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CONCLUDING STATEMENT
From Climate Crisis to Climate Resilience: Brazil Climate Summit
Children and Climate Action: Priorities and Commitments towards COP30

On 15-17 May, 2024, the Pontifical Academy of Sciences and the Pontifical Academy of Social Sciences held a *Climate Resilience summit* at the Casina Pio IV, in the Vatican, with Governors of States, Mayors of Cities and civil society climate activists which elevated resilience through Mitigation, Adaptation, and Societal Transformation (MAST), with an emphasis on locally led actions and systemic change.

At the end of the summit, a *Planetary Call to Action* was developed and signed by Pope Francis and the participants, which recommended the planning and holding of "*Regional Climate Summits,*" among which a "*Regional Climate Summit in Brasilia*."

Accordingly, on October 2-3, 2025, the Pontifical Academy of Sciences and the Pontifical Academy of Social Sciences, in partnership with the Alana and COP 30, organized a summit in Brasilia on "***Children and Climate Action: Priorities and Commitments towards COP 30***", which affirmed their our unwavering commitment to advancing a climate-resilient Latin America, acknowledging the essential involvement of diverse stakeholder communities in this endeavor.

The Brazil Summit addressed the issue of climate resilience from a child rights perspective. We examined technical guidelines for public policies that aim to protect, educate, care for, and empower children, whose rights must be upheld according to the principle of the best interests of the child as a primary consideration (Article 3 of the United Nations Convention on the Rights of the Child).

We emphasized the unique and central role Brazil plays in global climate resilience. The Amazon River Basin, which includes regions adjacent to Brazil that were represented at the Summit, deserves special attention as a critical component of the planet's future. We showcased studies of positive outcomes that will leave a lasting legacy of hope and optimism for how policy and strategy can drive change through MAST. We also presented an overview of existing child-centered solutions that are already being implemented in Brazil and South America. In the process we identified states and municipalities where effective climate resilience and adaptation actions are underway, as well as strategies to prioritize children in the climate agenda.

Strategic Orientation

MAST: A Three-Pillar Resilience Framework - We endorsed the MAST framework as a cornerstone of Latin America's climate resilience strategy:

- **Mitigation**: We support urgent actions to bend the global warming curve well below 2°C from pre-industrial levels. Mitigation must be scaled with justice, recognizing Latin America's right to sustainable development as it transitions toward a low-carbon future.
- **Adaptation**: Given Latin America's acute exposure to climate risks, we called for adaptation as an existential priority. Local resilience must anticipate, prepare for, respond to, and recover from climate shocks—from droughts, heat waves, and floods to food and water insecurity.
- **Societal Transformation**: We endorsed the idea that profound behavioral, institutional, and systemic shifts are essential. This includes promoting sustainable land use, circular economies, the transformative role of forests and nature-based solutions, and education to build climate resilience.

Scientific Foundations

The scholarly consensus of leading Brazilian and international climate scientists, as guided by the World Academy of Sciences, informed our discussions. The scientific white paper, included as Addendum 1, authored by Tercio Ambrizzi, Paulo Artaxo, and Carlos Nobre, noted:

Climate and Weather Impacts

The region has experienced a 1.55°C rise in global temperature above pre-industrial levels, and continental warming in some Brazilian areas has reached 2.4°C, posing a threat to agriculture, water resources, and public health. Extreme weather events—including heatwaves, droughts, storms, and floods—have increased nearly fortyfold in frequency and intensity, resulting in higher food and energy prices, social hardship, and mounting recovery and adaptation costs.

Greenhouse Gas Emissions and Risks

Global annual greenhouse gas emissions continue rising, reaching 57 billion tons of CO2 equivalent in 2024, with fossil fuels accounting for 92% of the total. Atmospheric CO_2 concentration surged from 280 ppm in 1850 to 426 ppm in 2024. The persistence of these gases means their damaging effects will reverberate for centuries. IPCC datasets show global surface temperatures and sea levels have already increased, with projections indicating future warming of 4–4.5°C in continental South America if emission trends continue.

Amazon Tipping Points

We noted that deforestation has claimed approximately 19% of the Amazon, weakening its capacity as a carbon sink and impacting its biodiversity. The region faces worsening droughts, frequent fires, and a looming risk of ecosystem collapse, potentially releasing

120 billion tons of carbon into the atmosphere. Such climate "tipping points"—if crossed—could trigger abrupt, irreversible global changes, with dire impacts for local communities and Indigenous peoples.

Adaptation and Resilience Strategies
We endorsed seven urgent adaptation strategies:

- Improving water resource management and urban infrastructure
- Protecting and restoring vulnerable ecosystems
- Developing drought- and flood-resistant crops and applying climate-resilient agronomic practices
- Building resilience within public health systems to cope with the impacts of climate change on physical as well as mental health, especially that of children.
- Expanding disaster planning and community training
- Raising climate awareness through education
- Fostering scientific collaboration across disciplines

Policy, Governance, and COP-30 Agenda
We further emphasized the urgent need for transformative action by governments and the private sector. This involves shifting from extractive, carbon-intensive practices to renewable energy and the circular economy, and adhering to strict sustainability targets, along with transparent criteria and mechanisms for climate justice. Brazil's hosting of COP-30 offers a unique opportunity to drive global change by bringing together science, policy, business, and civil society to advance practical, nature-based, and evidence-based solutions.

In a sobering reflection, we noted that in a world where limiting warming to 1.5°C or even 2°C seems increasingly unattainable, catastrophic impacts are likely without drastic reductions in emissions and robust adaptation measures. Achieving climate resilience in South America requires coordinated efforts aligned with the UN Sustainable Development Goals, with science and policy playing central roles in shaping mitigation, adaptation, and global equity.

COP-30's critical test will be bridging the gap between the urgent climate reality and slow political and economic response by:

- Ending fossil fuel dependence through fair, science-based transition roadmaps.
- Placing science at the core of global commitments and climate governance.
- Mobilizing fair, fast, and equity-focused climate financing for vulnerable regions.
- Rethinking value chains to achieve true carbon neutrality.
- Centering climate justice and broad social engagement, especially for Indigenous and marginalized communities.
- Combatting greenwashing with strict metrics and transparent accountability.
- Reinventing governance to ensure all nations deliver on their climate targets—moving from pledges toward verified, measurable, real-world action.

Children are Our Priority

"*May we always care for our children, not counting the cost, so that they … always know their infinite worth.*" *Pope Francis*

"*Even as children, we can learn to be builders of bridges and seek opportunities to help others.*" *Pope Leo XIV*

We noted that children — persons under age 18 — must be at the heart of all climate resilience efforts—not as passive victims, bystanders, or soon-to-be adults, but as key actors, indeed as "builders of bridges" in a new planetary ethic of care. Since the Pontifical Academy of Sciences and the Pontifical Academy of Social Sciences ten years ago called for more attention to children's rights and their role as agents of change, matters have not improved.[1] The recent summits of the Pontifical Academies, reflecting the core traditions of humanism and the visionary leadership of Pope Francis, have noted the sobering fact that approximately one billion children live in areas severely affected by climate disasters, making their engagement both a moral duty and an existential necessity. This is not a distant appeal; in this moment of planetary peril, justice demands that we summon the socio-emotional sensibilities, energy, and imagination of the young to build climate resilience. Their voices reveal risks—and solutions—forged in the crucible of climate disruption, and their agency energizes the work of resilience with hope and resolve. We noted that if we do not incorporate children's experiences and ideas today, we close the door on the promise of intergenerational justice tomorrow. The path to climate resilience, steep and dangerous, can only be crossed by uplifting the youngest among us—inviting them to co-create the world they will inherit. Thus, the eyes of the world were on Brasilia, the first of the ten regional summits of the Pontifical Academies to foreground the voices and experiences of children, as well as to call for adapting essential services to and for children systematically.

Further, we committed to:

- **Children's Engagement** - as the fundamental component of the summit, combined with the optimism and hope our children's voices provide toward ensuring a more resilient future, including but not limited to:
    - Resilient and culturally congruent education
    - Children and human rights
    - Children's participation in developing climate action plans and solutions
    - Climate impact on children's health and mental health
- **Regional Context**: Tailor solutions to Brazil's and the region's unique and diverse climate challenges and socio-economic, political/governance, and cultural

[1] Children and Sustainable Development. Ecological Education in a Globalized World. Proceedings of the Workshop 13-15 November 2015. A.M. Battro, P. Léna, M. Sánchez Sorondo, J. von Braun (eds). *Scripta Varia* 135 pp. 433 | Springer © 2017 https://www.pas.va/content/dam/casinapioiv/pas/pdf-volumi/scripta-varia/sv_children_sustainable_development.pdf

contexts, including exploring the role of forests and related nature-based solutions and nature-based education.

- **Community Engagement**: Collaborate with and empower local communities, Indigenous Peoples' leaders, and regional stakeholders in discussions and decision-making processes.
- **Regional Collaboration**: Foster regional and international cooperation and knowledge sharing to develop effective, innovative, and scalable child-centered and child-responsive climate solutions with consideration of Indigenous Peoples' knowledge systems.
- **Equity:** Ensure that we prioritize equity and the protection of the poorest and most vulnerable populations, including Indigenous people, children, and those who have the least to do with greenhouse gas emissions yet face the most significant burden. Address the disproportionate impacts of climate change on marginalized communities and incorporate diverse perspectives in climate planning.

Children under age 18 make up about 30% of the global population. The United Nations recognizes them as rights holders, whose voices and perspectives must be considered in decisions that affect their lives and communities. They are agents of change, and investing in children today is not only a matter of fulfilling their rights but also a strategic approach to ensuring sustainable development across generations.

We articulated an intergenerational perspective underscoring that empowering children contributes to stronger societies and more resilient futures. Yet, we noted, despite their agency, children remain among the groups most severely affected by the climate crisis, facing disproportionate risks to their health, education, right to play and leisure and to simply be children, as well as their overall well-being – as outlined in the UNCRC's General Comment No. 26 on children's rights and the environment, with a special focus on climate change. Data from UNICEF also reveal that almost 250 million children and adolescents had their education disrupted by climate-related crises in 2024**.**

Children and adolescents are rights-holders and cultural agents whose creative voices must be meaningfully included in policies, laws, and projects that impact their lives—especially those related to climate policy. Research conducted by Alana Institute and LACLIMA – Latin American Climate Lawyers Initiative for Mobilizing Action – highlighted that references to children in negotiations have shifted from sporadic mentions to more strategic recognition, from COP1 to COP29.

Since the UN Convention on the Rights of the Child (1989) and Brazil's Statute of the Child and Adolescent (1990), the right to participation has been recognized. Genuine participation strengthens citizenship, leadership, and personal development.
There have been essential advancements and decisions under the UNFCCC that call for integrating children into climate policymaking and recognizing their roles in education, communication, and leadership. Brazil is also one of almost 70 countries that have signed the Intergovernmental Declaration on Children, Youth and Climate Action, a commitment

to accelerate inclusive, child and youth-centered climate policies and action at national and global levels.

However, we observed that significant gaps still exist. Despite being heavily impacted by climate change, children and adolescents are still excluded from decision-making processes, often because of adult-centered structures and symbolic or manipulative participation practices.
To ensure safe, meaningful, and inclusive participation, efforts must:

- Avoid tokenism, manipulation, or control.
- Respect developmental stages, cultural diversity, and lived experiences.
- Guarantee informed consent, privacy, and voluntary participation.
- Be guided by trained adults who prioritize children's well-being.
- Reduce access barriers and acknowledge intersecting inequalities.
- Create spaces—both physical and symbolic—that foster genuine influence and feedback.

Participation should be flexible, either indirect (through consultations and research) or direct (via councils and advocacy). It must lead to concrete outcomes and respect the diversity of childhood and adolescence, especially those of marginalized groups.

We also note that for the protection, education, care, and empowerment of children to be fully achieved, the focus must expand to women—specifically mothers—who are the primary caregivers for their children's well-being. Mothers are a vital link in securing children's rights, representing the voices of the youngest children, who are among the most affected by the climate crisis but are not yet able to speak for themselves as adolescents can. By supporting the well-being and resilience of mothers, we ensure the genuine, safe, and inclusive participation of children.

Children are not only victims of the climate crisis; they are also agents of change and part of the solution. During the Summit, they presented innovative initiatives to tackle challenges and asked thoughtful and incisive questions. Adolescents from an Afro-Brazilian community in Pernambuco showcased their project "*From Waste to Resource*," which uses a filtering system to decrease pollutant loads in cassava flour production. Others highlighted the important role of schools as spaces for resilience and nature-based education. Another notable example of meaningful participation was the *mini COPs*— local, autonomous experiences promoted by schools, civil society organizations, and community groups to amplify children's voices in climate dialogue.

They also expressed their concerns and suggestions through performances, such as music and poetry.

"When the forest falls, it does not fall alone; the rain that waters your land falls, and the air you breathe falls. The future falls, which your children will seek"— excerpt from a poem recited by an Indigenous teenager as closing remarks at the summit.

The questions raised by children reflected not only their concern for their own rights but also for those of others – such as how to break social barriers and reach the most vulnerable populations, including people without access to formal education or those in the workforce; as well as questions related to ocean protection and expectations for what could be done differently at COP30.

Overall, their message was clear: adults are not doing enough, and children want their future considered in decisions made at COP30 and in all climate-related deliberations. Children embody hope and optimism. They remind us that a greener and fairer future remains within reach. It is therefore imperative to strengthen the connections between the child and climate agendas – ensuring that our collective responses to the climate crisis are ethical, equitable, inclusive, and responsive to children's unique vulnerabilities and potentials.

Addendum 1

Climate Change Impacts in South America and the Need for Urgent Joint Action

Tercio Ambrizzi, Paulo Artaxo, and Carlos Nobre

University of São Paulo, Brazil

1 – Climate Change Impacting Our Planet

Climate change is undoubtedly one of the most significant challenges facing humanity today. The World Economic Forum identifies that five of the ten most important risks to the global economy are associated with climate change and environmental degradation. In other words, climate urgency is no longer a distant debate, but a direct call to action in strategic areas. Thirty or forty years ago, we talked about climate change as something for the future, for the end of the 21st century. But climate change has arrived with full force, and in its most visible form: the increase in the frequency and intensity of extreme weather events. The economic impacts are significant in many areas.

In this context, the convergence between climate science and organizational transformation stands out as a strategic axis to advance solutions that the planet urgently demands. We have already warmed the planet by 1.55 degrees Celsius over the past 150 years. The increase in frequency and intensity of extreme climate events is easily observed across the globe.

Latin America, with its enormous variability of ecosystems, vast biodiversity (IPBES, 2019), and an economy that strongly depends on the climate, faces significant challenges as weather patterns continue to change. Climate impacts significantly affect agricultural productivity and hydroelectricity production, increasing the prices of food and energy, which especially penalize the poorest populations on our continent. Brazilian infrastructure, including cities and transportation systems, is quite vulnerable to extreme climate events. Floods and landslides, which have become more frequent, cause significant economic and social damage, generating high costs for repair and adaptation.

In 2024, global economic activities were responsible for the emission of approximately 57 billion tons of greenhouse gases (GHG). Despite the 15 years of the Paris Agreement and the 29 COPs held to date, greenhouse gas emissions continue to increase at significant rates each year. The primary greenhouse gases are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and chlorofluorocarbons (CFCs). These gases have natural and anthropogenic sources. The solar radiation balance is also affected by particulate matter (aerosol particles), primarily black carbon, organic aerosols, and sulfates.

The two main activities responsible for GHG emissions are the extraction and use of fossil fuels (oil, coal, and natural gas) and the deforestation of tropical forests. Currently, 92% of emissions are attributed to fossil fuels, and approximately 8% are associated with deforestation. In terms of economic sectors, energy generation, transportation, and food production are the industrial sectors that stand out.

In 1850, the concentration of CO_2 was approximately 280 ppm; by 2024, it had increased to 426 ppm, representing a rise of more than 60% in the concentration of this greenhouse gas. The primary anthropogenic sources of CH_4 are the decomposition of waste in landfills, agriculture, and rice cultivation; ruminant digestion; manure management associated with domestic livestock; biomass burning; and natural sources such as wetlands. For N_2O, the primary anthropogenic sources of this gas include artificial fertilizers in cultivated soils, biomass burning, fossil fuel combustion, and nitric acid production. Natural sources are associated with biological processes in soils and water. Finally, CFC emissions are entirely produced by human activities through synthetic compounds of industrial origin used in various applications, such as refrigeration and air conditioning. When greenhouse gases are released into the atmosphere, they have a long lifespan, meaning that the amounts released today may remain in the atmosphere for several centuries, depending on the gas.

The Intergovernmental Panel on Climate Change, popularly known by its acronym, IPCC, was created in 1988 by the World Meteorological Organization and the United Nations Environment Program (UN Environment), in an attempt to bring together experts from around the world and improve our understanding of climate change and all the complex scientific, technical, and socioeconomic issues involved. The IPCC is organized into Working Groups and periodically releases detailed and comprehensive reports, as well as summaries for government decision-makers; all information is also freely available to the general public.

There is ample observational evidence that the climate is changing rapidly, as illustrated in Figure 1, for the atmosphere, cryosphere, biosphere, and oceans. The impacts on ecosystems and society have been substantial.

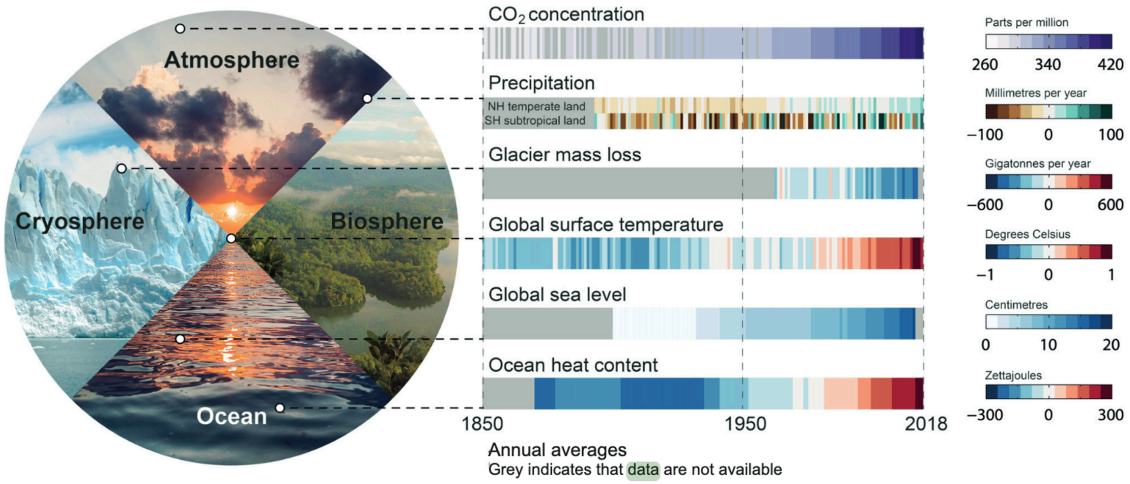

Figure 1 – Changes occurring throughout the Earth's climate system. Source: IPCC AR6, 2023.

Evidence that our planet's climate is changing includes:

- An increase in the average temperature at the Earth's surface, which can be verified through local measurements across the globe and through data from satellites orbiting the Earth.
- Increased ocean acidification, which occurs due to higher concentrations of CO2 in the atmosphere that end up being absorbed by the oceans.

- Decrease in the volume of sea ice in the Arctic, which has been observed in recent decades, and melting of glaciers around the world.
- Rising sea levels, which have increased by about 23 centimeters globally since 1980, are due to both the thermal expansion of warming ocean waters and the melting of glaciers and ice sheets on land.
- Increased frequency and intensity of extreme events, which are related to changes observed in the global water cycle (with prolonged and severe droughts in some regions and increased annual precipitation in others).

2 – The Future Potential Climate of Our Planet

The average temperature of our planet has already increased by about 1.5°C above pre-industrial levels. In continental areas, this average temperature rise has already reached approximately 2.1°C, and some Brazilian regions, such as the São Francisco River Valley and the eastern Amazon region, have experienced increases of up to 2.4°C. The Arctic region of our planet has already experienced a 3.5°C temperature rise over vast areas, encompassing Canada, Scandinavia, and Russia. Therefore, the Paris Agreement's goal of limiting global warming to 1.5°C is undoubtedly at risk.

And what about future scenarios? If greenhouse gas (GHG) emissions continue to grow at the current pace, the global average temperature could rise by about 2.5 to 3.1°C above pre-industrial values over the course of this century, according to IPCC climate simulations (IPCC, 2023). This will occur even if most countries fulfill their current reduction commitments. It is essential to highlight that a global average temperature increase of 3.1°C implies much greater warming in continental areas. In most of South America, we will see temperature increases of 4 to 4.5°C over the coming decades. This exacerbated warming will have profound effects on climate, the environment, economies, and populations. We can imagine life in cities such as Manaus, Belém, or Iquitos, with average temperatures 4 to 4.5 degrees higher than today.

The rise in average temperatures is associated with an increase in the frequency and intensity of extreme weather events, including heatwaves, droughts, storms, and floods. These events are expected to occur approximately 39 times more frequently and to intensify by a factor of 5. Indeed, these scenarios will have a profound impact on agriculture, infrastructure, public health, and daily life in all Latin American regions and worldwide.

Figure 2 illustrates one of the IPCC's climate modeling results, specifically for a scenario that leads to an average global temperature rise of 3°C. We can observe that the oceans warm less than continental ecosystems. In this case, South America could see temperature increases of around 4 to 4.5°C, with very significant impacts on the economies of all countries, as well as on public health and ecosystems.

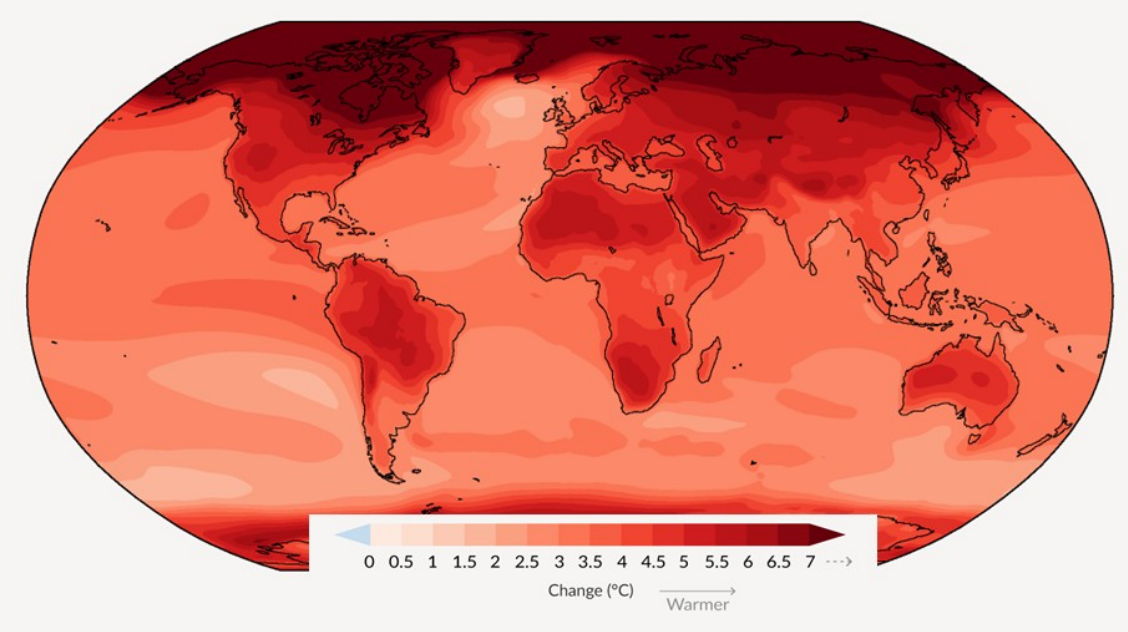

Figure 2 - IPCC climate modeling results for a scenario leading to an average temperature increase of 3 degrees Celsius. We note that the geographic distribution of this temperature increase is highly varied. Source: IPCC AR6 2023.

Another critical climate change relates to precipitation, where Central Brazil, the Amazon, and the Northeast may experience a significant reduction in rainfall. In contrast, Southern Brazil and Northern Argentina may experience an increase in precipitation. Precipitation is key to the functioning of ecosystems and essential for urban and rural populations. Countries that heavily rely on agricultural production, such as Brazil, will be significantly impacted by reduced precipitation. Andean countries that depend on water and regulation provided by the snow accumulated in the Andes will also be strongly affected.

The forecast of an increase in extreme weather events, such as torrential rains and prolonged droughts, is a significant highlight in the future of climate change. The latest IPCC assessment report (IPCC AR6 2023) predicts that extreme weather events will strongly increase in frequency and intensity throughout this century. Some climate models forecast

devastating and semi-permanent droughts for the Amazon and the central part of South America, which is highly concerning given the Amazon ecosystem's sensitivity to changes in precipitation patterns. The Amazon has around 120 billion tons of carbon stored in its ecosystem, and this carbon stock cannot be released into the atmosphere, as it would greatly exacerbate global climate change.

3 – Sea Level Rise and Impacts on Our Coastal Areas

Higher temperatures melt continental glaciers, expanding the volume of water in the oceans and causing sea levels to rise. Since the beginning of the 20th century, sea levels have increased at a rate unprecedented in the past 3,000 years (Climate Central, 2025). Global warming is causing the ice sheets in Greenland and Antarctica to melt, as well as continental glaciers, which are contributing to a rise in sea levels. Observations indicate that the global mean sea level has already risen by 30 cm relative to pre-industrial levels; however, regional differences are also significant. If current trends continue, the sea level is expected to rise by approximately 1 meter over the course of this century, depending on future emissions and the response of ice systems (Climate Central, 2025). Brazil is particularly vulnerable to sea level rise, as it has 8,500 km of coastal areas, with large cities that may face an increased risk of flooding, storm surges, and population displacement. The Brazilian urban areas most at risk from sea level rise are Recife, Santos, Porto Alegre, Belém, Fortaleza, and Rio de Janeiro, among others. These cities must develop effective strategies to adapt to sea level rise to protect their populations adequately. The costs of addressing sea level rise are high, given the data on infrastructure such as ports, airports, road systems, and our coastal cities.

4 – Extreme Climate Events in South America

One consequence of climate change is an increase in extreme weather and climate events. An extreme event is defined as a variable value that exceeds or falls below a threshold determined by applying statistical methods. An example of an extreme weather event is a prolonged period of consecutive days without precipitation in a given region. Another example of extreme weather events is a substantial amount of rain that occurs within a short period, typically within a single day. Additionally, extreme events can be evaluated in terms of their frequency, intensity, duration, and the damage they cause. For simplicity, extreme weather and climate events are referred to simply as extreme events.

In a recent study, Reboita et al. (2022) evaluated climate projections for South America using climate indices that encompass the entire continent, various seasons, and multiple model ensembles. Future predictions indicate, for both the southern summer (DJF) and winter (JJA), an increase in the frequency and intensity of extreme daily precipitation events over southeastern and northern South America. In the Amazon, during the DJF, there is a statistically significant increase in the number of consecutive dry days and a decrease in the number of consecutive rainy days. For northeastern Brazil, these characteristics are more intense in JJA. Considering the climate change signal for the climate indices used and the projections for a more intense climate forcing scenario (RCP8.5), it is noted that the regions most vulnerable to climate change are the Amazon, northeastern Brazil, and southeastern South America.

5 – Impacts of Climate Change in the Amazon

The Amazon is one of the most critical ecosystems for both global and local climate balance, due to its essential role in hydrological and carbon cycles (Nobre et al., 2025; Artaxo, 2019). Climate change is affecting the Amazon in several ways (SPA, 2021):

1. **Deforestation and forest degradation**: The Amazon has already lost 19% of its original area due to deforestation. Deforestation, exacerbated by extreme climate conditions such as more frequent droughts, is reducing the forest's capacity to act as a carbon sink. The Amazon has experienced four extreme drought events in recent years: 2005, 2010, 2015, and 2023. This results in greater greenhouse gas emissions into the atmosphere and loss of biodiversity.

2. **Droughts and fires**: Prolonged droughts and forest fires have become more common, altering the structure of the forest and favoring its conversion into other types of vegetation, such as savannas. This may lead to changes in species composition and ecosystem functionality.

3. **Biodiversity change**: The Amazon is the terrestrial ecosystem with the most incredible biodiversity on the planet. The forest depends on heavy rainfall and temperatures to which it has adapted over the last millennia. The decline in rainfall and the increase in temperature are stressing vegetation, which responds with lower photosynthetic rates and reduced carbon absorption. Several scientific studies suggest that the forest may have already initiated a process of carbon loss,

contributing to global warming and potentially leading to forest degradation (SPA, 2021).

The risk of this potential tipping point lies in the fact that the Amazon contains approximately 120 billion tons of carbon, which could be released into the atmosphere (equivalent to about 10 years of all fossil fuel burning), thereby significantly fueling the greenhouse effect.

6 – The Amazon Ecosystem Tipping Point

Science has identified several "tipping points," which correspond to thresholds where essential aspects of the climate system undergo significant changes and shift to a different state from the current one. Some of these tipping points include the melting of stored ice in Greenland, the collapse of the Amazon rainforest, alterations to the North Atlantic thermohaline circulation, and the loss of Antarctic ice cover, among others.

Tropical forests such as the Amazon play an essential role, as they work synergistically by redistributing water, storing carbon, and sheltering remarkable biodiversity. Tropical forests share a fundamental characteristic: the ability to recycle water. They act as natural pumps, extracting water from the soil after rainfall and returning it to the atmosphere to supply clouds, thereby facilitating the formation of rainfall.

Indigenous peoples have lived in the Amazon forests for at least 14,000 years. They have lived under various subsistence systems and cultural environments, which have shaped the current distribution of several forest types. In doing so, they have shaped the resilience of Amazonian forests while influencing heterogeneity and forest diversity, which can buffer responses to a variety of current disturbances. However, changes in regional climate regimes—namely, higher temperatures, longer dry seasons, and more intense extreme droughts—are threatening the ability of Indigenous peoples and local communities to gather and grow food, as well as sustain their basic livelihoods.

Human activities associated with agricultural frontier expansion have directly contributed to the decline in resilience of Amazonian forests (Flores et al., 2024). Human pressure is highly heterogeneous in space and time. For example, in Brazil, over the last four decades, deforestation has increased to expand agricultural land. This has led to a significant degradation process in the forest, potentially making the Amazon ecosystem a carbon source instead of a sink, as it was years ago. Examples of degradation factors include extreme droughts, edge effects resulting from habitat fragmentation, logging, and forest fires that deteriorate forest conditions. In addition, compounded disturbances—

synergistically combining different mortality and forest degradation factors—are currently undermining regional resilience, depending on the specific combination of factors, which reinforces the heterogeneous and asynchronous potential for local-to-regional tipping points caused by resilience loss, varying according to the different disturbances at play and the distinct forest responses.

Thus, both external threats (e.g., climate, deforestation, fires) and forest responses—highly dependent on forest type, diversity, and the presence of Indigenous peoples—currently determine the impacts on different tropical forests worldwide. Therefore, risks are highly heterogeneous in space and time, both within and among different tropical forests (Nobre and Fabrício-Neto, 2021). Global actions to eliminate deforestation are essential to halt this process and preserve tropical forests.

7 – The Necessary Adaptation and Increased Climate Resilience

The new climate has already arrived, and we need to adapt to it (IPCC, 2023). Adaptation aims to reduce vulnerability to the impacts of climate change and increase the resilience of ecosystems, populations, and the economy. The main strategies may include:

1. **Improving water resource management**: Developing and implementing policies for integrated water resource management, including the construction of storage infrastructure and the promotion of efficient water use practices, in urban areas, investing in resilient urban planning, with infrastructure projects and construction that consider the risks of flooding and other extreme climate events.

2. **Protection and restoration of ecosystems**: Conserving natural areas is essential. We must protect critical regions such as aquifer recharge zones and biodiversity hotspots to ensure ecosystem resilience and the continuity of their services.

3. **Restoring degraded ecosystems**: Implementing restoration projects to improve ecosystem health and their capacity to adapt to climate change.

4. **Developing sustainable agricultural systems**: Investing in research and development to create crop varieties more resistant to extreme climate conditions, such as droughts and floods.

5. **Adapting the public health system**: Strengthening the health system to cope with the impacts of climate change, such as heat-related illnesses and the spread of

vector-borne diseases. It is crucial to make the health system more resilient to climate change.

6. **Disaster resilience planning**: Developing contingency and disaster response plans that consider climate risks, including community training and improving infrastructure to protect populations.

7. **Promoting climate awareness**: Implementing educational programs on climate change and sustainability to raise awareness and engage the population. Currently, only a fraction of the population understands the risks that climate change poses to our society.

8 – The Paris Agreement, COP-30, and Planetary Sustainability

For science, it is clear that if there is no significant reversal in greenhouse gas emission trends, we risk surpassing climate safety limits, with catastrophic impacts on ecosystems, economies, and societies, especially the most vulnerable (Planetary Boundaries, 2025). With the current targets expressed in the Nationally Determined Contributions (NDCs)—the self-determined commitments countries make regarding GHG reduction—the 197 signatories of the Paris Agreement set the goal of limiting the temperature increase to 2°C, with the aspiration of keeping it at 1.5°C. Science clearly shows that limiting global average warming to 1.5 or 2.0°C is no longer possible given the accumulated GHG emissions of recent decades and the modest reductions pledged in most countries' NDCs.

We are facing unacceptable risks for humanity, the so-called climate tipping points, which are critical thresholds in the Earth system that, once crossed, may lead to abrupt and irreversible changes, with potentially catastrophic consequences for the planet and its societies. These tipping points may trigger positive feedback processes, where an initial change amplifies itself, leading to even greater consequences (Global Tipping Points, 2025).

Scientific knowledge—encompassing climate models, observational data, and scenario projections—provides a robust basis for guiding political, economic, and social decisions. However, the great challenge lies in translating this knowledge into concrete actions, particularly within the corporate and institutional sectors. In this scenario, the transformation of organizations, whether governments, companies, or financial institutions, becomes not only desirable but indispensable. The transition to a low-carbon economy

requires profound ruptures in production and consumption models, demanding institutional and strategic restructuring of organizations.

The corporate sector, in particular, must abandon extractive and carbon-intensive practices and move toward models based on the circular economy, renewable energy, sustainable supply chains, and green innovation. Private companies face the urgent need to reconfigure their business models, governance, and value chains to operate within planetary boundaries. This implies rethinking everything from the energy matrix to logistics, climate risk management, financial investments, and sustainability indicators. The necessary transition to a low-carbon economy demands innovation, investment in clean technologies, and a profound cultural and institutional transformation. Governments, in turn, must adopt effective political strategies in a complex international geopolitical and economic context.

This organizational transformation also involves revising governance and management systems. Governments and companies must effectively incorporate ESG (environmental, social, and governance) criteria, ensuring transparency, rigorous monitoring, and targets aligned with international climate commitments. This requires technical capacities, committed leadership, and a new ethos of collective responsibility. It is not only about adapting to climate risks but about acting as agents of change in a world that demands ecological regeneration and social justice.

COP-30 brings a unique opportunity for Brazil to lead this agenda, articulating science, policy, and economy toward systemic transformation, as emphasized by COP-30 president, Ambassador André Corrêa do Lago. In this context, COP-30 emerges as a tipping point—the "COP of Transformation." More than a diplomatic conference, it must serve as a convergence space for science, public policies, the productive sector, traditional peoples, and youth, focusing on real, viable, and evidence-based solutions. Brazil will have both the opportunity and responsibility to demonstrate climate leadership, positioning the country as a protagonist in a new global socio-environmental pact.

Science must play a central role, guiding mitigation and adaptation goals, while also challenging organizations to act with ambition and responsibility. It is essential to overcome greenwashing and move toward measurable and verifiable commitments that align with the principles of climate justice and global equity.

Among the main challenges COP-30 will need to address are:

- **Structuring fair and effective mechanisms to end fossil fuel exploitation and use**: Science has made it clear for decades that the current economic model, based on fossil fuel combustion, must be replaced by a low-carbon economy.

- **Strengthening the role of science in decision-making**: Country commitments must be supported by the most recent IPCC projections. Science must guide the development of mitigation targets and adaptation strategies.
- **Fair and accessible climate financing**: Many developing countries and vulnerable regions lack the resources to implement their NDCs. COP-30 must push for effective climate financing mechanisms with less bureaucracy and more focus on equity and results.
- **Transformation of value chains**: Organizations must rethink their entire operational logic—from raw material extraction to post-consumption—to become carbon neutral. This requires a long-term vision, technological innovation, human capacity building, and a new mindset for a more sustainable business.
- **Social engagement and climate justice**: Ensuring the active participation of Indigenous peoples, traditional communities, women, youth, and workers in shaping and implementing climate policies is essential. Climate justice must be the guiding principle of transformation.
- **Combating greenwashing and strategic inaction**: Many companies announce climate commitments that are merely environmental marketing. COP-30 must strengthen verification, transparency, and accountability mechanisms to ensure declared actions are truly implemented.
- **Creating stricter metrics to track emissions and impacts**: The verification of commitments requires internationally agreed metrics grounded in science.
- **Building climate governance** capable of holding the 197 signatory countries of the Climate Convention accountable for their emission reduction commitments and targets.

Brazil holds critical strategic advantages. We have wind and solar generation potential far greater than any other country. Around 80% of our electricity generation is already renewable. Brazil also has a unique biofuels program. However, we also have significant vulnerabilities: an agribusiness-based economy that is dependent on rainfall; around 60% of our electricity generation depends on rainfall; many of our cities are already living close to a temperature limit; we have a semi-arid region in the Northeast that is becoming arid; and we have 8,500 km of coastline vulnerable to sea level rise.

The 17 Sustainable Development Goals (SDGs) (Figure 3) represent the path the United Nations has structured to reduce social inequalities and build a sustainable future. SDG 13,

climate action, is fundamental for achieving several other SDGs. Without a stable climate, it will be impossible to ensure water, food, and health for most of the population. The set of recommendations outlined in the previous sections can enable South America to capitalize on its strategic advantages and mitigate its vulnerabilities with increased climate resilience.

The impact of climate change is vast and multifaceted, affecting the environment, the economy, and the quality of life of our population. Adapting to and mitigating these impacts requires joint and continuous efforts to protect the country's future and ensure a more resilient and sustainable tomorrow.

Figure 3 – The 17 Sustainable Development Goals (SDGs) outlined in the 2030 Agenda, which serve as a guide for building a new, more sustainable society with less social inequality. Climate change is SDG 13, but without a stable and predictable climate, many of the other SDGs cannot be achieved.

Collaboration in science is crucial for addressing the challenges of climate change. Only with multidisciplinary partnerships across all branches of science will we provide society with the scientific knowledge to adapt to the new climate, reduce greenhouse gas emissions, and achieve the 17 SDGs necessary to build a society that would be more just and resilient to climate change. This needs to be done simultaneously with reducing socioeconomic inequalities. The challenge is global, affecting all countries, each with its own unique characteristics. Scientific collaboration is essential in this task.

The TWAS (The World Academy of Sciences) (https://twas.org/) works to foster scientific collaborations in all countries, particularly in the Global South. TWAS implements several scholarly programs and scientific collaborations each year, and their effectiveness is significant in these South-South and South-North collaborations. Other TWAS programs coordinate activities among Academies of Sciences, building essential bridges among scientists worldwide.

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Addendum 2

In-person attendees of the Brazil Summit included:

Name	Affiliation
Adriana Coutinho Do Nascimento	Acompanhante
Alessa Sumie Nunes Noguchi Sumizono	WWF - Brasil
Ana Carla Pecego Da Silva	ALANA
Ana Cecilia Sabbá Colares	Ministério das Relações Exteriores
Ana Claudia Leite	ALANA
Ana Paula Felizardo	Secretaria Nacional dos Direitos da Criança e do Adolescente
Ana Potyara Tavares	ANDI - Comunicação e Direitos
Andrea Adriana Da Silva Melo	Secretaria Municipal de Educação/Departamento Pedagógico de Educação Infantil E Pacto Municipal Pela Primeira Infância
Andrea De Lima E Silva Lemos	OAB Águas Claras
Andreia Santos	CMEI Maria Honória Ribeiro
Angel Priscila Da Mota Dos Santos	Acompanhante
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Anne Emanuelle Cipriano Da Silva	Conselho Regional de Psicologia/UNB Grupo de Estudos Ecohumana
Belisa Cesar Rotondi	ALANA
Bianca Hammerschmidt	MPI
Cainan Silva Da Silva	SEDUC RS
Camilla Kafino	Polícia Federal
Capitu Maciel	ALANA
Carla Robécia Nascimento	Acompanhante
Carolina De Brito Maciel	ALANA
Cila De Castro Silva	ALANA
Claudia F Vidigal	Van Leer
Claudia Fleury Abdalla	ALANA
Claudia Lins	Confederação Nacional de Municípios
Claudio Marcelo De Faria Rodrigues	Prefeitura Municipal de Mogi das Cruzes
Cristiane Aparecida Buzo De Lima	Prefeitura Municipal de Jarinu
Daniel Porcel	Instituto Talanoa
Daniela Teixeira Santos	Fundação Visconde de Cabo Frio
Danielle Perali De Medeiros	Fundação Visconde de Cabo Frio
Danilo Moura	UNICEF
Davi Candido De Oliveira	UCB

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Debora Parker Chagas Carvalho	Exército de Salvação
Denise Da Costa Eleutério	OABDF Subseção de Taguatinga
Diego Rodrigo Marra	Ação Social do Planalto
Dirlene Tikuna	Ministério dos Povos Indígenas
Edgard Gouveia Júnior	Livelab
Elisa Meirelles	UNICEF
Emanuella Ribeiro Halfeld Maciel	ALANA
Fabiola Galli	ALANA
Fabricia Estevão Da Silva	Secretaria De Educação do DF
Fernanda Santana De Oliveira	DEA/MMA
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Flavia Moura França	Secretaria Municipal de Educação de Santo Antônio do Descoberto - Go
Francieli Lisboa De Almeida	Ministério dos Povos Indígenas
Gabriel Adami	Comitê Participativo - PYCC
Gerivaldo Nogueira Da Silva	Escola de Contas do TCDF
Gerusa De Oliveira Moura Cardoso	Prefeitura de Jundiaí
Giane Boselli	Childfund Brasil
Gilson Domingos De Paiva	Escola de Contas TCDF
Gregory David Bulit	UNICEF
Guilherme Barros Pereira	Prefeitura de Jarinu
Guiliana Bergamo	ALANA
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Hyorrana Da Silva Cruz	Secretaria Municipal de Educação
Ilona Szabo	Igarape Institute
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Irani Da Silva Pereira	Secretaria Municipal de Educação
Isabela Souza Julio	Secretaria Estadual da Educação do Rio Grande do Sul
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Leticia Neves Carvalho	The Nature Conservancy
Lionice Mendes Sales	Escola Tia Angela Maria Abdon
Lis De Oliveira	Mandato da Deputada Sâmia Bomfim
Lucas Almeida	UK Government
Lucas Silvestre Schankula	Embaixada Alemanha/ German Embassy
Luciana Abade Silveira	COP30
Luciana Lopes De Vasconcelos Lima	Prefeitura do Recife
Luciene Maria Rezende Lopes	CMEI Vovó Joaquina Pontes
Luiz Alberto Cunha	Autonomo
Luiza Borges Soutto Mayor	Ministério da Saúde
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