 7ª Assembleia das Nações Unidas para o Meio Ambiente (UNEA 5.2, Nairobi, 2021), as Soluções Baseadas na Natureza (SbN) são "ações voltadas para proteger, conservar, restaurar e gerir de forma sustentável ecossistemas terrestres, de água doce, costeiros e marinhos, naturais ou modificados, que abordam de maneira eficaz e adaptativa os desafios sociais, econômicos e ambientais, ao mesmo tempo em que proporcionam bem-estar humano, serviços ecossistêmicos, resiliência e benefícios que podem ser enfrentados por meio de SbN, com esta definição e abrangente e aponta desafios que podem ser enfrentados por meio de SbN, com impactos positivos sociais, econômicos e ambientais. Embora a definição da ONU (2021) traga uma importante perspectiva internacional, ela precisa ser ampliada para refletir as especificidades do Brasil. O Brasil, de dimensões continentais e variedade geográfica, abriga biomas diversos e ameaçados pelas ações humanas. Segundo o índice de Gini<sup>1</sup>, foi o sexto país mais desigual do mundo em 2022. Por isso, é essencial que as soluções climáticas e socioambientais valorizem os saberes

<sup>1</sup> <https://www.unep.org/topics/nature-action-rankings/gini-coefficient-by-country>  
<sup>2</sup> <https://worldpopulationreview.com/country-rankings/gini-coefficient-by-country>

