

POLICY BRIEF



Science Panel for the Amazon

Contribution to the Amazon Summit - IV Meeting of Presidents of the Parties to the Amazon Cooperation Treaty Organization (ACTO)

The Amazon is a regional entity with global relevance, spanning eight countries and one territory (Brazil, Bolivia, Colombia, Ecuador, Guyana, Peru, Venezuela, Suriname, and French Guiana). Concerned by the growing urgency of catastrophic threats to the Amazon and inspired by the [Leticia Pact](#), which emphasized the crucial role of research, technology, and knowledge management in guiding decision-making, a group of over 250 preeminent scientists from the region and global partners have united to form the unprecedented Science Panel for the Amazon (SPA) (source: <https://www.theamazonwewant.org/>). With the vision of becoming a global authority, the Panel aims to synthesize and communicate state-of-the-art, policy-relevant science and knowledge about the Amazon, integrating it with Indigenous and local knowledge, to accelerate solutions for sustainable and equitable development in the region. As a significant step towards this vision, the Panel unveiled a 1300-page [landmark Report](#) at COP26 on the state of the Amazon and solutions to advance sustainable development in the region, referred to as an “encyclopedia” of the Amazon. The Panel also launched three important policy briefs on [Amazon tipping points](#), the development of [“arcs of restoration”](#) in

the region, and the importance of [Indigenous territories in fighting the climate crisis](#) at COP27.

Recent political developments are indicating a growing momentum towards the conservation of the Amazon region. In this context, the SPA presents a set of policy-relevant recommendations aimed at informing decision-making policy choices.

POLICY-RELEVANT RECOMMENDATIONS FOR NATURE-BASED SOLUTIONS FOR THE AMAZON

1. Achieve zero deforestation and ecosystem degradation: Ensuring the integrity of hydrological systems, biodiversity, and the fundamental role of the Amazon as a global climate regulator requires ~80% of forests to remain standing. To maintain that benchmark, the urgent priority is to achieve zero deforestation and ecosystem degradation in the Amazon by 2030, and to establish a complete and immediate deforestation and ecosystem degradation moratorium in areas that are nearing a tipping point.

2. Conserve and monitor the status of Amazon ecosystems: (i) consolidate, expand and provide resources for protected areas; (ii) support and recognize Indigenous land rights through titling and other law-based recognition processes; (iii) protect undesignated lands; (iv) invest in command and control; (v) provide near-real-time monitoring of forest loss and forest degradation, combined with effective on-the-ground enforcement of illegal activities.

3. Restore and remediate Amazon's ecosystems: Restoration at scale can be achieved through restoring (i) forests in protected areas; (ii) forests in undesignated lands; (iii) areas that have been cleared above the legal allowance on private lands; (iv) forest cover beyond legal compliance; and (v) degraded farmland. These efforts must be driven by a multifaceted approach that aims to conserve and restore biodiversity and the functioning of the ecosystem, alongside improving livelihoods. It is crucial that these initiatives transcend national borders, supporting the establishment and implementation of landscape-level initiatives to maintain connectivity and promote the overall health of freshwater ecosystems to preserve critical ecological functions.

These strategies can be implemented by: (a) strengthening existing public policies and developing specific policies to address the specific recommendations presented by the SPA; (b) enhancing implementation and enforcement of policies and strengthening governance systems; (c) clarifying land tenure and resolving conflicts; (d) improving the commitments and policies of the private sector and of countries that import products from the Amazon; (e) empowering Indigenous and local communities, women, and youth; (f) supporting innovation and capacity building; and (g) effective monitoring.

4. Invest in a bioeconomy of standing forest and flowing rivers: (i) invest in accessible education, science, research, technology, and innovation valuing Indigenous and local knowledge; (ii) create fiscal and financial incentives to engage the private sector and multilateral institutions in innovation and sustainable value chains; (iii) ensure transparency and accountability throughout supply chains; (iv) promote green job creation, capacity building, and incentives to local entrepreneurs; (v) invest in rural, urban, and peri-urban sustainable infrastructure; and (vi) foster coordination and cooperation across the Amazon countries.

5. Support people's empowerment and governance: (i) implement a transparent and inclusive regional governance system to improve natural resource management and strengthen human and territorial rights; (ii) engage Indigenous peoples and local communities (IPLCs) in planning and policymaking processes and promote their political representation at all levels of governance; (iii) recognize diverse knowledge systems and promote intercultural education and dialogue; (iv) establish and scale up mechanisms that reach IPLCs' organizations directly, considering their local economies, governance structures, and diverse ways of life; (v) protect IPLCs' land and water rights to guarantee social justice and conservation outcomes; and (vi) provide secure land tenure rights and the institutional environment for enforcing these rights.

6. Mobilize financing and foster partnerships for conservation and sustainable development: The scale of the Amazon basin, the significant disparity between the available resources and the financial requirements, and the challenges it faces, call for ambitious, large-scale, international finance development

including private and public financial partnerships. This must be leveraged to promote and sustain restoration, conservation, forest management, the development of sustainable value chains, payments for ecosystem services schemes, and investment in education, science, technology, and innovation.

CONTEXT AND FOUNDATIONAL KNOWLEDGE FOR INFORMED RECOMMENDATIONS AND ACTIONS

A. The Amazon basin encompasses the largest tropical forest in the world, a place of immense natural and cultural wealth and diversity.

1. The Amazon is home to the largest tropical forest in the world. It houses a remarkable share of unique and irreplaceable biodiversity, with >13% of the world's described species compressed into about 0.5% of Earth's land and <0.001% of Earth's water. This extraordinary diversity, a product of complex dynamics that have been co-evolving for tens of millions of years, confers stability and resilience to terrestrial and aquatic ecosystems. Although scientists describe new species in the Amazon at the extraordinary rate of one every other day, many groups are still poorly known.

2. The Amazon plays a critical role in water cycle in the region and beyond the Basin (e.g., glaciers, *páramos*). About 28% of the rainfall in the Amazon has fallen previously, increasing westward until it exceeds 50% at the foothills of the Andes. This sustains a high flow of atmospheric moisture inland from the Atlantic Ocean and maintains high rates of evapotranspiration year-round. A significant amount of moisture results from rainfall recycling flows to the southern part of South America via "aerial rivers", which is

estimated to contribute to 70% of the annual mean input to water vapor to the La Plata basin. Rainfall produces the largest river discharge on Earth, 220,000 m³/s, accounting for 16-22% of the world's total river input to oceans. The El Niño-Southern Oscillation (ENSO) is one of the causes of interannual variability in rainfall in the Amazon, responsible for recent severe droughts (e.g., 2015-2016) producing low river water levels, increasing the risk of forest fires, releasing carbon, smoke, and soot into the atmosphere, and affecting the health of the local population. The El Niño has returned in 2023. The Amazon also has a crucial role in maintaining regional and global climate stability, storing approximately 150-200 billion tons of carbon in its soils and vegetation.

3. The Amazon is home to around 47 million people, including nearly 2.2 million Indigenous people distributed among more than 410 groups speaking over 300 languages, as well as local communities (i.e., riverine and Afro-descendant communities), all of whom hold profound knowledge of ecosystem functions. IPLCs play a critical role in the generation, conservation, and sustainable management of Amazonian agricultural and biological diversity and ecosystems. Over the past 12,000 years, Amazonian Indigenous peoples promoted cultural and technological innovations, including the production of the earliest ceramics in the Americas, early monumental architecture, and plant domestication. This legacy of sophisticated environmental knowledge systems and worldviews is critical for informing and guiding scientific research, development projects, conservation policies, and bioeconomy initiatives.

B. In the face of a warming climate, increased deforestation and ecosystem degradation, and fiercer wildfires, the Amazon could soon reach a tipping point beyond which recovery may be impossible.

1. The Amazon's natural resources have been unsustainably exploited since colonial times, but has risen sharply over the past 50 years. The continuous expansion of agriculture and extractive industries, including the recent rise in illegal activities, represent the main drivers of deforestation, habitat fragmentation, environmental degradation, and threats to its biocultural diversity.

2. Approximately 18% of the Pan Amazon has been converted to other land uses, and at least an additional 17% has been degraded within the biome. Human disturbances have put many species at high risk of extinction, with several restricted to minor portions of their original range, with further impacts to species' interactions and interdependencies. They are also changing how the Amazon's forests and other ecosystems' function, impacting carbon storage and sequestration, decreasing the Amazon basin's productivity and resilience, and affecting its capacity to supply vital regional and global ecosystem services.

3. The Amazon tropical forest is highly vulnerable to climate change, experiencing a current temperature increase of approximately 1.2°C over the last 40 years, with climate changes occurring heterogeneously across the basin. In the southern fringes, the dry season has extended by more than 5 weeks, while temperatures have risen by 2-3°C over the past four decades. Along the Amazon-Cerrado boundary, mean temperatures have increased approximately 1°C within the last 20 years. The region has witnessed

an unprecedented rise in the frequency of extreme droughts, leading to increased tree mortality and a shift in the Southern Amazon from being a carbon sink to becoming a carbon source ($+0.11 \pm 0.13 \text{ g C m}^{-2} \text{ d}^{-1}$). A 2°C increase of the equilibrium temperature of the Earth combined with continued deforestation and degradation could significantly alter the hydrological cycle and forest functioning, likely pushing the Amazon forest to a critical tipping point.

4. The Amazon's climate is nearing a critical threshold with regional and global implications, potentially causing irreversible and severe degradation of the remaining forest, with drastic changes to the regional water cycle, and projected heavy impacts on aquifers, agribusiness, and urban water supplies. The increasing concentration of carbon in the atmosphere is expected to hasten the Amazon's tipping point. Deforestation and forest degradation exacerbate the impact of climate change, leading to a higher prevalence of forest fires, reduced forest resilience, increased tree mortality, and heightened drought stress in a feedback loop.

5. The loss of forest resilience may push 18-41% of the system beyond tipping points toward irreversible degraded states by 2050. The southern Amazon is of particular concern, given the amount of compounding disturbances at play. Passing the tipping points would simultaneously 1) preclude national and global efforts to control greenhouse gas emissions, 2) change rainfall regimes and impact agricultural productivity within and beyond the Amazon; 3) exacerbate already high levels of human inequality and vulnerability, particularly to Indigenous women and youth, who continue to experience elevated levels of illiteracy, poverty, infant mortality, maternal fertility, and

lower education rates; 4) decrease cultural and biological diversity, and (5) drive a reinforcing cycle that would trap the system in a degraded, carbon-emitting, unequal socioecological state.

6. There is still hope to avoid the tipping points. Together, Indigenous territories (ITs) (27%) and protected areas (PAs) (25%) cover around 52% of the Amazon basin and are essential for conserving terrestrial and freshwater ecosystems and maintaining structural and functional connectivity across the Andes-Amazon basin. There are more than 6,000 Indigenous territories in the Amazon, covering 170 million ha of forested area and protecting approximately 24.5 GtC aboveground, or 10-20% of the global forest carbon stocks. This stock represents ~2.5 years of global greenhouse gas (GHG) emissions (as of 2019), making them an important buffer against climate change. These territories show significantly lower deforestation (6%) than all other land tenure categories, including private properties (~25%) and even Natural Protected Areas (~8%). Nevertheless, it is estimated that 51% of PAs and 48% of ITs are under pressure from illegal deforestation, unsustainable extractive activities and infrastructure development, aggravating the threats to the Amazon and its peoples.

C. The Amazon We Want is a Living Vision to bring sustainable development and well-being to Amazonian people, while conserving the unique resources of the Amazon and advancing on a sustainable development trajectory that will reduce the risk of passing dangerous tipping points.

1. We must urgently change course, and advance in a Living Vision for the Amazon We Want. This vision proposes sustainable development pathways that are ecologically healthy, socially

fair, culturally inclusive, and support economic prosperity. The Living Vision aligns with the Sustainable Development Goals (SDGs). It aims to maximize synergies between different dimensions of sustainable development, recognizing the natural limits of the Amazon's ecosystems, respecting human rights, deepening decentralized governance, controlling illicit activities, strengthening partnerships for conservation, and advancing transformative development pathways.

2. To effectively manage the resilience of the Amazon, prevent tipping points, and safeguard its essential ecosystems for Indigenous peoples, local communities (IPLCs), global biodiversity, and the Earth's climate and carbon cycles, a precautionary approach is crucial. This requires improving conservation policies at the regional scale through innovative solutions, promoting local management and community engagement in governance, and fostering transboundary collaboration and integrated conservation planning.

3. Forest restoration entails a combination of approaches aimed at expanding and sustaining tree cover, thereby yielding diverse advantages encompassing climate change mitigation, biodiversity conservation, and societal welfare. It is crucial to integrate restoration efforts with conservation measures, recognizing that solely increasing forest cover cannot adequately counterbalance the significant ongoing deforestation and degradation. Restoration is an opportunity for millions of hectares that have been deforested or degraded. To ensure the continuity of livelihoods and economies, it is essential to integrate socially beneficial aspects of restoration into existing farming systems. This approach holds particular relevance in the Amazon Basin, where degraded pastures often yield limited income.

4. Intercultural education serves as a vital tool for facilitating meaningful exchanges between diverse knowledge systems. It is imperative to share experiences and strengthen capacities to foster inclusive learning environments that are rooted in the territory and engage in dialogue through different local languages. This approach plays a pivotal role in developing innovative strategies for conservation, environmental connectivity, and sustainable development in the Amazon. By recognizing the importance of Indigenous peoples' participation in shaping the future of the planet and embracing diversity, intercultural education represents a significant advancement. It acknowledges that no single culture possesses all the answers to the challenges posed by the climate crisis. To promote intercultural education, it is essential to prioritize the protection of Indigenous and local languages and territories, strengthen local governance, enhance political-administrative autonomy, develop inclusive curricula, bridge primary, secondary, and tertiary education, and foster participatory curriculum models with room for technological innovation.

5. The Amazon forest holds immense importance for the entire planet, representing an irreplaceable heritage for humanity. While the primary responsibility for its stewardship lies with the Amazonian countries, this responsibility should be shared globally. It is essential to mobilize financial support from advanced economies, considering their significant

contribution to greenhouse gas emissions and deforestation through the import of "forest-risk" commodities.

6. Partnerships and commitments among Amazonian countries such as the Amazon Cooperation Treaty Organization (ACTO) and the Leticia Pact, as well as at sub-regional and state levels, are particularly important to: 1) develop and implement effective environmental policies to avoid, mitigate, and compensate for the impacts of infrastructure and extractive projects on environmental assets and services, as well as on people in the Amazon basin; and 2) enhance collaboration on science, technology, and innovation to advance a bioeconomy based on healthy standing forests and flowing rivers. Fostering coordination across the Amazon Basin involves tackling challenges such as natural disasters, ecosystem degradation caused by illegal mining and fires, and implementing early warning systems to detect deforestation and degradation. Additionally, there is a need to monitor climate change and biodiversity at a watershed scale, promote responsible consumption, develop a new bioeconomy, empower women and IPLCs, enhance citizen education, and mobilize international finance to support these objectives.

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