SCIENCE PANEL FOR THE AMAZON

POLICY BRIEF

THE AMAZON WE WANT
Science Panel for the Amazon

A CALL FOR GLOBAL ACTION TO MOVE THE AMAZON FOREST SYSTEM AWAY FROM TIPPING POINTS

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KEY MESSAGES

1. Global climate change, the conversion of large areas of tropical forest to agriculture and rangelands, and forest degradation driven by wildfires are pushing the Amazon towards irreversible thresholds, often called *tipping points* (Figure 1). A 'tipping point' is a critical threshold beyond which an ecosystem could shift abruptly to an alternative configuration; a tipping point could be driven by environmental conditions (e.g., rainfall) or ecosystem characteristics (e.g., tree coverage), and can be accelerated by feedback mechanisms. In the Amazon, crossing

FIGURE 1: Wildfire in Anapú, Amazonas, Pará, Brazil, 2015. Photo: Araquém Alcântara (https://araquemalcan-tara.com; @araquemoficial on Instagram)

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tipping points may cause systemic (large-scale) forest collapse (or a 'dieback') and conversion to degraded forest or open ecosystem states. A systemic dieback would release 110-275 Gt CO_2eq, increasing global temperatures by 0.1–0.2°C and destabilizing other tipping elements of the Earth system.[1]

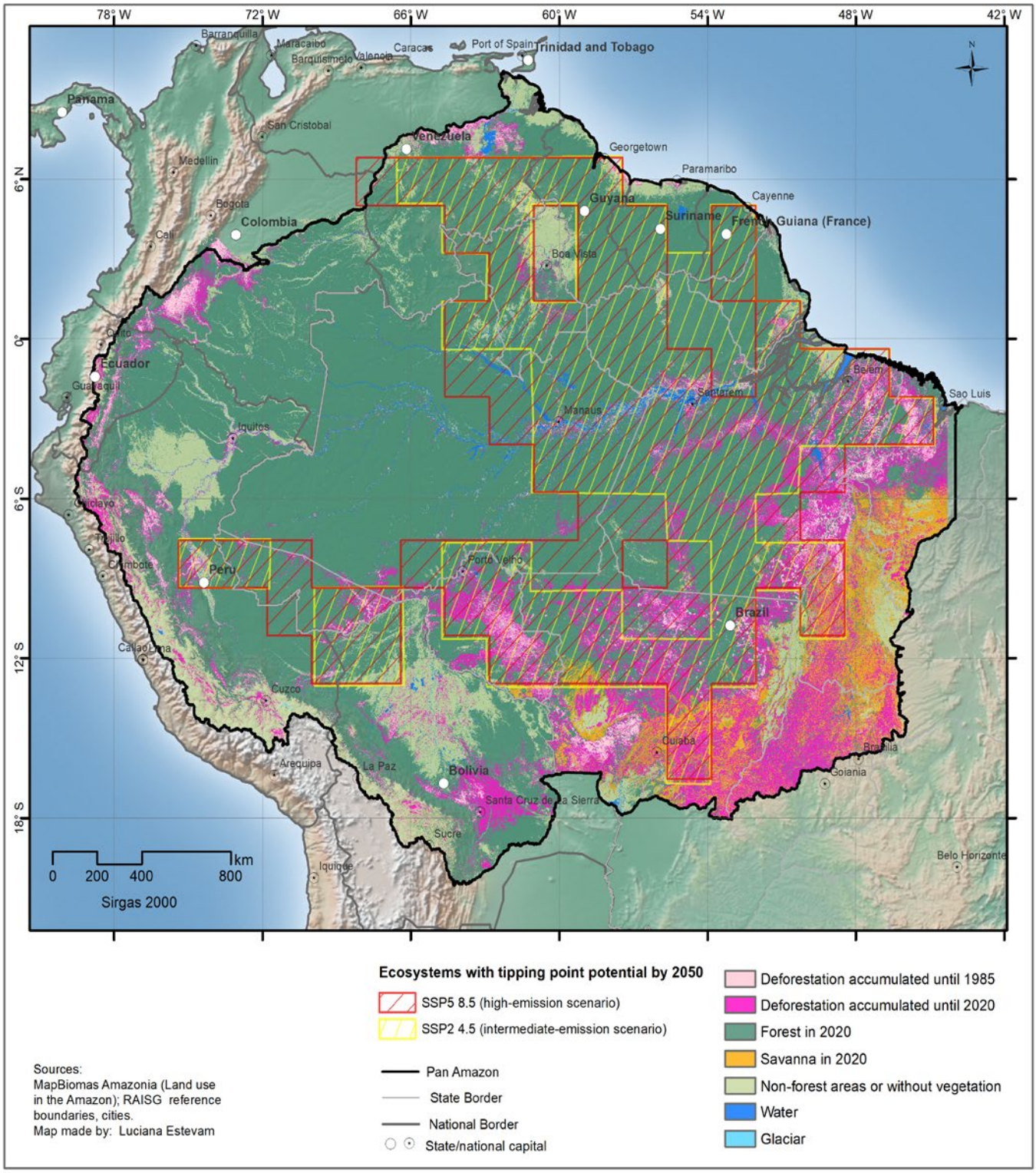

FIGURE 2: Changes in annual precipitation (mm.yr^{-1}) may push 18-41% of the Amazon's forests past tipping points toward permanently de-graded states. Deforestation, forest degradation, and wildfires can accelerate these processes.

2. The Amazon Basin has already warmed, on average, ~1°C in the last three decades. Changes occur heterogeneously throughout the Basin. In the southern fringes, the dry season has lengthened by more than 5 weeks and temperatures have risen 2-3°C in the last 4 decades. In the eastern Amazon, along the Amazon-Cerrado boundary, mean temperatures have risen ~1°C within the past 20 years.[2] From the southern to eastern Amazon, climate change, deforestation, and degradation have altered tree species composition and functional diversity, causing the area to turn from a carbon sink to a carbon source ($+0.11 \pm 0.13$ g C m^{-2} d^{-1})[3,4]. The increasing frequency of extreme drought and wildfire drive further tree mortality, deforestation, and forest degradation.

3. Deforestation, degradation, and wildfires, mostly illegal, significantly contribute to forest loss across the Amazon Basin. Deforestation reached 17% of the whole Pan Amazon in 2020[5], while forest degradation reached ~17% of the biome in 2017[6]. The year 2021 saw a 15-year high in deforestation rates in the Brazilian Amazon (an increase of 17% over 2020[7]), and wildfires have burnt approximately 151,000 km^2 yr^{-1} in the last 18 years[8]. Forest mortality leads to reduced evapotranspiration from trees, driving reduced atmospheric water, cloud formation, and rainfall, reinforcing forest die-off in a feedback loop. Such feedback loops may be the major cause of a persistent new degraded configuration in the Amazon Forest, after crossing tipping points.

4. Intensification of climate- and land use-induced disturbances reduce the Amazon's resilience. Resilience depends on internal mechanisms that have been in place for millennia, including (1) the heterogeneous environmental conditions that buffer the spread of disturbances, such as wildfires; (2) forest connectivity which promotes recovery; and (3) biocultural diversity that enhances forest adaptability. The intensification of disturbances negatively affects these mechanisms and cause the Amazon forest system to lose resilience.

5. The loss of forest resilience may push 18-41% of the system beyond tipping points toward irreversible degraded states by 2050 (Figure 2). The southern Amazon is of particular concern, given the amount of compounding disturbances at play. Passing the tipping point 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; 4) decrease cultural and biological diversities, and (5) drive a reinforcing cycle that would trap the system in a degraded, carbon-emitting, unequal socioecological state.

RECOMMENDATIONS (Figure 3)

There is an **urgent need for global, national, sub-national, and local action to conserve the Amazon** and reduce the risk of catastrophic social and environmental shifts.

We must follow a precautionary approach to manage resilience, prevent the Amazon from crossing tipping points, and maintain the Amazon's ecosystems, which are essential to Indigenous peoples and local communities (IPLCs), Earth's climate and carbon cycles, and global biodiversity.

The main pathways to achieve this are:
A. Improving conservation policy at the regional scale and finding innovative solutions.
B. Promoting local management and the engagement of local communities in governance.
C. Transboundary collaboration and integrated conservation planning.


GOVERNANCE AT LARGE SCALE
Environmental monitoring and law enforcement
Policy support to enforce forest protection
Traditional practices allied to modern technology
GOVERNANCE AT LOCAL SCALE
Restoration of forest function and structure
Resilience increase via protected areas and Indigenous territories
Strong governance supporting sustainable production
TRANSBOUNDARY CONSERVATION PLAN
Cooperative and innovative financial schemes
Conservation measures working together as ecological networks
Compensation for reductions in deforestation and degradation

FIGURE 3: A new vision for a sustainable and socially-just Amazon must be urgently developed and implemented to avoid crossing tipping points, which would have severe impacts on climate, ecosystems, biodiversity, and human well-being at local, regional, and global scales. Illustration: Dedê Paiva | www.dedepaiva.com.br. Colour: Aline Antunes)

A. IMPROVING CONSERVATION POLICY AT THE GLOBAL SCALE AND FINDING INNOVATIVE SOLUTIONS

A.1. Immediate moratorium in areas more likely to cross a tipping point (e.g., Southern Amazon), and in protected areas and Indigenous territories; so that there is zero deforestation in the Amazon by 2030. At the same time, surveillance should be increased over protected areas and Indigenous Territories. **Public forestlands not allocated by the national or state governments for its use by society might be urgently designated as no-go areas with a moratorium on logging activities, or areas under sustainable management, in order to curb illegal activities, such as land grabbing, logging, and mining. Eliminating the impunity currently associated with deforestation and degradation reaffirms national commitments to combat climate change and safeguard biodiversity.**

A.2. Deforestation is not justified for expanding agricultural production and will not promote sustained socioeconomic development in the Amazon. Rather, **the focus should be on increasing the productivity of already deforested and degraded lands, which is technically feasible and would allow abandoned land to be restored.** This requires policy support to expand access to productivity-enhancing infrastructure, technology, and services.

A.3. Improvement and innovation in conservation policy is of paramount importance. Innovation in environmental monitoring and law enforcement can enhance the ability to impose binding and onerous penalties, increase cost-effectiveness, and ensure environmental protection. Amazonian countries may also need restructuring environmental governance that supports effective environmental sanctioning procedures and penalties.

A.4. Conservation agendas must include the strategic expansion of protected territories, particularly in areas under pressure, reduction of forest degradation, protection of secondary forests, and commitments to reduce greenhouse gas emissions. Such agendas should be designed in a collaborative way for conservation policy planning and implementation.

B. PROMOTING LOCAL MANAGEMENT AND THE ENGAGEMENT OF LOCAL COMMUNITIES IN GOVERNANCE

B.1. Restoration initiatives should bring together scientific and Indigenous and local knowledge to promote the most effective pathways to restore forest function and structure. Such initiatives should focus on the arc of deforestation running from the south to the east of the Basin, where the majority of changes in forest structure and climate effects have been felt, and which are likely closer to potential tipping points (see SPA's publication 'Transforming the Amazon through "Arcs of Restoration"')[9].

B.2. Local management and the meaningful engagement of local communities is critical. Indigenous peoples and local communities have demonstrated the ability to sustainably manage their territories, while engaging in socio-economic activities that increase forest resilience. They are also leading in the development of sustainable value chains for products from the Amazon Forest. In this way opportunities for sustainable and value-added

chains that promote specification as opposed to the commoditization (generalization) of socio-biodiversity products will be critical. These activities can only realize their full potential with **investment in education and science that combines traditional knowledge and technological innovation, and the creation of centers of excellence in the bioeconomy.**

B.3. Stronger governance systems and policies are needed to support sustainable rural and industrial production, including the development of sustainable supply chains. Such governance systems should promote cooperation between existing companies, as well as between these companies and new participants in the emerging socio-biodiverse economy. Such measures support the formation of local productive arrangements that creatively improve endogenous capacities (Amazonian peoples) and integrate them with exogenous resources at the local to global scale.

C. TRANSBOUNDARY COLLABORATION AND INTEGRATED CONSERVATION PLANNING

C.1. Effective conservation and climate adaptation require a vision for transboundary, collaborative, and integrative conservation planning and implementation. Large-scale financing schemes must close the gap between what is available and what is required to maintain and restore natural habitats. Public-private partnerships could design and implement market-based, demand-driven policy instruments, while also strengthening public budgets.

C.2. Protected areas, Indigenous territories, and other effective area-based conservation measures (OECM) need to work together as ecological networks to support conservation and sustainable use. All areas should implement management plans, developed in a participatory manner, with well-defined conservation goals for biodiversity and ecosystem services. These areas should be co-managed by local communities, private stakeholders, and other sub-national and local forms of governance. This will reinforce IPLCs' importance as local managers; their traditional practices and knowledge, allied to modern technology, can reduce the risk of the Amazon passing tipping points. IPLCs have proven themselves to be guardians of the forest, buffering deforestation and degradation (see SPA's publication "The Role of Amazonian Indigenous Peoples in Fighting Climate Crisis")[10]. Indigenous territories should further meet the livelihood requirements of IPLCs.

C.3. Mechanisms that offer financial compensation for reductions in deforestation and degradation can improve the conservation of biodiversity and associated ecosystem services, while also creating large-scale economic opportunities. These mechanisms are based on: 1) measures that redistribute revenues at the state level to municipal governments based on ecological indicators; 2) payments for environmental services (PES) through mechanisms such as LEAF, REDD+, and ART-TREES; 3) Environmental Reserve Quotas, an economic mechanism to offset deficits in private properties that do not enforce the minimum standards for native forest protection, 4) ecotourism concessions in protected areas, 5) forest concessions in managed resource protected areas that allow companies or communities to explore sustainable non-timber products.

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BACKGROUND INFORMATION

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