



a scientific call for COP30

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Science Academies United for Climate Action

Executive Summary

Hosting COP30 in Belém, at the heart of the world's largest tropical forest, represents more than symbolism – it is a call to global responsibility. Tropical forests across the Amazon, Congo Basin, Southeast Asia, Mesoamerica, and New Guinea are essential to the planet's ecological balance, climate stability, and cultural heritage. Covering around 18 million km², they harbor immense biodiversity, regulate rainfall and temperature, store vast amounts of carbon, and sustain hundreds of millions of people.

Yet these ecosystems face converging crises: deforestation, fires, fragmentation, illegal exploitation, and escalating climate stress threaten to push them past critical tipping points. As degradation intensifies, feedback loops between forest loss, reduced rainfall, and declining humidity risk transforming carbon sinks into net sources of greenhouse gases—accelerating global warming and destabilizing food, water, and health systems worldwide.

Science warns that biodiversity loss and ecosystem collapse are no longer distant threats but unfolding realities. Safeguarding tropical forests is therefore not optional—it is an existential imperative for climate resilience, intergenerational justice, and the survival of cultures and livelihoods intricately linked to these landscapes. Biodiversity must occupy the center of climate negotiations, bridging the Paris Agreement with the Kunming–Montreal Global Biodiversity Framework and aligning decarbonization with nature conservation and social equity.

To meet this challenge, science must guide evidence-based policymaking, innovation, and cooperation. The signatory Academies of Sciences call for:

1. Large-scale, long-term research and monitoring, fostering data sharing and cross-border collaboration.
2. Training and inclusion of new generations of scientists, including Indigenous and local communities.
3. Strengthening infrastructure for education, technology, and public awareness.
4. Partnerships with the private sector to promote sustainable, biodiversity-based land-use systems, bioeconomy, and tourism.
5. Evidence-driven public policies that translate knowledge into effective action.
6. Expanded international observation of the Earth's climate and oceans to support global monitoring.
7. Strengthening the translation of knowledge into action, by overcoming regulatory barriers, ensuring transparency and compliance, and expanding real-time systems for monitoring climate variables and land-cover change.

International cooperation must ensure fair climate and biodiversity finance, respect for sovereignty, and equitable benefit-sharing for ecosystem services. Protecting tropical forests means protecting life, justice, and the future.

COP30 must be a turning point. Science is ready, knowledge is available, and solutions exist. What is lacking is political will. Belém offers the world an opportunity to act decisively – placing science, equity, and biodiversity at the heart of global climate action.



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Statement

Hosting COP30 in Belém, at the heart of the world's largest tropical forest, is more than symbolic: it is the latest call to global climate responsibility.

The world's tropical forests – from the Amazon to the Congo Basin, from Southeast Asia to Mesoamerica and New Guinea – are among the most critical ecological, climatic, and sociocultural pillars of the planet. Together they cover approximately 18 million square kilometers, harbor a very large share of the planet's terrestrial biodiversity, store vast amounts of carbon, and strongly influence continental hydroclimatic processes. These include those associated with their basin's subsidiary source — the Andean Mountain chain, the most extensive and diverse on Earth — which hosts the regional glacial cryosphere and supports the highest number of endemic species worldwide.

Tropical forests also play a crucial role in intercontinental hydrological and biogeochemical cycles. They influence rainfall patterns far beyond their borders, modulate atmospheric heat and moisture fluxes, and function as some of the largest natural carbon sinks on Earth. Their rivers and wetlands harbor a high proportion of the world's freshwater species and sustain important fisheries. Disruptions to their ecological integrity can trigger cascading imbalances that affect both local and global systems, altering precipitation patterns, evapotranspiration, soil moisture, groundwater recharge, and streamflows. These changes have profound consequences for agricultural productivity, food security, freshwater availability, and hydropower generation, as well as for the health and well-being of billions of people. They can also intensify extreme hydrometeorological events, such as droughts and floods, and increase the risk of emerging pandemics and other adverse health outcomes. Moreover, these forests are home to hundreds of millions of people, including Indigenous peoples and traditional communities, whose ways of life and health are deeply intertwined with their ecosystems.

The world's three great tropical forest regions — the Amazon, the Congo Basin, and Southeast Asia — each face distinct but converging systemic risks. In the Amazon, accelerating deforestation, forest fragmentation, and ecological degradation—stemming from higher temperatures and reduced precipitation, as well as fires and extreme climate stress — are pushing the forest toward critical transitions. In the Congo Basin, although deforestation rates remain comparatively lower, increasing fragmentation, fire, and prolonged dry seasons raise the risk of shifts from closed-canopy rainforest to more open woodland or savanna, especially under high warming scenarios. In Southeast Asia, extensive deforestation, recurrent fires, land use change to industrial agriculture, and the degradation of peatlands are driving massive greenhouse gas emissions and undermining forest resilience. Together, these pressures threaten not only regional ecosystems and communities but also the global climate system, making the protection of all tropical forests an urgent planetary priority.

Science has been warning about these risks for decades. Today, in the face of an intensifying climate crisis and growing social vulnerability, these warnings carry an ethical imperative. What is at stake is not only the Amazon or any single forest, but the planet's climate resilience, much of its biodiversity, the food security and health of millions, and the survival of ancestral cultures. Climate change, primarily caused by the emission of fossil fuels, is threatening the survival of tropical forests. COP30 must implement a transition away from fossil fuels to ensure the survival of tropical forests, while also implementing the 17 Sustainable Development Goals (SDGs), thereby building a more resilient world and reducing social inequalities.

The Academies of Sciences endorsing this document affirm that without living, functional, and socially integrated tropical forests, global climate stability would be impossible to sustain. Science must fulfill its role as a reliable source of evidence, a tool for strategic planning, and a foundation for urgent and informed decision-making. The necessary actions go beyond environmental conservation. They include strengthening scientific infrastructure in tropical regions, protecting the territorial and cultural rights of Indigenous peoples, and enabling transitions to sustainable, knowledge-based, and innovation-driven economies. Knowledge for action is available, technologies already exist, and alternative pathways are mapped. What remains lacking is political will, effective international cooperation, and global long-term commitment. Science is ready, but it must finally be heard.

Tropical forests today face a convergence of mutually reinforcing threats: deforestation, forest fires, illegal activities, predatory mining, large-scale infrastructure projects, and the uncontrolled expansion of agriculture are causing rapid regime shifts of vegetation, forest degradation, habitat fragmentation, and erosion of ecological resilience. At the same time, the impacts of climate change are already evident: rising average temperatures, shifts in rainfall regimes, and increasingly frequent and severe droughts, fires, and floods. These phenomena are no longer projections, but realities lived across South America, Africa, and Asia.

Biodiversity must no longer be treated as a peripheral issue in climate negotiations. Science must fulfill its role as a reliable source of evidence, a tool for strategic planning, and a foundation for urgent and informed decision-making. Experts worldwide have reiterated that there will be no viable solution to the climate crisis without strong integration between decarbonization efforts and improving the well-being of human populations with equity and commitments to nature conservation. By buffering the impacts of climate extremes, biodiversity enhances the resistance and resilience of tropical forest ecosystems. Tropical biodiversity – from the Amazon to the Congo Basin, from Borneo to the Guiana Shield – must be placed at the center of decision-making. COP30 represents a crucial opportunity to reposition biodiversity at the core of the global agenda, bridging the Paris Agreement with the Kunming-Montreal Global Biodiversity Framework. Protecting tropical forests and other biodiverse ecosystems also means protecting lives, recognizing knowledge systems, respecting cultures, and ensuring human rights for both present and future generations.

Scientific models predict that as deforestation and degradation intensify, reduced evapotranspiration and declining humidity increase tree mortality and biomass loss, reinforcing carbon and water-cycle feedbacks. Once deforestation surpasses critical thresholds, rainfall becomes insufficient to sustain forests, leading to further degradation or even large-scale ecosystem collapse. Alarmingly, signs of these processes are already being observed in different tropical regions.

Tropical forests, which currently act as major carbon sinks through their biological productivity, are approaching a critical balance. Continued global heating and ongoing degradation risk are turning these sinks into net sources of greenhouse gases, transforming a negative feedback on climate into a positive one that further accelerates global warming. Preserving these ecosystems is not optional; it is a fundamental requirement for preventing further escalation of the global climate and biodiversity crisis.

The human dimension of this crisis also demands attention. Indigenous peoples, riverine and forest communities, smallholder farmers, and urban populations rely on the integrity of ecosystems for their well-being, water, food, health, security, and cultural identity. The degradation of natural systems threatens not only their subsistence and rights, but also the social and economic stability of entire nations. Ignoring this multidimensional crisis, which combines environmental injustice, historical inequality, and existential risk, is unacceptable. Protecting tropical forests also means protecting lives,

recognizing the diversity of knowledge systems, respecting cultures, and ensuring human rights for both present and future generations.

The degradation of these forests has implications that transcend national borders. They regulate rainfall regimes and other biological processes that influence climate stability and disease dynamics across continents. Their vast carbon stores are vital for mitigating global warming, and their collapse would accelerate the climate crisis, trigger mass human migrations, reduce agricultural productivity, and increase the frequency of extreme weather events both locally and globally. Conserving and restoring tropical forests is thus a civilizational commitment for our and future generations, grounded in climate justice and the planet's habitability for human societies.

Science plays a fundamental role in understanding, monitoring, and responding to the complex socio-environmental challenges that threaten tropical forests. Addressing these realities requires strengthening interdisciplinary and transdisciplinary research networks capable of integrating knowledge from the natural, social, and human sciences with Indigenous, traditional, and local knowledge. This integration is essential for developing effective and legitimate solutions that respect cultural and ecological diversity as proposed by the One Health approach.

There is also an urgent need to expand investments in mission-oriented science that focuses on concrete problems such as forest restoration, recovery of degraded areas, hydrological cycle monitoring, environmental surveillance for diseases spillover preparedness, development of social technologies, sustainable biodiversity management, biodiversity-based technological innovation of land-use systems and mitigation of climate change impacts. This includes advancing areas where science can provide concrete solutions, such as remote sensing monitoring, carbon accounting methodologies, green and low-carbon technologies, ecosystem services assessment, and sustainable agricultural models. Knowledge production must engage with the real needs of tropical populations and must also align with international commitments made by their countries, such as the Paris Agreement.

The signatory Academies of Sciences reaffirm their commitment to contributing to the protection of tropical forests and other biodiverse biomes, and to building a sustainable planetary future. To this end, we prioritize:

(i) Supporting large-scale, long-term multidisciplinary scientific research and monitoring programs and cross-border collaboration that produce robust, reliable, and openly accessible data and knowledge, while fostering international exchange and cooperation among research institutions worldwide.

(ii) Promoting the training of new generations of scientists, including young people, Indigenous, and traditional communities, thereby strengthening local capacities and expanding global opportunities, as well as facilitating knowledge sharing, mobility, and partnerships that connect tropical regions with the broader scientific community.

(iii) Strengthening scientific, technological, and educational infrastructure, ensuring access to well-equipped laboratories, digital connectivity, and high-level collaborative networks, and promoting public education and awareness to enhance societal understanding of the impacts of climate change and biodiversity loss.

(iv) Promoting partnerships with the business sector, developing sustainable, biodiversity-based land-use systems, bioeconomy, and tourism.

(v) Supporting the formulation and implementation of evidence-based public policies, ensuring that scientific knowledge informs strategic decision-making across all levels of governments and institutions.

(vi) Enhance the international effort of observing Earth's climate using ground-based networks as well as remote sensing from space, to monitor the changes in terrestrial and oceanic ecosystems.

(vii) Strengthening the capacity to translate knowledge into effective action by addressing practical and regulatory barriers to forest protection, reinforcing mechanisms for compliance and transparency, and expanding facilities for continuous and real-time monitoring of climate variables and land-cover change.

We also recognize that the challenges faced by tropical forests require international cooperation. Such cooperation must be grounded in a fair climate and biodiversity finance mechanisms and in valuing the ecosystem services provided by these forests and their peoples. Fair compensation for environmental services, benefit-sharing, and the effective protection of traditional knowledge must be embedded in binding multilateral commitments. Tropical forests must be studied and protected based on shared responsibility, respect for the sovereignty of their countries, and recognition of biodiversity and climate protection as a global common good.

In this spirit, we encourage the establishment of equitable academic partnerships that promote knowledge exchange, the sustainable use of biological resources, and the development of inclusive bioeconomy models that integrate advanced technologies and traditional knowledge, also assuring social justice.

Finally, we call on decision-makers, multilateral organizations, funding agencies, and civil society to recognize and support science as a strategic ally in building long-term solutions to environmental and global challenges. COP30 must place science at the center of its debates. It must strengthen its commitment to knowledge and to life. Let tropical forests no longer be viewed as frontiers of exploitation, but embraced as frontiers of wisdom, innovation, solidarity, justice, and hope for the entire planet.

The time is now. What is at stake is more than the conservation of a biome. It is the planet's climate future, intergenerational justice, and the very possibility of coexistence between humanity and nature. Protecting their ecological integrity is not merely an environmental choice; it is an existential imperative.

We are at a defining moment. Science is ready. The accumulated knowledge provides a solid foundation for action. Yet actions have been slow, fragmented, and disconnected from the urgency the situation demands. COP30, taking place in the Amazon, but with a global reach, must mark a turning point. We cannot leave Belém with vague commitments or postponed promises.

Science is a fundamental ally in this effort, offering data, models, and evidence-based solutions to inform effective public policy and responsible decision-making. The allied Academies of Sciences, through IANAS and other global partners, are ready to support world leaders in this effort. International cooperation must be strengthened and become more supportive, just, and effective.

The climate and biodiversity crises are no longer distant threats; they are a present reality affecting lives, economies, and ecosystems across the planet. The increasing frequency and severity of extreme events – prolonged droughts, devastating floods, hurricanes, and unprecedented heatwaves – underscores the urgency of coordinated global action on mitigation and adaptation. COP30 must be a

turning point where world leaders move beyond vague pledges and deliver concrete, ambitious commitments to limit global warming.

The scientific evidence is unequivocal: climate change is accelerating sea-level rise, melting glaciers and polar ice, intensifying extreme weather events, disrupting water and food systems, and driving biodiversity loss on an unprecedented scale. Its cascading impact threatens human health, economies, and environmental and social stability worldwide. These transformations are not distant projections; they are unfolding now, disproportionately affecting the most vulnerable populations. Science warns that every fraction of a degree matters, and every delay deepens the threats. The time for hesitation is over. The Intergovernmental Panel on Climate Change (IPCC) reports are very clear: we need to stop the extraction and use of fossil fuels as quickly as possible, implementing the decarbonization of our economies and societies. We also need to halt tropical deforestation and invest in ecological restoration worldwide. The climate has already changed. We need to adapt our cities and rural areas to the new climate to minimize the impact on our population. It is time for bold, concrete commitments and actions, and the opportunity at COP 30 cannot be lost. For the planet, science makes its call in the name of life, justice, and future generations.