MEMO TO EARTH - THE AMAZON[1] IS IN THE TIPPING POINT OF DIEBACK

Draft proposal in progress, version 2 June 2025[2]

This is a project document in progress and it will change all the time with the inclusion of insights from partners and experts. It is still at an early stage and will take a few more weeks to format it as a first published version.

A fisherman walks across the dry bed of a branch of the Amazon River near Tefé, in Brazil.

Here's a suggested Table of Contents for the document "Memo to Earth About the Amazon":

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[1] With Amazon we need the tropical forest cover of the Amazon/Orinoco watershed

[2] This is a very early draft proposal, the end product will be written by a whole lot of people, stakeholders that will be looking at it before it gets delivered as a proposal.

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PLANETARY HEALTH CHECK

Planetary Health Check 2024. Design: Globaïa

In the Planetary Health Check Report[3] we see that we are crossing planetary boundaries beyond which our world will soon no longer be able to provide a safe environment for humanity to operate in. The Earth system consists of all the interconnected components of our planet: air, water, ice, land, and all living species which together form the biosphere. These components constantly interact, forming a large network, where changes in one area can affect the others. Considering the Earth system this way helps us better care for our planet. In general, there are three major aspects of today's Earth system that are crucial for a sustainable future for humanity:

- Stability: The Earth system's ability to not disrupt relatively constant conditions over long periods, as seen during the Holocene.
- Resilience: The Earth's capacity to withstand disturbances and recover from them, such as the ability of a forest to recover from a wildfire disturbance and return to a comparable pre-fire state.
- Life-Support Functions: The essential processes provided by the Earth system sustain life on our planet by, for example, maintaining temperature ranges suitable for abundant life in many regions and sustaining the cycles of water between soils, plants, and the atmosphere.

Right now the stability of the Earth system is in danger because we are nearing the so-called

Tipping Points: critical thresholds in the Earth's system where change becomes self-sustaining, triggering significant, often abrupt, and irreversible impacts. This shift happens when positive feedback mechanisms amplify initial changes, pushing the system from one stable state to another rapidly.

There are several tipping points and they are interconnected; a shift in one part of the Earth system can cascade and push the other tipping points.

The collapse of the Amazon rainforest, the Arctic sea ice cover and the Atlantic Meridional Overturning Circulation (AMOC) are interconnected and if one goes into the tipping point, it will accelerate the others towards those tipping points.

A BLACK SWAN EVENT LIKE NO OTHER - IMPLICATIONS OF FAST AMAZON DIEBACK

In this memo we state that we are likely just years away from the tipping point of the dieback of the Amazon, which, once it is happening, will accelerate and is unstoppable by human intervention. Where the report is underestimating the situation in the Amazon is that it says

[3] Planetary Health Check

that the tipping point will be reached at deforestation levels of between 20-25% (currently estimated at 17% and at global warming of between 1.5 - 2°C. But the two record droughts of 2023 and 2024 actually show that we are perilously close already and as our calculations show, the effects will be much more devastating than currently estimated. Here is our research in progress:

Calculating the tipping point

If we lose the Amazon, the planet is likely to heat up by an additional 2 - 2.5°C above IPCC trajectories within decades[4]. This basically means game over for globally interconnected human societies with 8.2 billion people. We are years, rather than decades away from this situation if we don't act at the size and speed the existential challenge demands of all of us. If we do and we succeed we may be at the doorstep of a revolution aimed at regenerating the natural abundance of our planet, which has nurtured countless species including us for millions of years.

We have at best a few years to turn this catastrophic situation around. The good news is, that if we succeed, we will have developed the technical-financial and observation tool set to mobilize and reward millions of people to reverse the damage to the biosphere, which we can then deploy in other places around the world. Our premise is simple: we can reverse most of the planetary crisis by reviving the biology of the planet everywhere, by everyone.

Act Now!

SUMMARY

Our Greatest and Most Urgent Global Climate Emergency: The Collapse of the Amazon/O…

For those who have 2 minutes reading time, please read the summary in the separate Google Doc link.

WE ARE ALL IN DANGER

The Amazon rainforest, the most vital cooling system for the Earth, is at a tipping point, facing severe threats from deforestation, fires, and climate change. As a critical carbon sink and regulator of the planet's water cycle, its destruction could lead to an additional 2- 2,5°C rise fast in global temperatures, significantly worsening the climate crisis. 0,5°C would be caused by additional CO_2 to the atmosphere and 2°C would be added by the collapse of the atmospheric cooling through the water cycle. It is not clear how fast it could happen, but a large part of this additional heating up could happen within years rather than decades.

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[4] Calculation based on the this article: Restoring the earth's damaged temperature regulation is the fastest way out of the climate crisis. Cooling the planet with

Scientific data already show that large parts of the Amazon have shifted from being carbon sinks to becoming net carbon emitters, accelerating global warming. The reduction of the Amazon rainforest is already disrupting rainfall patterns, threatening food production, freshwater supplies, and ecosystems as far as Argentina, Mid- and Northern America and Africa.[5]

ACTION TO AVERT THE TIPPING POINT

Urgent global action is required to restore and protect the Amazon.

This includes:

1. Legal Personhood for the Amazon: Establishing the Amazon as a legal entity with rights to exist and regenerate. This framework empowers Indigenous communities and environmental organizations to act on behalf of the Amazon, and be the legal vehicle to invest in the reversal of the damage. The ACTO organization could be amplified to take on this huge task.

2. Global Financing: Mobilizing $2 billion per month over the next two years to finance large-scale restoration and protection efforts and then slowing down to about $1 billion per month over time. This will involve a combination of public funds, green bonds, and carbon-sequestration-based investments, incentivizing private sector involvement.

3. Indigenous Leadership and Community Engagement: Indigenous peoples and local communities, who have safeguarded these forests for millennia, will play a central role in forest regeneration, protection, and sustainable land management.

4. A Digital and Financial Architecture, which we propose to call Arara: Implementing a smart contract system using blockchain technology to ensure transparency, automate payments for ecosystem services (PES), and track progress in real-time. This digital architecture will provide direct payments to local communities and forest guardians for their role in protecting and restoring the forest. Satellite-based real-time monitoring, fire brigades, and control posts at access points will be deployed to prevent further deforestation, while local communities will be empowered to manage and protect their territories.

BENEFITS

1. Climate Stability: Restoring the Amazon will prevent this additional 2-2,5 °C rise in global temperatures and stabilize global weather patterns, protecting ecosystems and agriculture worldwide.

2. Biodiversity Conservation: Protecting the Amazon's unique ecosystems will safeguard thousands of species and prevent mass biodiversity loss.

3. Sustainable Livelihoods: Empowering local communities with sustainable land management and direct payments will ensure long-term economic stability while preserving the forest.

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[5] Chuvas das Terras Indígenas da Amazônia contribuem para 57% da renda agropecuária do Brasil - Instituto Serrapilheira

4. Global Water Cycle Restoration: Reviving the Amazon's biotic pump function will help maintain global rainfall patterns, critical for agriculture and ecosystems across continents.[6]

5. Sustainable Development Goals: The project to restore and protect the Amazon directly improves several Sustainable Development Goals (SDGs) by addressing key environmental, social, and economic challenges:

1. SDG 1 (No Poverty): Provides financial support to 1.5 million families, creating sustainable livelihoods and reducing poverty in forest communities.
2. SDG 2 (Zero Hunger): Promotes agroforestry and sustainable farming practices, enhancing food security while preserving biodiversity.
3. SDG 3 (Good Health and Well-being): Implements healthcare programs with mobile clinics and telehealth, improving access to medical care in remote areas.
4. SDG 4 (Quality Education): Establishes programs in 50,000 schools to teach agroforestry, permaculture, and environmental stewardship, combining education with hands-on conservation efforts.
5. SDG 7 (Affordable and Clean Energy): Provides solar panels to schools and homes, ensuring access to renewable energy for over 1.5 million families.
6. SDG 13 (Climate Action): Protects and restores the Amazon as a critical carbon sink and biotic pump, mitigating climate change and stabilizing global temperatures.
7. SDG 15 (Life on Land): Focuses on reforestation, biodiversity conservation, and ecosystem restoration across vast Amazonian landscapes.
8. SDG 16 (Peace, Justice, and Strong Institutions): Strengthens governance through community councils, empowering indigenous leadership and promoting inclusive decision-making.
9. SDG 17 (Partnerships for the Goals): Mobilizes international collaboration and financing, integrating indigenous organizations, governments, and private entities for a unified approach to Amazon restoration.

6. National Determined Contributions: The project enhances the involved countries' NDCs by significantly increasing carbon sequestration through large-scale reforestation, protecting critical carbon sinks and restoring ecosystems that stabilize the water cycle and reduce emissions.

The comprehensive approach ensures that the Amazon remains the vital cooling organ and hydrological pump of the living Earth, benefiting both local communities and the global population. Through legal protections, financial mobilization, Indigenous leadership, and technological innovation, we can avert the catastrophic collapse of the Amazon and its far-reaching consequences.

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[6] https://turningthetide.watercommission.org/

The current extreme drought in the Amazon Rainforest shows that this largest cooling organ of the living planet is now in the tipping point of drying out and dying back.[7]

THE CARBON SEQUESTERED IN THE AMAZON/ORINOCO FORESTS IS ENORMOUS

Dr. Luciana Gatti, a senior scientist at Brazil's National Institute for Space Research (INPE), has stated that parts of the Amazon rainforest have already shifted from being a carbon sink to a carbon emitter. She said, "The first very bad news is that forest burning produces around three times more CO_2 than the forest absorbs...the southeast Amazon is now a net carbon source." This alarming shift is due to deforestation, fires, and climate change impacts, which are degrading the Amazon's ability to absorb CO_2.

If the 280 billion tons of CO_2 were released from the burning of the Amazon, the extra atmospheric carbon would significantly increase global temperatures, though the exact amount is hard to pinpoint due to the complexity of climate systems. However, the additional 40-60 ppm to the atmosphere (depending on the speed of the destruction and the capacity of the oceans to absorb the additional gas) would likely cause an increase in global temperatures by about 0.5°C over time, if we assume a climate sensitivity CO_2 of 3°C.

The 2050 net zero goal is based on limiting global warming to 1.5°C above pre-industrial levels, as outlined by the Paris Agreement, to avoid the worst impacts of climate change by balancing the amount of greenhouse gasses emitted with those removed from the atmosphere. This goal assumes the proper functioning of the natural sinks such as the Amazon and would be impossible to reach with the demise of the Amazon. That net zero proposition assumes temperature overshoot and that natural sinks will bring it back down once we stop emitting which can't happen without the sinks.

But it gets much worse than that, because the IPCC models don't properly account for the cooling capacity of the rainforests through the water cycles.

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[7] expert reaction to The Global Tipping Points Report 2023 | Science Media Centre

THE SCIENCE

THE DESTRUCTION OF COOLING CAPACITY THROUGH THE WATER CYCLE WILL BE MUCH GREATER!

Our Greatest Global Climate Emergency:

Save the Amazon /Orinoco Rainforest

The Amazon/Orinoco Rainforest covers 6.5 million km² : Earth's Largest Cooling Organ

Responsible for 8% of global oxygen production, around 22% of global river discharge. Home to 30% of the world's species.

Cooling effect when healthy: 190 W/m² through evapotranspiration and cloud formation.

Total cooling: 4 x 10^{22} joules/year, offsets Offsets 134% of Earth's Energy Imbalance (EEI = 2.9 x 10^{22} joules/year or 1.81 W/m²).

Essential to maintaining planetary health and regulating global temperatures.

Without the Amazon/Orinoco, global temperatures could rise by more than 2°C.

Maintaining rains for food production in large parts of South America, US West and MidWest and Southern Africa.

Tipping point connected to Artic Ice melt and AMOC slow down.

While Climate Sensitivity only looks at the effects of CO_2, Earth System Sensitivity (ESS) refers to the long-term response of the Earth's climate to CO_2 changes, including both fast feedbacks (like clouds and water vapor) and slow feedbacks (such as ice sheet melt, vegetation shifts, and carbon cycle changes).

ESS typically results in higher temperature increases than climate sensitivity due to the inclusion of all these processes. The big mistake in the models is that the temperature effects of collapse of the atmospheric water cycle can be very fast, within months! That makes the situation so dangerous.

In the 5th Report of IPCC on the page 666 is written: Myhre et al. 2013

"As the largest contributor to the natural greenhouse effect, water vapor plays an essential role in the Earth's climate. However, the amount of water vapor in the atmosphere is controlled mostly by air temperature, rather than by emissions. For that reason, scientists consider it a feedback agent, rather than a forcing to climate change. Anthropogenic emissions of water vapor through irrigation or power plant cooling have a negligible impact on the global climate".

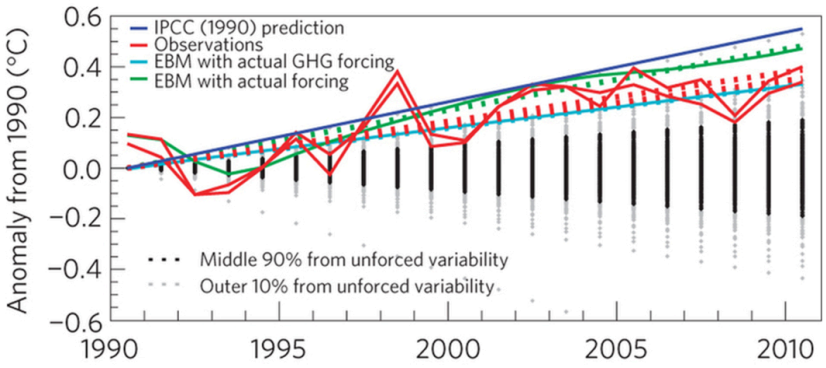
This is blatantly wrong! The climatologists may need years to figure this out, but we do not have that time left. When water vapor condenses to form clouds, it releases latent heat that is

radiated back into space, in large part through the atmospheric window. Also, the clouds increase the Earth's albedo, reflecting sunlight and creating a cooling effect. This dual influence (and there are more, such as the tropopause heating up and the low Bowen ratio over forests, making GHGs ineffective, lowering their climate sensitivity!) makes water a major cooling forcing of the climate through phase change!

Certainly from a risk management perspective applying the precautionary principle, saving the Amazon is very sensible, absolutely necessary climate insurance!

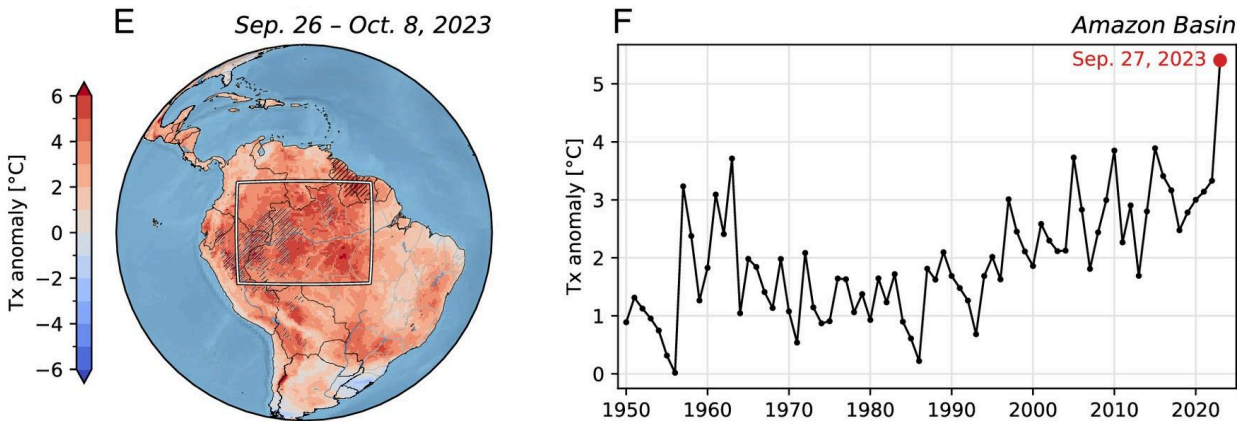
Peter Bunyard and Rob de Laet, co-authors of the article: ''Restoring the earth's damaged temperature regulation is the fastest way out of the climate crisis - cooling the planet with plants''[8] calculated the temperature fingerprint of the earlier record drought in the Amazon in 2005, which was in a neutral year where temperatures were not affected by either El Nino or La Nina, and came out at a value of 0.24°C and lo and behold, there is a spike in global temperatures at the end of that year of roughly that magnitude, indicating that our calculations about the cooling power of the rainforests may well be close to the truth.

DROUGHT SIGNATURE CLEARLY VISIBLE IN THE GLOBAL TEMPERATURE RECORDS

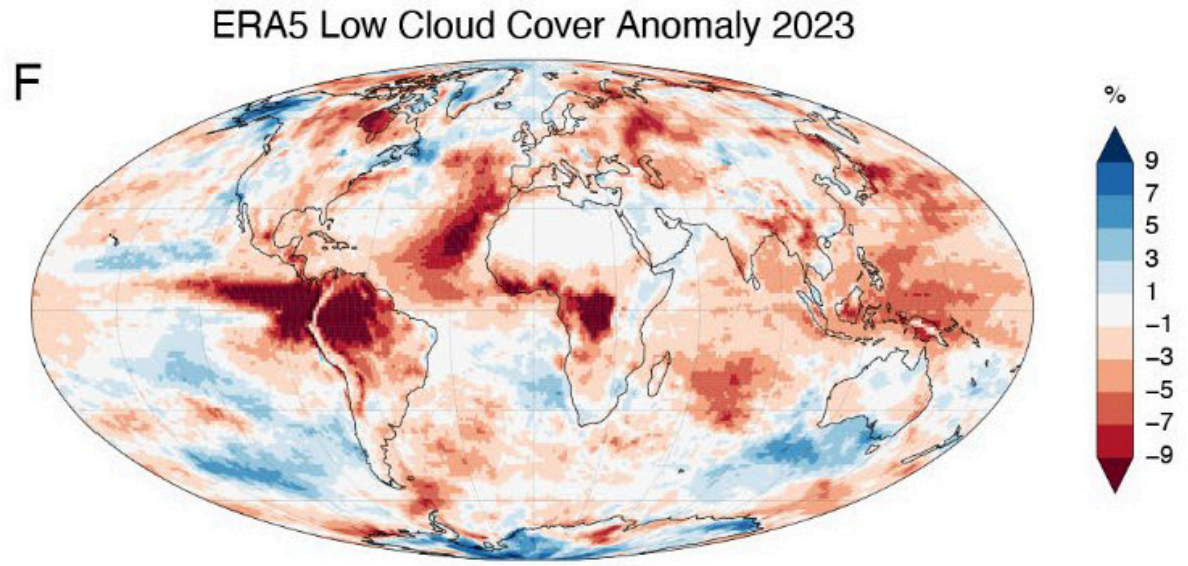


We calculated additional heat from reduced evapotranspiration in record 2005 (neutral year) at 0,244 C and the peak is cleary visible in the record.

[8] See footnote 3.



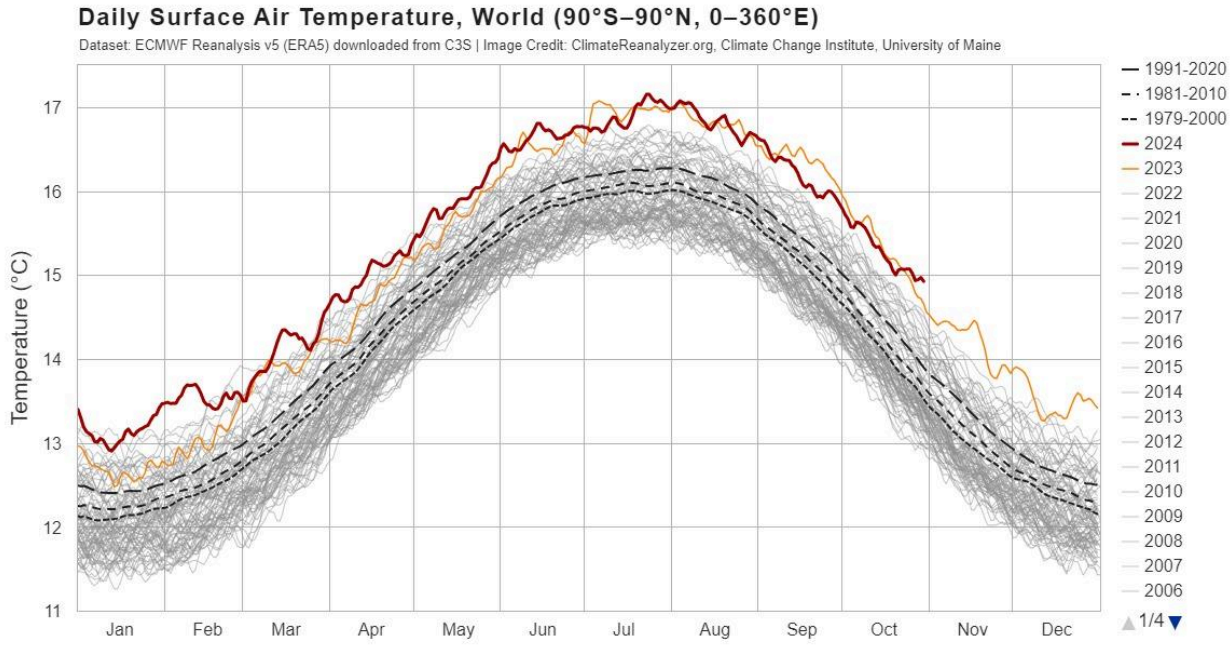
We see that the heating up of the Amazon basin in years of drought spike: 2005, 2010, 2015 and now +5,3 C in 2023.



This is also visible in the cloud cover anomaly over the area (as well as the Congo, the droughts are often twins)

Based on this, while the final data are not in yet, we can estimate that the additional global warming caused by the 2023 and 2024 droughts combined, could add about 0.4°C to global temperatures. Although there are more factors affecting yearly variations, the largest short term variation is typically caused by the ENSO (El Nino Southern Oscillation). During El Niño years, global temperatures usually increase by approximately 0.1 °C to 0.2 °C, whereas during La Niña years, they generally decrease by about the same amount. In 2023 we had an El Nino, and now when this article is written (first week October 2024), we are in the neutral phase going into a weak La Nina. So the total drought signature minus the ENSO variation would probably be

around + 0.1 °C compared to the start of the drought in 2023.[9] In the chart below you see that despite coming out of an El Nino, the temperatures in 2024 track those of 2023 closely and it would be logical that, depending on the strength of the La Nina the end 2024 temperatures could equal those of 2023 or even above, despite the flip of the ENSO, which normally would decrease global temperatures by between 0.2 and 0.4 °C. On 29 October 2024 the global temperature anomaly compared to the 1979-2000 average was 1.41 °C and around 2-2.1 °C[10] above the pre-industrial baseline.



In short: if the tipping point has been reached and we lose the Amazon, the process will accelerate, we will have lost the fight against climate change and the IPCC models did not show the speed or the full impact of the dieback, mainly due to faulty atmospheric water modeling.

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[9] The new record of drought and warmth in the Amazon in 2023 related to regional and global climatic features | Scientific Reports

[10] June 2024 marks 12th month global temperature reaching 1.5 C

STATEMENT BY CHIEF RAONI

Chief Raoni, the leader of the Indigenous nations of the Amazon: “We need white men on our side to save the Amazon from destruction. We need to mobilize the nations of every country to make a large movement to stop this destruction.”[11]

Professor Johan Rockström, Professor in Environmental Science at the Stockholm Resilience Center, said:

“This report confirms the need to take tipping points seriously, and that they not only are hard-wired in the Earth system, but are very likely just around the corner, many of them already at 1.5°C of global warming. This calls for urgent action, and the report draws a fundamental

[11] ‘We need white men to save the Amazon,’ 92-year-old Indigenous Chief Raoni says

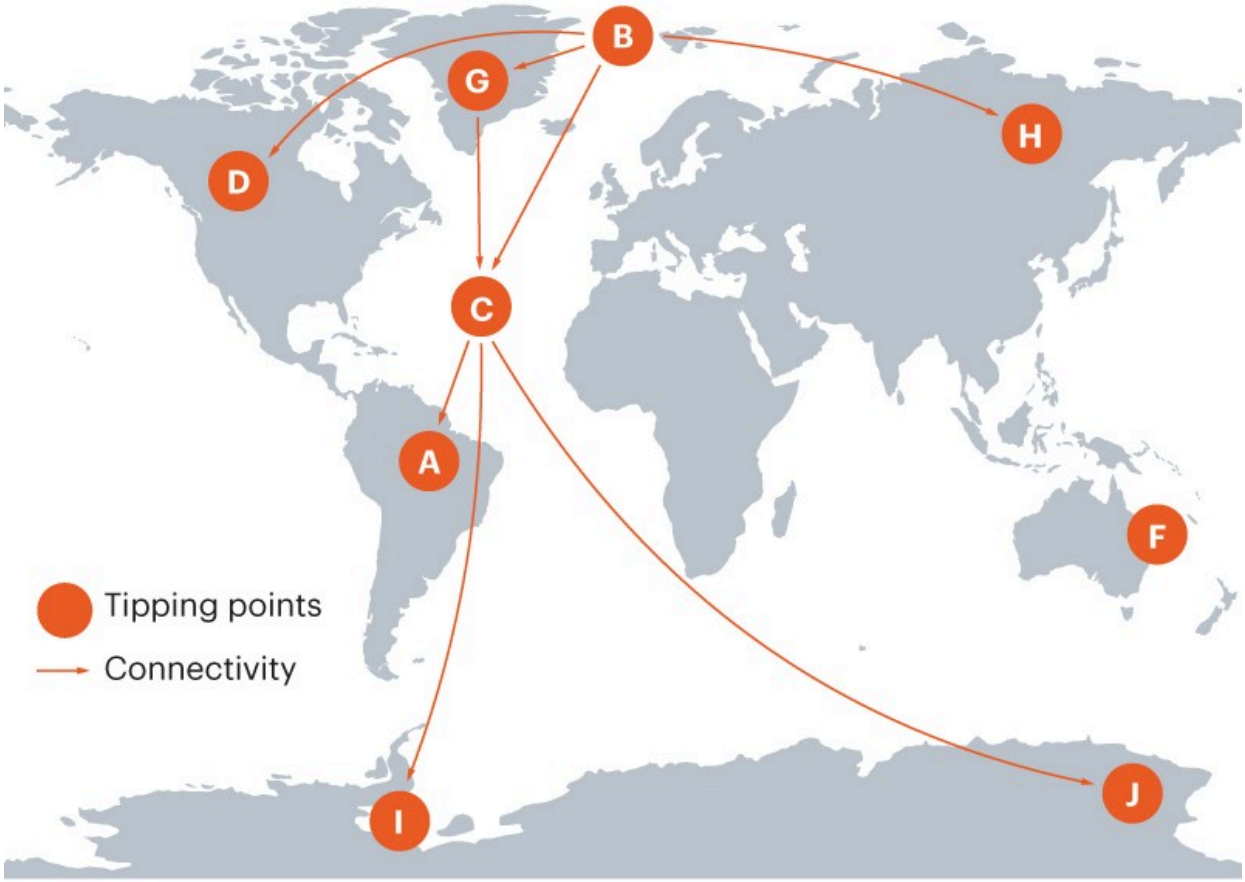
conclusion from this fact – nothing less than social tipping points are required to enable a manageable and dignified climate future. Incremental change is not an option."[1213]

[12] The Tipping Points of Climate Change — and Where We Stand | Johan Rockström | TED

[13] The Double Crisis: Climate & Biodiversity | DLD Nature

RAISING THE ALARM

Evidence that tipping points are under way has mounted in the past decade. Domino effects have also been proposed.



A. Amazon rainforest
Frequent droughts

B. Arctic sea ice
Reduction in area

C. Atlantic circulation
In slowdown since 1950s

D. Boreal forest
Fires and pests changing

F. Coral reefs
Large-scale die-offs

G. Greenland ice sheet
Ice loss accelerating

H. Permafrost
Thawing

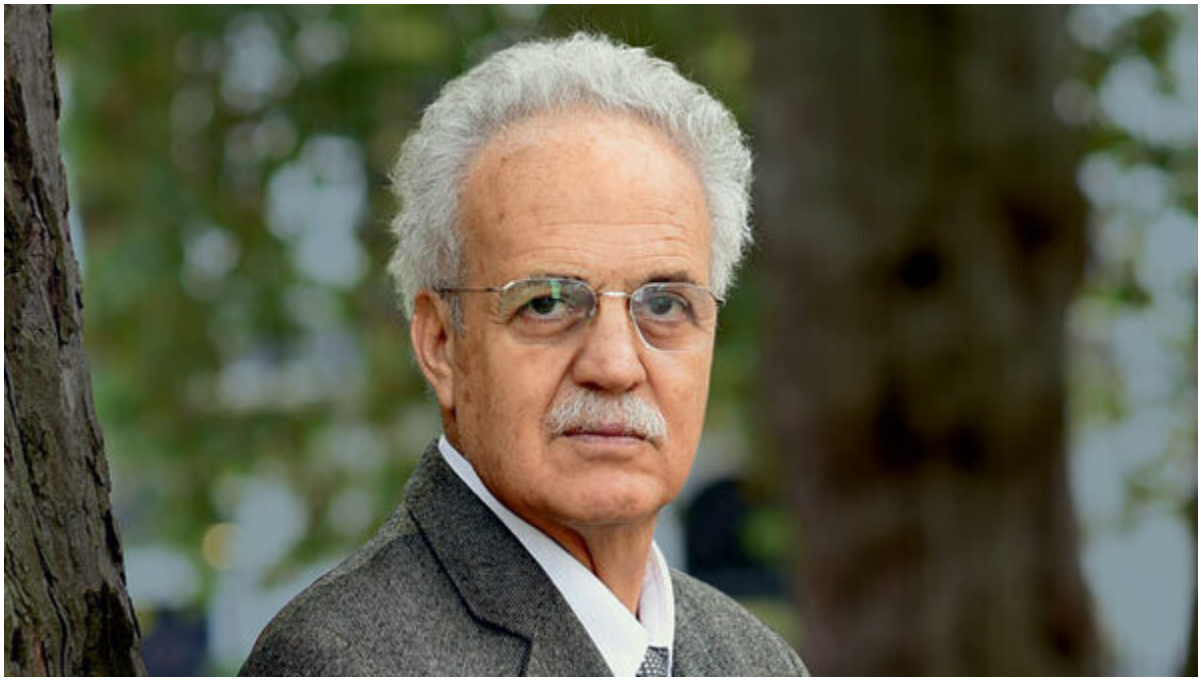
I. West Antarctic ice sheet
Ice loss accelerating

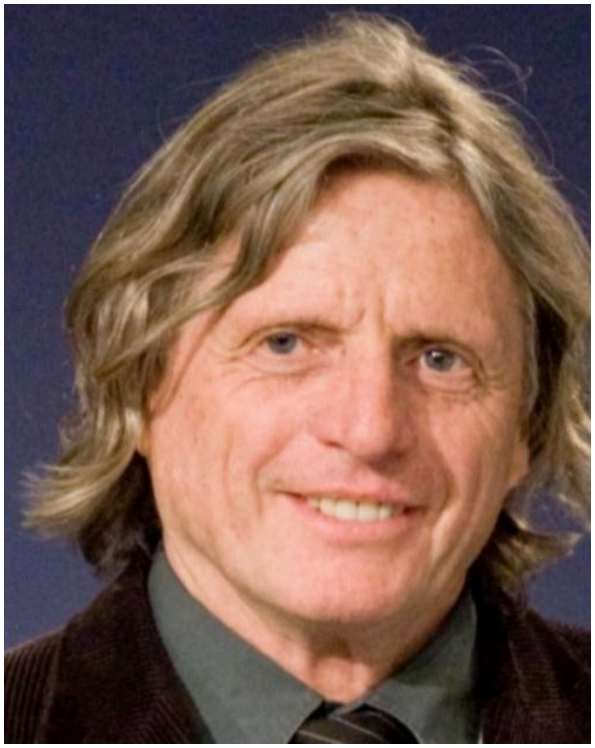
J. Wilkes Basin,
East Antarctica
Ice loss accelerating

Professor Carlos Nobre, co-chair of the Science Panel for the Amazon and globally distinguished Brazilian climate scientist and former Vice Chair of the IPCC, recognized for his pioneering work on the Amazon's tipping point and the role of tropical forests in climate stability. His advocacy for sustainable Amazonian development through initiatives like "Amazonia 4.0" have earned him several prestigious honors.

He stated on 11 October:

'' For sure the Amazon forest is very close to a tipping point''





Martín von Hildebrand is a Colombian ethnologist and anthropologist renowned for his extensive work in securing indigenous territorial rights and conserving the Amazon rainforest. He founded the Gaia Amazonas Foundation and has been instrumental in protecting over 200,000 square kilometers of the Colombian Amazon. In October 2024, he was appointed Secretary-General of the Amazon Cooperation Treaty Organization (ACTO). Recently, von Hildebrand emphasized the urgency of preventing the Amazon from reaching a "point of no return," highlighting the critical need for coordinated conservation efforts.[14]

Professor Virgilio Viana[15] is one of the most respected scientists in this field. This is a direct quote:

''The Amazon rainforest is at a tipping point and if it dies back, the consequences will be catastrophic globally. Now as the climate is changing, rainfall patterns and temperature is increasing, the likelihood of forest fires has grown tremendously and it's likely to continue to increase. So we have to invest heavily in prevention and combating forest fires and this has to include an approach which is centered on communities and people that are the guardians of the

[14] Laureate Martin von Hildebrand takes on top post to promote sustainable development around the Amazon

[15] https://www.pass.va/content/pass/en/academicians/ordinary/viana.pdf

rainforest. And FAST, Foundation for Amazon Sustainability, is focusing exactly on this as a strategic priority at the moment.''

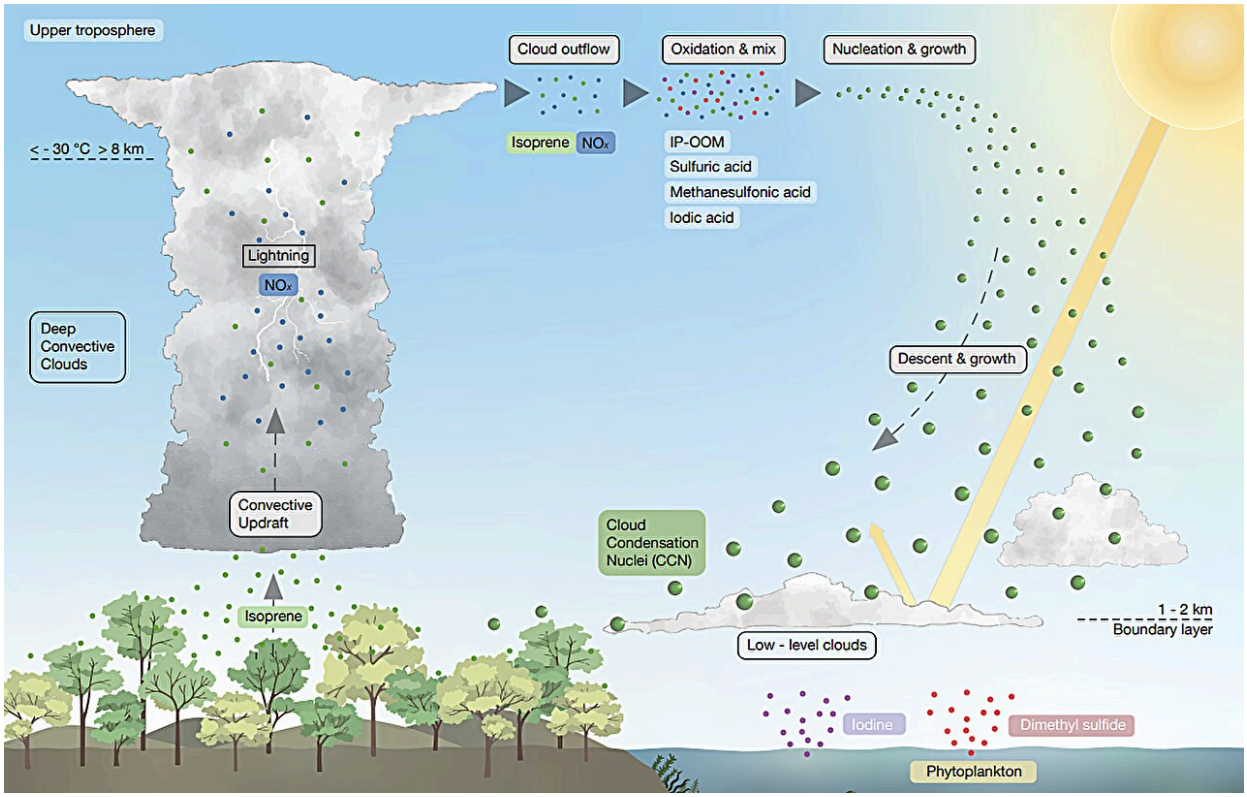
Atossa Soltani is Director of Global Strategy for the Amazon Sacred Headwaters Alliance, supporting a coalition of 30 Indigenous nations in Ecuador and Peru that aims to protect 35 million hectares of tropical rainforests by establishing a protected region that is off-limits to industrial-scale resource extraction. It advocates a new economic model, under Indigenous peoples' stewardship, that prioritises the well-being of Indigenous communities, as well as the ecological integrity of the whole bioregion. Atossa is also the Founder and Board President of Amazon Watch, where she served as the first Executive Director for nearly two decades. She has told the authors that the tipping point is near.

FORESTS MAKE CLOUDS, RAIN, WIND AND COOL THE PLANET[16]

What the Indigenous people have known all along and western science is slowly waking up to is that forests make clouds, wind, rain and cool the planet by exporting latent heat in two steps out into space. This is not correctly in the IPCC models and that is why they are underestimating the importance of especially the tropical rainforests as the evolved cooling organs of the living planet.

[16] The Amazon rainforest as a cloud machine: How thunderstorms and plant transpiration produce condensation nuclei

A recent article by Peter Bunyard, Rob de Laet[17] and others showed calculations that if we regenerate forest and/or change degraded and open agricultural land in the tropical zone of 280 million hectares, this will result in global cooling of about 1 C. The reverse is also true: **if we lose the Amazon, the planet will heat up by at least an additional 2-2.5 C above IPCC trajectories**. More than 90% of the cooling/warming effect of the tropical rainforests is caused by the atmospheric water cycle, driven by all healthy ecosystems, but the tropical rainforests are the champions: the real cooling organs of the living planet.[18]



[Rainforest emissions linked with new particle formation at high altitudes]

To save the Amazon/Orinoco basin, it is essential to revitalize the forest and restore its biotic pump and rainmaking capacity, which are critical for maintaining the region's hydrological cycle. The Amazon's vast forests act as a natural "pump," drawing moisture from the Atlantic Ocean, creating clouds, and generating rainfall that sustains not only the forest itself but also regional and global weather patterns. Deforestation disrupts this process, leading to reduced rainfall,

[17] Lead author of this memo

[18] Calculations Amazon.pdf

prolonged droughts, and the collapse of ecosystems. By restoring degraded areas, replanting native species, and protecting the remaining forest, we can reestablish the biotic pump, enhance moisture recycling, and prevent the tipping point of dieback, ensuring the Amazon/Orinoco basin remains a vital component of Earth's climate regulation system.

The collapse of the biotic pump is not the only factor, the shifting north of the InterTropical Conversion Zone (ITCZ) because of the heating up of the landmasses in the northern hemisphere in the northern summer is a factor as well, but all the more reason to strengthen the biotic pump function of tropical rainforests!

DEATH SPIRAL OF THE AMAZON RAINFOREST

The Amazon Rainforest is now at the tipping point of this death spiral. Even the climatologists who warned of the tipping point of dieback, like Carlos Nobre and Johan Rockstrom, may still underestimate how fast it can go once the biotic pump collapses and the forest does not rain on itself anymore. The largest river system in the world is drying out in a shocking way. Only if we take bold global action we may be able to avert this **largest climate catastrophe in humanity's history**. [19]**URGENT GLOBAL ACTION NEEDED**

The consequences for the planet are horrible, in the short term the collapse of food production, fresh water crisis for cities from Bogota to Sao Paulo, collapse of country electricity grids because the dams will be empty[20] [21], which is already happening in Ecuador. In Southern Africa the record drought affecting 70 million people[22] is directly related to the drought in the Amazon as you know and it is likely that the recent heavy rains in the Sahel and Sahara have been at least partly caused by the collapse of the biotic pump over the Amazon. This is the moment to wake up people to the full extent of this existential tragedy and find the resources to have action at the scale and size to avert the catastrophe. We have limited time to stop the dieback. Maybe not immediately from a science point of view (science is too slow to get a grip on all the details) but from a planetary risk management perspective, this information should be taken very seriously and acted upon!

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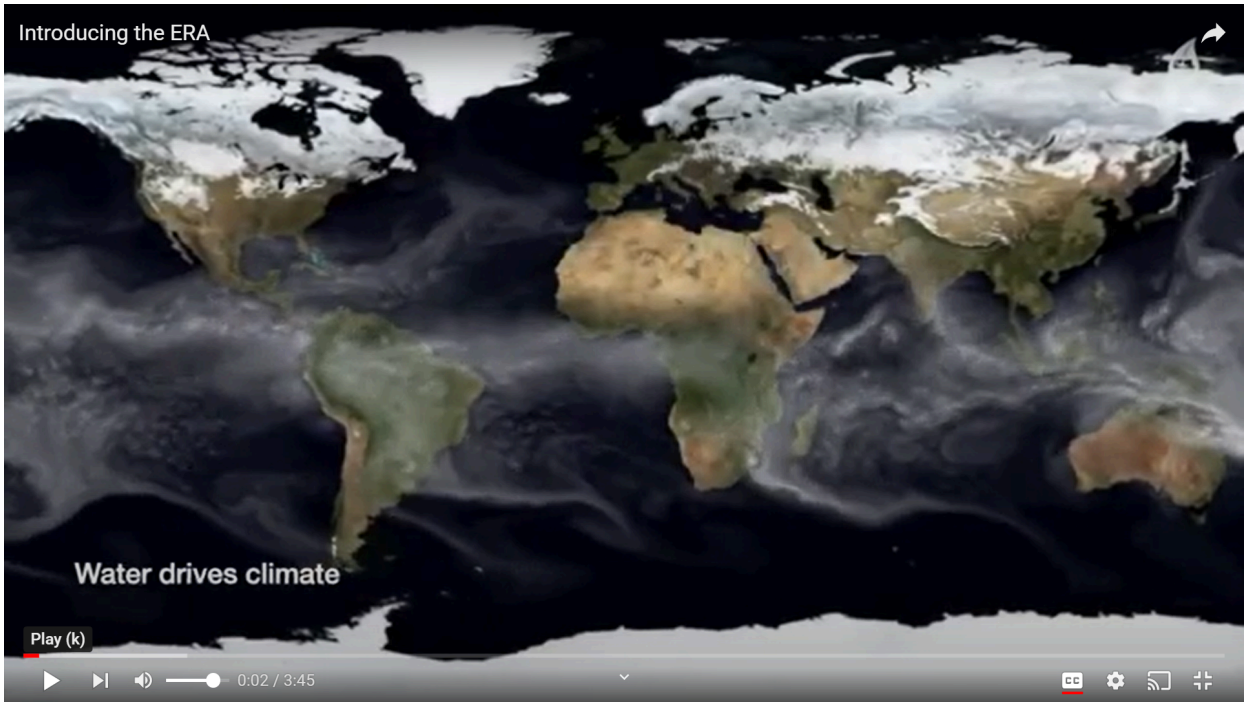
[19] https://www.nature.com/articles/s41586-023-06970-0

[20] South America drought brings wildfires and blackouts

[21] Deforestation is jeopardizing electricity generation in Brazil

[22] Nearly 68 million people reeling from drought in Southern Africa: Official



Look at the powerful atmospheric humidity flow between the Congo rainforest and the Amazon[23].

The world must unite to restore the Amazon rainforest, placing indigenous leadership at the forefront of this vital effort and providing the legal structure, finance, digital services and overall planning support to carry out the enormous program to restore the biome.

Indigenous communities have safeguarded these forests for millennia, understanding the intricate balance between nature and human survival. Their deep knowledge of the land and sustainable practices are crucial for restoring degraded areas and revitalizing the Amazon's ecosystems. By empowering indigenous peoples and supporting their leadership, we can rebuild the forest's resilience, restore its role in regulating the global climate, and ensure the long-term health of this critical biome. Only through global collaboration and respect for indigenous wisdom can we protect and restore the Amazon for future generations.

MANY LARGE SCALE PLANS AND INTENTIONS

Apart from the ACTO/OTCA treaty and organisation which we will describe later, several ambitious plans have been tabled without so far the effect of stopping the destruction.

[23] https://www.youtube.com/watch?v=Ykqvn_6y3-I

1. **Leticia Pact**

The Leticia Pact, signed in September 2019, is a regional agreement involving seven Amazonian countries (Brazil, Bolivia, Colombia, Ecuador, Guyana, Peru, and Suriname). The pact focuses on coordinated efforts to protect and conserve the Amazon rainforest through joint actions, particularly to address deforestation, wildfires, and environmental degradation. It emphasizes cooperation on monitoring, information sharing, and sustainable development initiatives to preserve the Amazon ecosystem.

www.presidencia.gob.pe/leticiapacto

2. Amazon 80x25 Initiative

The Amazon 80x25 Initiative aims to protect 80% of the Amazon by 2025, emphasizing conservation, indigenous rights, and sustainable land use practices. This ambitious target seeks to halt deforestation and degradation by strengthening protected areas, supporting sustainable economic alternatives, and promoting the rights of Indigenous peoples. It is backed by various NGOs, Indigenous groups, and research organizations as part of the broader goal to keep the Amazon ecosystem intact and functioning.

www.amazon80x2025.org

3. Belém Declaration

The Belém Declaration, released after the Amazon Summit in August 2023, is a comprehensive framework with over 100 action points proposed by the eight Amazonian nations (Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela). It focuses on creating unified strategies to tackle deforestation, climate change, and illegal activities like mining and logging. Key aspects include Indigenous rights, scientific research collaboration, sustainable development, and the establishment of new funding mechanisms for Amazon conservation.

DECLARATION OF BELÉM

4. Science Panel for the Amazon / The Amazon We Want

The Science Panel for the Amazon (SPA) produced a comprehensive report titled "The Amazon We Want," offering scientific insights and recommendations for conserving and sustainably managing the Amazon. It highlights the need for urgent action to protect biodiversity, mitigate climate change, and support local and Indigenous communities. The report calls for a shift to sustainable development models, increased investment in conservation, and policy changes at local, national, and international levels.

https://www.theamazonwewant.org

Also many proposals like this one have been written. Here are the most recent ones:

5. A just transition for the Amazon: A mission-oriented framework

This plan presents a framework for sustainably managing the Amazon rainforest while benefiting local communities. It highlights the Amazon's crucial role in climate stability, biodiversity, and water cycles, emphasizing the urgent need to address deforestation, illegal mining, and unsustainable agriculture.

Key proposals include:

1. Mission-Oriented Approach: Setting measurable goals to end deforestation and restore degraded areas by 2030. This involves engaging private and public sectors and local communities in sustainable initiatives.

2. Green Industrial Strategy: Developing the Amazon into a hub for bioeconomic innovation by fostering green industries aligned with local ecosystems.

3. Common Good Framework: Prioritizing collective decision-making, transparency, and benefit-sharing to ensure local communities are active contributors to development.

4. Public-Private Partnerships and Co-Creation: Collaborating with businesses, governments, and Indigenous communities to shape markets that align with environmental and social goals. Conditional agreements would ensure projects benefit local populations and reinvest profits in sustainable initiatives.

This plan is unlikely to help counter the emergency.

6. **Planaveg**[24]

The renewed National Native Vegetation Recovery Plan (Planaveg) for 2025-2028 was launched on October 28, 2024, at COP16 in Cali, Colombia, reaffirming Brazil's goal to restore 12 million hectares of native vegetation by 2030 and might get a new boost. Our digital financial architecture could be of great help to this plan.

The first phase (2017-2024) achieved 1.5 million hectares, mostly in the Mata Atlantic. The updated Planaveg is a collaboration between Brazil's Ministry of Environment and Climate Change, eight ministries, local governments, and key organizations including WWF-Brasil, The Nature Conservancy (TNC), Conservation International (CI-Brasil), World Resources Institute (WRI Brasil), the International Sustainability Institute (IIS), and the Coalition Brazil on Climate,

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24 https://news.mongabay.com/short-article/2024/11/brazil-renews-plan-to-restore-degraded-land-half-the-size-of-the-uk/

Forests, and Agriculture, which also form the União pela Restauração (U4R), another coalition aiming at restoring 4 million hectares of land.[25]

7. Amazonia 2030 Amazonia 2030 is a research initiative dedicated to promoting sustainable development in the Amazon, aiming to achieve social, economic, and environmental well-being in the region by 2030 through evidence-based strategies and policy recommendations.

8. INPA - Instituto Nacional de Pesquisas da Amazônia

The National Institute for Amazonian Research (INPA) is a leading Brazilian research institute focused on the Amazon's biodiversity, ecosystems, and sustainable development. Based in Manaus, INPA conducts interdisciplinary studies on climate, forests, and aquatic systems, promoting conservation and sustainable use of natural resources. It also supports education, training, and public outreach to enhance understanding and stewardship of the Amazon.

9. Gaia Amazonas inspires climate change action and the world's largest ecological corridor

The Andes-Amazon-Atlantic Corridor (also known as the Triple A or AAA Corridor) is an ambitious ecological initiative conceptualized by Martín von Hildebrand, founder of the Colombian NGO Fundación Gaia Amazonas. This proposal aims to establish a 135-million-hectare ecological corridor spanning the Andes mountains, the Amazon rainforest, and the Atlantic Ocean. The primary objective is to protect the world's largest continuous tropical forest and its invaluable biodiversity, while simultaneously addressing global climate change challenges. The corridor would integrate existing protected areas and indigenous territories across multiple South American countries, fostering cross-border collaboration for environmental conservation and sustainable development. This initiative builds upon the vision of the COAMA program, launched in the late 1980s by Fundación Gaia Amazonas and a network of Colombian NGOs, which focuses on empowering indigenous communities and preserving the Amazon rainforest.

10. **Bolsa Verde**

Bolsa Verde (Green Grant) was a Brazilian environmental and social policy initiative launched in 2011 under President Dilma Rousseff, building on earlier environmental policies from the Lula administration as part of the broader **Brazil Without Misery Plan (Plano Brasil Sem Miséria)**. The program aimed to eradicate extreme poverty by addressing both economic and environmental vulnerabilities.

Designed to support rural families living in environmentally sensitive areas, particularly in the Amazon rainforest and other critical ecosystems, it provided financial incentives for sustainable practices through a **payment-for-ecosystem-services (PES) approach**. Families residing in or

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25 https://news.mongabay.com/2024/11/experts-welcome-brazils-revived-reforestation-plan-as-much-needed-boost/

near Brazil's forested areas received direct financial transfers, typically on a regular monthly basis, in exchange for their commitment to protect and sustainably manage their local environment.

The **Bolsa Verde** program, initially championed by **Marina Silva** during her tenure as Environment Minister (2003–2008), was effectively **abandoned in 2017** under President **Michel Temer**. The program, which provided financial incentives to low-income families living in protected areas in exchange for conservation efforts, saw drastic budget cuts and a lack of new enrollments, leading to its de facto termination.

WHY ARE THESE PLANS NOT STOPPING THE DESTRUCTION?

The continued destruction of the Amazon rainforest is driven by several complex, interconnected factors. Despite numerous conservation efforts, these challenges have proven difficult to overcome due to economic, political, and social dynamics. Here are the major factors contributing to ongoing deforestation and degradation:

1. Agricultural Expansion

- Cattle Ranching: A leading cause of deforestation in the Amazon, driven by the global demand for beef. Large tracts of forest are cleared to create pastures, especially in Brazil, which is one of the world's largest beef exporters.

- Soybean Cultivation: Soy farming, mainly for animal feed, has expanded significantly, pushing deeper into forested areas. Although a moratorium helped curb deforestation in some areas, illegal expansion still occurs, and new farmland is constantly being sought.

2. Illegal Logging

- Unsustainable Timber Harvesting: Illegal logging remains rampant, with vast areas cleared to extract valuable hardwoods. Much of this logging is unregulated, causing extensive ecological damage. Corruption and weak enforcement allow illegal operations to continue largely unchecked.

- Infrastructure Access: Roads built for logging operations open up previously inaccessible areas, leading to further deforestation for agriculture and settlement.

3. Mining

- Gold Mining: Both legal and illegal gold mining have devastating effects, especially on river ecosystems. Mining operations lead to deforestation, mercury contamination, and the displacement of local communities.

- Other Minerals: Beyond gold, the Amazon is rich in resources like iron, bauxite, and copper. The growing demand for these minerals has spurred mining operations, further contributing to forest loss.

4. Infrastructure Development

- Roads and Highways: New roads, railways, and infrastructure projects increase accessibility to remote areas, facilitating illegal activities like logging, mining, and land grabbing. For instance, the construction of highways in the Amazon has led to significant deforestation along their corridors.

- Dams and Hydropower Projects: The development of dams for energy has led to flooding large areas of the rainforest, disrupting ecosystems and displacing local communities.

5. Weak Law Enforcement and Governance

- Corruption: Corruption at local and national levels undermines enforcement of environmental regulations. Bribery and illicit networks allow illegal logging, land grabbing, and mining to continue with minimal consequences.

- Inconsistent Policy Enforcement: Shifts in political leadership often lead to changes in conservation policies. Recent political developments in some Amazonian countries have prioritized economic growth over environmental protection, leading to weakened environmental regulations and enforcement.

6. Land Tenure Conflicts

- Land Grabbing: Unclear land ownership and weak governance allow individuals and corporations to illegally occupy and clear land, often at the expense of Indigenous peoples and local communities. These conflicts over land tenure make it challenging to implement effective conservation measures.

- Indigenous Land Rights: While Indigenous territories are often more protected, these lands face increasing pressure from encroachment, mining, and agriculture. Weak enforcement of Indigenous rights exacerbates the issue.

7. Global Market Demand

- Commodity Exports: The global demand for beef, soy, palm oil, minerals, and timber drives deforestation. Countries that rely on these exports as economic mainstays face significant pressure to expand production, often at the expense of environmental conservation.

- Supply Chain Gaps: Even with international efforts like zero-deforestation commitments from companies, enforcement across supply chains remains challenging. Many illegal products still make their way into global markets.

8. Climate Change and Fire

- Climate Change Effects: The Amazon is becoming drier, making it more susceptible to wildfires. Climate change-induced droughts lead to more frequent and severe fires, which can spread quickly across deforested areas.

- Deliberate Burning: Farmers often use fire as a tool to clear land for agricultural purposes. However, these fires can easily get out of control, leading to larger and more destructive blazes that contribute to deforestation and air pollution.

9. Economic Pressures

- Poverty and Economic Necessity: In many Amazonian countries, local communities depend on farming, mining, and logging for their livelihoods. Economic alternatives are often limited, and without viable options, people continue to rely on destructive practices to make a living.

- Governmental Economic Priorities: Many governments view the exploitation of the Amazon as a means to stimulate economic growth, generate revenue, and develop infrastructure. Balancing economic development and conservation remains a persistent challenge.

These factors demonstrate the need for a holistic approach to Amazon conservation, which addresses economic development, governance, land rights, and environmental stewardship simultaneously.

HOW BIG WILL THE DAMAGE BE IN ECONOMIC SENSE

A lot has been written over the years of the costs of the collapse of the Amazon rainforest as well as of the costs of the heating up of the planet. While the authors think these costs are all underestimated both in time and size, because of lack of imagination from the side of the scientific community and economists, they still are sufficiently high to easily merit the investment in reviving the Amazon rainforest. Off late the real damage is starting to sink in.

Here are just a few studies regarding the direct cost to the South American economy:

World Bank: Brazil faces $317 billion in annual losses to Amazon deforestation

Publication: A Balancing Act for Brazil's Amazonian States: An Economic Memorandum

An older study comes with similar ballpark numbers:

Limiting the high impacts of Amazon forest dieback with no-regrets science and policy action

This study on the potential Amazon forest dieback (AFD) highlights the enormous economic and ecological stakes involved in addressing this environmental threat. AFD refers to a hypothesized climate-driven transformation of the Amazon rainforest into a lower-biomass, drought-prone ecosystem, with dire implications for carbon storage, biodiversity, and local climates. This

transformation will have cascading socioeconomic consequences, including impacts on agriculture, energy production, transportation, and health.

Economic projections paint a stark contrast between the costs of inaction and the benefits of proactive measures. Over a 30-year period, socioeconomic damages from AFD are estimated to range between $957 billion and $3.6 trillion, dwarfing the current annual Gross Brazilian Amazon Product of $150 billion. These losses are driven primarily by disruptions to ecosystem services such as water regulation and carbon sequestration. Mitigation and adaptation actions, by comparison, are far less costly, ranging between $64 billion for deforestation curbing and $122 billion for adaptation measures. These "no-regrets" strategies offer benefits regardless of whether AFD occurs.

Quantifiable losses would dominate sectors like agriculture, with projected reductions in crop yields impacting food security across the Amazon and even the La Plata basin. The energy sector could see hydroelectric potential fall by up to 50%, jeopardizing power supplies. Additional losses, such as declines in fisheries and increased costs in health and transportation, would further strain regional economies. Non-quantifiable impacts, such as urban migration and health crises due to diseases and malnutrition, compound these challenges, highlighting the profound societal costs of inaction.

The economic benefits of taking immediate action lie in both averting catastrophic losses and fostering long-term resilience. Investment in reforestation, sustainable land use, and decentralized energy infrastructure would not only mitigate potential damages but also enhance local livelihoods and ecosystem health. The study underscores the urgent need for interdisciplinary research and coordinated policy action to address the uncertainties surrounding AFD and ensure a sustainable future for the Amazon and its people.

Damage of rising temperatures to the global economy

The working paper titled "The Macroeconomic Impact of Climate Change: Global vs. Local Temperature" by Adrien Bilal and Diego R. Känzig quantifies the global economic effects of climate change. It finds that a 1°C increase in global temperature reduces global GDP by 12%, significantly higher than prior estimates of 1-2%. Using a novel dataset spanning 120 years and a time-series local projection approach, the study identifies that global temperatures correlate strongly with extreme weather events, unlike localized country-level temperature measures.

The authors integrate these findings into a neoclassical growth model, estimating a 25% welfare loss and a social cost of carbon (SCC) of $1,367 per ton, far exceeding earlier estimates. Key drivers of these substantial impacts include extreme climatic events such as heatwaves, droughts, and storms, which are better predicted by global temperature trends than local ones. The research underscores the higher economic costs of global warming compared to localized temperature changes and highlights the importance of global decarbonization policies, which become cost-effective under these new estimates. The paper advocates reevaluating climate policy priorities given the underestimated economic risks of global temperature rises.

Obviously all these papers underestimate the effects as there are no calculations of the effects of the disrupted atmospheric hydrology in these papers and still the business case is obvious if only looking at carbon, not at water. Once these are in the models, we will find the impacts are both faster and greater.

NBER WORKING PAPER SERIES THE MACROECONOMIC IMPACT OF CLIMATE CHANGE: GLOBAL VS. LOCAL TEMPERATURE Adrien Bilal Diego R. Känzig

DO WE HAVE EXAMPLES OF SUCCESSFUL LARGE REGENERATION PROJECTS?

A few very large projects have been successful in the last few decades:

- The world's largest nature regeneration projects include the Great Green Wall in Africa, which aims to restore 100 million hectares of degraded land across the Sahel and has already restored 20 million hectares while creating 350,000 jobs.
- China's Three-North Shelter Forest Program, the largest artificial forest project, has increased tree cover from 12% to 18% over 50 million hectares to combat desert expansion.
- The Bonn Challenge targets restoring 350 million hectares globally by 2030, involving countries like Brazil and Rwanda, but it is not clear how much has been really done on the ground.
- The Loess Plateau Rehabilitation Project in China restored 3.5 million hectares of heavily eroded land, reducing Yellow River sediment runoff by 100 million tons annually and boosting agricultural productivity.
- The Eden Reforestation Projects have planted close to a billion trees in various countries including very large projects in Madagascar.
- FMNR projects in Niger and elsewhere have recovered at least 6 million hectares of desertified land.

These projects collectively showcase transformative efforts in reforestation, biodiversity recovery, and sustainable land management at a massive scale.

WHAT NEEDS TO CHANGE?

None of the earlier mentioned initiatives have stopped and reversed deforestation in the Amazon area. In fact in 2024 we are seeing another year of record destruction of the Amazon and the adjacent Pantanal and Cerrado. More success has been achieved in the Mata Atlantica where governance is much better organized. What needs to change?

1. Strengthen and Enforce Environmental Laws

- Strict Law Enforcement: Governments need to improve monitoring and enforcement of existing environmental regulations. This includes cracking down on illegal logging, mining, and land grabbing, with heavy penalties for violators. Effective use of technology, such as satellite monitoring and drones, can help detect illegal activities in real-time.

- Anti-Corruption Efforts: Tackling corruption within enforcement agencies is critical. Heavier punishment, transparent processes, independent oversight, and rewarding community engagement can help beat this disease threatening planetary health. It is clear that the Amazon countries need the world to support these efforts with finance and technology.

2. Secure Land Rights for Indigenous Peoples and Local Communities

- Legal Recognition: Indigenous and local communities are often the best stewards of the forest. Securing more legal land titles and recognizing their rights will help protect vast areas of the Amazon. Evidence shows that Indigenous-managed lands tend to have lower deforestation rates.

- Support for Indigenous Guardians: Increase funding and support for Indigenous forest guardians who actively monitor and protect their territories. These programs can include training, equipment, and legal assistance to empower Indigenous leaders.

3. Promote Sustainable Economic Alternatives

- Agroforestry and Regenerative Agriculture: Encourage sustainable farming methods that integrate trees and crops, such as agroforestry and regenerative agriculture. These practices can improve soil health, increase biodiversity, and provide farmers with additional income sources without destroying the forest.

- Ecotourism and Non-Timber Forest Products: Promote ecotourism and the sustainable harvesting of non-timber products (like nuts, fruits, and medicinal plants) as alternative income sources. These activities can provide local communities with economic benefits while maintaining the forest ecosystem.

- Green Financing: Offer incentives for companies and farmers who adopt sustainable practices, including access to green loans, tax breaks, and carbon credits. Investors can participate via "Living Forest Shares," providing upfront capital and receiving returns from carbon offset sales or offset credits themselves for the regeneration of Indigenous territories. These financial mechanisms can make sustainable choices more attractive and economically viable.

Envisionation's Biosphere Restoration Plan utilizes Empathy Coins—digital assets linked to environmental restoration—to enable inclusive investment in Earth's recovery. Each coin represents one tonne of living carbon, aligning financial returns with biosphere health and fostering a sustainable future. They will be one of our partners. (envisionation.org)

For Indigenous territories, we will partner with Kwaxala, an Indigenous-led cooperative fund dedicated to protecting and regenerating at-risk forests by transferring stewardship back to Indigenous communities. In the Kwaxala formula,we will not prefinance with a loan, but by acquiring the legal rights to invest in the regeneration of Indigenous land and ecosystems. This innovative approach enables forests to generate income through carbon credits and ecosystem services, benefiting both Indigenous stewards and investors. Their pilot project in British

Columbia returns 140,000 acres to the Kwiakah First Nation, transforming it into a sustainable economic asset. Kwaxala's model offers a scalable, equitable solution for forest conservation and Indigenous empowerment, applicable to the Amazon Indigenous areas as well als other areas such as nature reserves. (kwaxala.com)

4. Implement Sustainable Supply Chain Policies

- Zero-Deforestation Supply Chains: Encourage and enforce commitments from companies to eliminate deforestation from their supply chains. This includes stricter certification standards for commodities like beef, soy, and palm oil, with penalties for violations.

- Consumer Awareness and Advocacy: Increase consumer awareness of the environmental impact of their purchases. Empower people to make informed decisions by providing clear labeling for sustainably sourced products and promoting brands committed to ethical practices.

5. Large-Scale Reforestation and Restoration

- Massive Reforestation Programs: Launch large-scale reforestation projects to restore degraded land, replant native species, and rebuild biodiversity corridors, with recovering landscape design in a strategic way. Agroforestry enhances connectivity between forest patches, mitigating edge effects and enabling wildlife movement, with 100-meter corridors supporting species like tamarins and large cats. Protecting and connecting tropical forest islands in deforested areas aids forest recovery by acting as seed banks, wildlife refuges, and biodiversity reservoirs, facilitating natural regeneration and species migration. They also reduce soil erosion and buffer against extreme weather, creating favorable conditions for forest regrowth.

These programs should involve local communities, creating jobs and economic incentives.

- Nature-Based Solutions: Prioritize nature-based solutions, such as rewilding and carbon sequestration through forest restoration. These approaches enhance ecosystem services, improve water quality and infiltration and combat extreme weather.[26]

6. Integrate Climate Action with Conservation Efforts

- Climate Finance for Forest Conservation: This plan is built on the large scale deployment of capital to support forest protection. .

- Adaptation and Resilience: Invest in climate adaptation measures to protect the Amazon from the effects of climate change. This includes restoring natural water cycles, improving fire management, and building resilience among local communities, as seen in the 12 measures.

7. Strengthen Regional and Global Cooperation

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[26] Global potential for natural regeneration in deforested tropical regions | Nature

- Cross-Border Collaboration: Encourage cooperation among Amazonian nations to create unified policies on conservation, illegal activities, and sustainable development. ACTO (Amazon Cooperation Treaty Organization) can play a pivotal role in coordinating these efforts.

8. Enhance Technological Monitoring and Data Transparency

- Real-Time Monitoring Systems: Invest in advanced satellite and AI-based monitoring systems that can detect illegal deforestation, fires, and other harmful activities in real time. Open data platforms can allow the public, researchers, and NGOs to track deforestation trends and hold governments accountable.

- Blockchain for Traceability: Use blockchain technology to improve transparency and traceability in supply chains, ensuring that products sourced from the Amazon are produced sustainably and legally. This could help reduce illegal trade in timber, gold, and other resources.

9. Engage and Educate Local Communities

- Education and Training Programs: Invest in education and training for local communities to increase awareness of sustainable practices and conservation. This could include agricultural training, financial literacy, and climate education programs that empower people to adopt and advocate for sustainable practices. They are mentioned in the 12 point plan.

- Empower Youth and Women: Engage youth and women in conservation efforts, providing them with leadership roles and economic opportunities. Empowering local leaders can help sustain long-term community-driven conservation efforts.

10. Shift Economic Priorities

- Rethink Economic Growth Models: Encourage Amazonian nations to shift away from extractive economic models that prioritize short-term gains at the expense of long-term sustainability. Governments should explore how to balance economic development with environmental stewardship, emphasizing sectors that support forest preservation.

- Debt-for-Nature Swaps: Consider debt-for-nature swaps, where countries can relieve portions of their national debt in exchange for commitments to conserve and restore the Amazon. This can provide financial relief while prioritizing environmental preservation.

Addressing the destruction of the Amazon requires coordinated global and local actions that account for social, economic, and environmental dimensions. By combining these measures, we can create a mid- and long term path forward that ensures the Amazon remains a vibrant and essential part of our planet's ecosystem. But it will not work in the short run and we have run out of time. These processes will take decades while the Amazon is now pointing a bullet at the whole planet.

AN EMERGENCY PLAN: FROM WORDS TO ACTION

As the area is now in an accelerating downward spiral with existential consequences for life on our planet, we need to turn words into action at the speed needed to avert collapse of the forest and with that the global climate.

The emergency proposal consists of five parts:

1. Declaring Legal Personhood of the Amazon: possibly upgrading the ACTO (Amazon Cooperation Treaty Organization) or another existing legal structure treaty, with a focus on indigenous peoples having a deciding voice in governance.[27]

2. Global Financing: Rally the world to finance around 2 billion USD per month for approximately two years and then it slowly scales down, depending on necessity to 1 billion USD per month.

3. A worked out Strategic Plan that focuses on the highest priorities for protection and regeneration, to be launched at the COP30 in Belem. The draft is written below and needs to be enriched by parties to have the highest impact possible

4. A comprehensive plan to deploy these resources effectively coupled with an automated digital monitoring reporting and verification protocol leading to Payment for Eco Services.

5. Twelve key measures to reverse the dieback:

1. **Provide up to $500 monthly to 1.5 million families, including Indigenous, quilombola, and riverine communities, to protect and regenerate forests through community-led plans and sustainable landscape management and satellite-digital-financial architecture.**

2. **Protection and Regeneration Contracts: Contracts for Indigenous territories, protected areas, and national parks to ensure forest guardianship and stewardship.**

3. **School Program: Implement agroforestry, permaculture, fish ponds, and tree nurseries in 50,000 schools.**

4. **Fire Brigades and Equipment: Equip 10,000 brigades with fire prevention and firefighting tools.**

5. **Network of Seed Collectors: Employ 100,000 collectors to gather native seeds for reforestation.**

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[27] https://otca.org/en/about-us/

6. **Cattle Buyback Program: Buy back 5 million cattle and restore 5 million hectares of land to forest**

7. **Ban on Monoculture Crops in Core Area: Prohibit soy, sugar cane, and palm monoculture, supporting farmers to transition to more profitable agroforestry alternatives.**

8. **Control Entry Points on Roads, Rivers, and Airstrips: Establish 1,000 control posts to monitor illegal access.**

9. **Community Empowerment and Governance: Set up 1,000 governance councils and train 10,000 community monitors.**

10. **Real-Time Forest Monitoring Alert system for Forest Guardians: Empower and deploy 20,000 guardians as well as Fire Brigades with monitoring equipment.**

11. **Health Care Program: Provide mobile clinics, telehealth, and preventive health campaigns for remote areas.**

12. **Solar Panel Program: Install solar panels for 1.5 million homes, 50,000 schools, and convert 10,000 boats to solar power.**

DECLARING LEGAL PERSONHOOD OF THE AMAZON

LEGAL PERSONHOOD

Legal personhood is a transformative legal framework that grants ecosystems like rivers, forests, and entire biomes the rights typically reserved for individuals or corporations. By recognizing the Amazon-Orinoco water basin as a legal entity, we can protect its right to exist, regenerate, and thrive. It will act as a governance structure that allows investments in the area to be done and it is likely that we can create a return on investment within 10-15 years with an IRR of 6% and an off-balance global beneficial influence of magnitudes that level as it repairs the climate wholescale.

Legal personhood gives it a powerful defense against deforestation, pollution, and other destructive activities. This legal status would allow guardians - often indigenous communities or environmental organizations - to act on behalf of the ecosystem in courts, ensuring that any harmful actions are legally challenged. The Amazon-Orinoco basin, as the largest cooling organ of the planet, plays a critical role in regulating global climate by driving the biotic pump, which draws moisture from the Atlantic and creates rainfall, maintaining the water cycle across vast regions. Legal personhood would not only protect this biome from forest dieback and ecological collapse but also ensure the long-term sustainability of the planet's climate system. This crucial step is necessary for the basin to continue functioning as a vital planetary cooling mechanism, safeguarding both local biodiversity and global climate stability.

DECLARATION OF THE RIGHTS OF THE AMAZON

With the official declaration of the right of the Amazon, first at the XI Pan-Amazonian Social Forum in Bolivia in June 2024 and again at COP16 in Cali, Colombia in October 2024, a first step has been set in this direction. The declaration asserts the Amazon's fundamental rights, highlighting its critical role as a global climate stabilizer and source of biodiversity. It emphasizes the need to recognize the Amazon as a subject of rights, based on the interdependence between its ecosystems and Indigenous peoples. The declaration outlines specific rights, including the right to life, respect, health, and restoration, and calls for the Amazon to be free from contamination, commercialization, and extractivism. It urges Amazonian states to adopt legal measures to protect these rights and recognize Indigenous peoples as key defenders of the Amazon. Additionally, it stresses the importance of global cooperation, the recognition of Indigenous wisdom, and the establishment of sustainable practices. It calls on governments to halt extractivism, create protective zoning, and ensure the Amazon's representation in global climate discussions, aiming for a transition toward sustainable, community-based energy alternatives. Here is the link to the full declaration.

DECLARATION RIGHTS OF THE AMAZON.docx

AMAZON COOPERATION TREATY ORGANIZATION (ACTO or OTCA in Spanish)

The legal structure of the Amazon Cooperation Treaty Organization (ACTO) offers a powerful platform to launch and coordinate a large-scale restoration program for the Amazon. As an intergovernmental body composed of the eight Amazon basin countries, ACTO's mandate is to promote the sustainable development and conservation of the Amazon region through regional cooperation. By leveraging ACTO's legal framework and established governance mechanisms, we can align national policies, secure multilateral funding, and coordinate actions across borders to restore the forest. ACTO's organizational structure, which already includes working groups on biodiversity, water management, and indigenous affairs, can be expanded to integrate forest restoration initiatives under indigenous leadership. This approach would ensure that the program respects national sovereignty while fostering collaboration on shared goals, such as reviving the biotic pump, enhancing ecosystem services, and securing climate resilience for the entire Amazon basin. Through ACTO, we can channel resources, expertise, and political will to effectively implement this critical program.

EMPOWERING THE GOVERNANCE OF ACTO/OTCA

The Amazon Cooperation Treaty Organization's (ACTO) governance structure can quickly be reinforced to ensure a key role for Indigenous peoples and local communities in its decision-making processes. This can be achieved by creating permanent seats for Indigenous representatives and local community leaders within the governing body, giving them a decisive voice in the development and implementation of conservation and restoration policies across the Amazon basin.

COICA, FOSCA AND NATIONAL INDIGENOUS PLATFORMS

COICA (Coordinator of Indigenous Organizations of the Amazon River Basin). COICA represents the Indigenous peoples of the nine countries that make up the Amazon Basin: Bolivia, Brazil,

Colombia, Ecuador, Guyana, Peru, Suriname, Venezuela, and French Guiana. Founded in 1984, COICA works to defend the rights, territories, and cultures of Indigenous peoples across the Amazon, advocating for sustainable development, protection of the rainforest, and Indigenous leadership in environmental governance. COICA plays a key role in uniting Indigenous voices for collective action and representation on regional and global platforms.

If the Indigenous councils agree, COICA can play a leading role in ACTO by formalizing its participation in the treaty's governance structure, granting it a decisive voice in decision-making processes related to the protection and sustainable management of the Amazon basin.

FOSCA (Forest Solutions for Climate Action) is based in Peru. It operates within the framework of nature-based solutions and focuses on forest conservation and ecosystem restoration across the Amazon region. The initiative collaborates with various local, national, and international stakeholders to implement projects that help mitigate the effects of climate change while promoting sustainable development in the region.

Fundación Gaia Amazonas, founded in 1990 by Dr. Martín von Hildebrand, an ethnologist and anthropologist renowned for his work in securing indigenous territorial rights and protecting the Colombian Amazon rainforest. It is currently led by Director Francisco von Hildebrand and is focused on protecting the Amazon rainforest by empowering indigenous communities to manage their territories sustainably. The organization supports indigenous governance by developing life plans, advocating for legal recognition of their rights, and integrating traditional knowledge with modern conservation strategies.

Gaia Amazonas is a Colombian non-governmental organization dedicated to the comprehensive protection of the Amazon rainforest through collaboration with its Indigenous inhabitants. For over three decades, the organization has developed socio-environmental and cultural strategies rooted in Indigenous governance systems and traditional knowledge. Their initiatives focus on empowering Indigenous communities, promoting sustainable development, and fostering intercultural policies to ensure the Amazon's resilience and preservation.

The Amazon Sacred Headwaters Initiative is an Indigenous-led effort to protect and restore 35 million hectares in the headwaters of the Amazon, spanning Ecuador and northern Peru, where the Marañón and Napo rivers converge. This sacred and biodiverse region, home to Indigenous communities like the Achuar, Kichwa, Shuar, and Waorani, is a vital carbon sink and biodiversity hotspot. The initiative opposes oil extraction and deforestation, promoting sustainable livelihoods and a post-extractive economy guided by Indigenous sovereignty. The Amazon Sacred Headwaters Alliance (ASHA), founded with federations like CONFENIAE and AIDESEP, oversees these efforts, protecting 86 million acres in the Napo, Pastaza, and Marañón Basins. Led by Uyunkar Domingo Peas Nampichkai, an Achuar leader, and supported by Atossa Soltani as Director of Global Strategy, ASHA unites Indigenous nations and NGOs to champion conservation, sustainability, and Indigenous leadership.

NATIONAL ORGANIZATIONS

In Brazil, APIB (Articulação dos Povos Indígenas do Brasil) represents Indigenous peoples nationwide, advocating for their rights and environmental protection. In Colombia, ONIC (Organización Nacional Indígena de Colombia) is the main body uniting Indigenous communities for political, social, and territorial rights. In Peru, AIDESEP (Asociación Interétnica de Desarrollo de la Selva Peruana) leads the defense of Indigenous lands and cultural survival in the Amazon. Ecuador's CONAIE (Confederación de Nacionalidades Indígenas del Ecuador) represents Indigenous nationalities in political and environmental struggles. In Bolivia, CIDOB (Confederación de Pueblos Indígenas de Bolivia) works to protect Indigenous rights and territories, particularly in the lowlands. In Venezuela, ORPIA (Organización Regional de Pueblos Indígenas de Amazonas) represents Indigenous communities in the Amazon region, focusing on land and cultural rights. The Amerindian Peoples Association (APA) in Guyana advocates for the rights of Indigenous peoples, focusing on land protection and sustainable development. In Suriname, VIDS (Vereniging van Inheemse Dorpshoofden in Suriname) represents Indigenous villages and chiefs, working to protect their land and culture. In French Guiana, FOAG (Fédération des Organisations Autochtones de Guyane) unites Indigenous organizations to defend their land rights and cultural heritage.

All these organizations will be asked to take part in the great regeneration plan.

GLOBAL FINANCING: RALLY THE WORLD TO FINANCE THE RESCUE AND RECOVERY

Financial structuring:

The project will be financed by public and private sector funds through a combination of debt and equity. This will include senior debt as well as first loss equity from multilateral development banks, agencies, sovereigns and their sovereign wealth funds. The middle layer of capital will be provided by private sector funds at attractive yields, this is possible thanks to the cost efficient leverage through the public capital.

The structures managing the project will be set up in a reputable jurisdiction (likely Luxembourg) and the debt raised will be in the form of listed green bonds with a very clear use of proceeds. To minimise fraud and losses funds will be unlocked only when particular stages of projects are achieved.

Corporate governance and compliance will be of the highest quality with multiple levels of auditing and review.

The financial structuring and compliance are using the tried and tested practices of large infrastructure investments rather than the venture capital approaches of the climate change investment sector up until now.

To secure $2 billion USD per month for the next two years to protect and restore the Amazon, we need to leverage a strategic mix of blended finance, green bonds, carbon-sequestration based investments and government financial incentives. Novel digital assets linked to

environmental restoration, such as the soon to be launched Empathy Coin, enable inclusive investment in Earth's recovery, aligning financial returns with biosphere health and fostering a sustainable future. (envisionation.org)

Blended finance - where public and philanthropic funds de-risk investments for private capital - can mobilize significant resources by incentivizing private sector involvement in ecosystem restoration projects. Public funds from governments and multilateral institutions would provide a foundational guarantee, reducing the risk for private investors and attracting large-scale capital flows. Simultaneously, green bonds, which raise money specifically for environmental projects, can be issued by governments and financial institutions, with the Amazon's restoration serving as a key driver for carbon storage and climate resilience. These bonds can appeal to global investors seeking sustainable returns. However, these processes are too slow currently and we need to adapt to get the finance much faster.

Furthermore, investments tied to carbon sequestration credits - where companies or governments pay for the Amazon's ability to absorb and store carbon - can generate additional revenue streams. As companies commit to achieving net-zero emissions, demand for carbon credits is growing, and the Amazon offers one of the most effective natural solutions for carbon sequestration. By establishing a transparent and verifiable system for monitoring carbon absorption through restored ecosystems, we can create a sustainable financial mechanism, ensuring that investors, governments, and corporations contribute to the funding necessary to safeguard the Amazon and the global climate. This blend of financial strategies would not only meet the $2 billion per month goal but also create a replicable model for large-scale climate action financing.

Government programs can significantly boost restoration efforts. For example, Brazil's national development bank (BNDES) is channeling ca. 36 billion USD to restore 24 million hectares and remove 1,65 billion tons of CO_2 from the atmosphere by 2050 within the "Arc of Restoration" project. The same bank promotes credit lines for the forest sector that includes forest restoration and may have an important impact in the implementation on the ground.

We propose expanding **Bolsa Verde 2.0** across all Amazon Basin countries - Brazil, Bolivia, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela - as a **regional incentive program** to protect forests, support sustainable livelihoods, and combat climate change. Modeled after Brazil's initiative, the program would provide **financial incentives** to Indigenous peoples, traditional communities, and smallholders in exchange for conservation efforts, sustainable agroforestry, and biodiversity protection. Backed by **carbon and biodiversity credits, international climate finance, and community-led monitoring**, it would foster **regional cooperation** through the **Amazon Cooperation Treaty Organization (ACTO)** and other stakeholders. By 2030, the initiative aims to **protect 50 million hectares, support 2 million families, and prevent gigatons of CO_2 emissions**, making it a flagship model for nature-based solutions and sustainable development in the Amazon.

To finance the Amazon restoration project effectively, there are several existing instruments that can be applied both in Brazil, Colombia, and on the world stage. These tools leverage public-private partnerships, sustainable investments, and carbon markets.

1. Blended Finance Initiatives:

- IDB's Amazon Initiative: The Inter-American Development Bank (IDB) is a key player in mobilizing finance for environmental projects in the Amazon. Blended finance tools that combine concessional financing from IDB with private capital can be used to lower investment risks and encourage greater private sector participation.

- The Tropical Forest Alliance (TFA): Global platforms like TFA, which coordinate public and private sector commitments, offer a framework for blended finance initiatives that can be applied in both Brazil and Colombia to scale ecosystem restoration.

2. Green Bonds:

- Brazilian Development Bank (BNDES) Green Bonds: BNDES has started issuing green bonds aimed at financing sustainable agriculture and reforestation projects. These can be extended to support larger-scale Amazon restoration efforts, with bonds dedicated to carbon sequestration and climate resilience.

- Colombian Green Bond Program: Colombia is also developing its green bond market, with government and multilateral support. Scaling this for forest restoration in the Colombian Amazon, similar to the Arc of Restoration in Brazil, can help channel more funds towards ecological recovery.

3. Debt-For-Nature Swaps

Debt-for-nature swaps are financial arrangements where a portion of a country's external debt is forgiven in exchange for investments in environmental conservation, typically protecting biodiversity or restoring ecosystems. These swaps would be particularly effective in Amazon countries with high debt levels and rich biodiversity, such as Venezuela, Suriname, and Bolivia, as they face fiscal constraints but host critical ecosystems that benefit from enhanced conservation funding.

The Amazon Basin spans nine South American countries. Government debt, as a percentage of GDP, varies across these countries: Brazil (84.68%), Bolivia (80.8%), Peru (32.1%), Ecuador (55.4%), Colombia (54.3%), Venezuela (241%), Guyana (26.4%), Suriname (90.3%), and French Guiana (N/A, data included in France's). A higher debt-to-GDP ratio indicates a greater debt burden, impacting fiscal policy and economic stability.

4. Carbon Credit Markets:

- Voluntary Carbon Markets (VCM): Programs like the Amazon Fund in Brazil, which has recently reopened, focus on international donations and can be expanded to integrate carbon credit projects, leveraging the Amazon's massive carbon sequestration potential.

- ART-TREES: The Architecture for REDD+ Transactions (ART) launched a program known as TREES (The REDD+ Environmental Excellence Standard) that can issue high-integrity carbon credits for large-scale forest restoration. Both Brazil and Colombia could adopt this model to mobilize capital from carbon markets.

- Forest Carbon by Planet.com now has such a granular real time tool for tree density observation, it can be used to collect data on any polygon in the area.

5. Global Financing Institutions:

- Green Climate Fund (GCF): The GCF, which funds large-scale climate resilience projects, can be tapped into by Brazil and Colombia, providing essential funding for the Amazon restoration program through existing international channels. Total size is about 10 Billion USD for worldwide program.

- Global Environment Facility (GEF): GEF funds can also be mobilized for biodiversity and ecosystem restoration projects, particularly under the Amazon Sustainable Landscapes Program, which already covers parts of the region. GEF has funded various environmental projects in Latin America, with an approximate **$1 billion** already disbursed through the **Amazon Sustainable Landscapes Program**. This funding directly supports forest conservation and sustainable land management across the Amazon basin.

6. The LEAF Coalition, a public-private partnership backed by governments and companies like Amazon and Unilever, can provide substantial funding for the Amazon restoration by purchasing high-integrity carbon credits from Brazil and Colombia, helping to meet the $2 billion per month target through emissions reductions and forest conservation. This initiative leverages both public and private capital to accelerate large-scale forest protection and restoration efforts. Total commitment is about 1 billion USD.

7. The Amazon Fund, managed by Brazil's national development bank (BNDES), is a major financing mechanism aimed at reducing deforestation and promoting sustainable development in the Amazon. Funded by international donors like Norway and Germany, it can play a crucial role in mobilizing resources for large-scale forest restoration by supporting projects that preserve biodiversity, promote sustainable land use, and generate carbon credits to further attract global investments. Current size is about 600 million USD.

8. The United Nations Capital Development Fund (UNCDF) focuses on providing financial support to low-income countries. In the Amazon, Bolivia and Guyana could apply for funding to finance forest conservation, ecosystem restoration, and sustainable development projects.

UNCDF could help these countries use blended finance to attract investment for environmental initiatives, including green bonds and sustainable projects like reforestation and Indigenous-led conservation. By mobilizing climate finance and supporting local communities, UNCDF would play a key role in developing economic models that protect the Amazon and support local livelihoods.

9. The Tropical Forests Forever Facility (TFFF) is a proposed Brazilian-led endowment fund intended to conserve tropical forests worldwide. Presented by Brazil's government, this fund aims to mobilize up to $250 billion, sourced from public and private sectors, to support forest conservation across the Amazon, Congo Basin, and Southeast Asia. It is structured as a "pay-for-performance" model, rewarding countries that meet specific deforestation reduction targets, with the goal of reducing deforestation rates to 0.5% or lower. The fund will invest in a diversified portfolio, generating returns to support tropical forest countries financially for their conservation efforts. Countries may opt for periodic cash payouts or reinvestment to increase long-term gains. The TFFF also aims for simplicity and transparency by using satellite monitoring to track deforestation and facilitate fund allocation.[28]

Operational launch of the TFFF is expected at COP30 in Belém, Brazil, in 2025, with backing from global institutions like the World Bank, which will assist in management and verification processes.

If the entire Amazon and Orinoco forest areas were enrolled in ARR and REDD+ like programs, the forests could potentially sequester between **1 and 2 billion tons of CO2 per year**, depending on the sequestration rate.If the forest cover would be restored to its original size, the total theoretical maximum sequestration capacity would be around 4 billion tons plus close to 1 billion ton avoided emissions from further forest fires and destruction, This makes these forests critical to global climate mitigation efforts, with a potential for carbon credit sales upwards of 10 billion USD per year with a theoretical maximum of 60 billion at current market prices (ARR 25 USD, REDD+ 7 USD).

These financial tools, combined with international commitments from governments, multinational corporations, and investors seeking to offset carbon emissions, can generate the necessary $2 billion per month for restoring the Amazon, creating a model that can be replicated globally.

Green Bond Scenario for the Amazon Restoration Project with Debt-for-Nature Swaps

FIRST PHASE SPECIAL VEHICLE

Step one, we are asking Bio4Climate, a 501c3 with aligned objectives to be the fiscal sponsor of the first phase for fundraising for the design sprint conference for the digital-financial architecture and start up of pilot projects as well as fundraising for a detailed feasibility study.

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[28] https://www.cgdev.org/publication/tropical-forest-finance-facility

Foundation for Amazon Sustainability (FAS), the largest civil society organization of the region, founded in 2008, has in principle agreed to process the finance for the first phase of this project till COP30 in Belem. FAS works with bottom up, participatory, on the ground projects, with a people centered approach to develop nature based solutions for both climate adaptation and mitigation. FAS is the largest and most acclaimed civil society organization of the Amazon with a permanent staff of 150, based in Belem

It has strong governance, compliance and safeguards, including (i) strategic planning with support of Bain and Company updated regularly, now up to 2030; (ii) 32 independent audits by PwC, with no observations; (iii) recipient of 30+ prizes, including Annual Award for Humanity by Gulbenkian Foundation, UNESCO Prize on Education for Sustainable Development; Best Brazilian Civil Society Organization; among others.

Possible financial partners to form the project's Green Finance Task Force are:

Clean Valley Capital

EQX Biome

Open Future Fund - Open Future Coalition

Regen Network

A PLAN TO PROTECT AND REGENERATE THE AMAZON (EXTENDED DESCRIPTION OF 12 POINT PLAN)

To effectively restore and protect the Amazon, a comprehensive action plan is essential, targeting multiple areas of intervention that integrate environmental stewardship, community empowerment, and technological advancements. The following key initiatives form the backbone of this ambitious effort.

The most important and most impactful measure is the first one:

1. Payments to Indigenous Communities, Quilombola, Riverine People, Smallholder Families and other Communities to protect and revive the nature in their areas: Provide up to $500 monthly to 1.5 million families to protect and regenerate the forest, based on FPIC/Plano de Gestao Gatherings on the application of the money for improvement of well-being of the forest, the community and the families (see later on the chapter on FPIC/Plano de Gestao). The community plan would include a demarcation of the territory the community of family will protect. If they want to do this with regional plans such as watersheds, we will co-design a protective landscape design based on the needs for forest and people (food production, cultural spaces, etc). The initial amount will be an interest-free loan that does not have to be paid back if the plan is carried out. In fact after the kick off, further improvements (as monitored by data on the ground collected via an app and satellite data)

2. Protection and Regeneration Contracts: Contracts for Indigenous territories, protected areas, and national parks to ensure forest guardianship and stewardship.

3. School Program: Implement agroforestry, permaculture, fish ponds, and tree nurseries in 50,000 schools. Education via Youtube.

4. Fire Brigades and Equipment: Equip 10,000 brigades with fire prevention and firefighting tools.

5. Network of Seed Collectors: Employ 100,000 collectors to gather native seeds for reforestation.

6. Cattle Buyback Program: Buy back 5 million cattle and restore 5 million hectares of land to forest.

7. Ban on Monoculture Crops in Core area: Prohibit soy, sugar cane, and palm monoculture, supporting farmers to transition.

8. Control Entry Points on Roads, Rivers, and Airstrips: Establish 1,000 control posts to monitor illegal access.

9. Community Empowerment and Governance: Set up 1,000 governance councils and train 10,000 community monitors.

10. Real-Time Forest Monitoring Alert system for Forest Guardians: Empower and deploy 20,000 guardians as well as Fire Brigades with monitoring equipment.

11. Health Care Program: Provide mobile clinics, telehealth, and preventive health campaigns for remote areas.

12. Solar Panel Program: Install solar panels for 1.5 million homes, 50,000 schools, and convert 10,000 boats to solar power.

DETAILED DESCRIPTION OF PROGRAM ITEMS

These twelve program items all need to be organized by separate task forces and we will invite organisations and experts to form these task forces to carry out these large sub projects.

TASK FORCES TO ORGANIZE THE 12 POINT PLAN

1. Pay 1.5 Million Smallholder Families to Protect and Regenerate the Forest

- Objective: Provide financial incentives to smallholder families, indigenous peoples, quilombolas, and riverine communities to protect and regenerate the Amazon forest. This will be deployed in a system of payments for ecoservices that will be tracked with a combination of on the ground data collection via cell phones and satellite tracking of changes.

- Target: 1.5 million smallholder families across all 9 Amazon countries.

- Monthly Salary: $500 per month, equating to $6,000 per year per family linked to action on the ground.

- Internet Infrastructure: Implement Starlink satellite internet in remote areas for communication and financial transactions, and provide all families with smartphones.

- Settle land claims in favor of these groups for eternal, non-transferable stewardship tenure.[29]

2. Protection and Regeneration Contracts

Indigenous Territories:

- Area: 200 million hectares (2 million km²)

- Contracts: Indigenous land stewardship, sustainable forest use, biodiversity monitoring

- Support: Legal entities for governance, salary payroll, cars, phones, GPS alert systems, and reforestation incentives.

Protected Areas (Conservation Units, Extractive Reserves):

- Area: 150 million hectares (1.5 million km²)

- Contracts: Co-management, sustainable livelihoods, biodiversity monitoring

National Parks:

- Area: 50 million hectares (500,000 km²)

- Contracts: Guardianship, eco-tourism, restoration, research

[29] Delays in land titling threaten the conservation success of quilombos in Brazil

3. School Program: Agroforestry, Permaculture, Fish Ponds, Tree Nurseries and Video Education

- Target: 50,000 schools across the Amazon Basin.

- Agroforestry and Permaculture: Each school implements agroforestry systems on 1 hectare of land.

- Fish Ponds: Schools build fish ponds for food security.

- Tree Nurseries: Each school grows 50,000 seedlings per year, with schools replanting 200,000 hectares of degraded areas annually.

- The Pupils are actively involved in seed collection for reforestation, adding budget to the schools.

- All schools get (satellite) internet and access to educational curricula via YouTube.

- The role of the local educators will focus on deeper understanding, building essential social and emotional skills, personalizing learning, hands-on practical experience and nurturing the relationship with nature.

- Schools can become key seed collectors for money as well in the system of seed banks [30]

4. Fire Brigades and Equipment

- Fire Brigades: 10,000 brigades responsible for 20,000 hectares each.

- Equipment: Firefighting vehicles, water pumps, hoses, and fire-resistant clothing.

- Training: For fire prevention, early detection, and firefighting techniques.

5. Network of Seed Collectors

- Seed Collectors: 100,000 collectors to gather native seeds, connected to the school network.

- Target: Collect 1 billion seeds annually, paying $5 per 1,000 seeds (real pricing needs to be established).

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[30] Seed Collection and Distribution Platform

- Seed Banks: Establish 1,000 regional seed banks and seed collection and distribution platforms.[31]

Seed Collection and Distribution Platform

6. Cattle Buyback Program

- Buyback: Purchase 5 million cattle and restore 5 million hectares to native forest or agroforestry.

- Land Restoration: Convert deforested land into reforested or agroforestry-managed areas.

7. Phase Out Monoculture Crops

- Ban new soy, sugar cane, pasture and palm monoculture.

- Create roll back programs to reverse the use of these fields to other means.

- Support: Provide financial assistance and training to 200,000 farmers transitioning to diversified cropping systems, which will improve their income.

8. Control Entry Points on Roads, Rivers, and Airstrips

- Control Posts: 1,000 entry control posts at key access points.

- Monitoring: Use satellite imagery, drones, and ground sensors to detect illegal activity.

- Scale up flight monitoring: upgrade radar systems, ground-based sensors, and satellite surveillance, along with automated alert systems to track unauthorized or suspicious activity.[32][33]

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[31] Brazil's native seed collector networks drive wider social change, study finds - Conservation news

[32] https://www.linkedin.com/feed/update/urn:li:activity:7266972917677080576/

[33] https://mongabay.org/impact/ai-driven-reporting-uncovers-illegal-amazon-airstrips-tied-to-drug-trafficking/

9. Community Empowerment and Governance

- Local Councils: Establish 1,000 governance councils, made up of community members, indigenous leaders, and local authorities.

- Monitoring: Equip 10,000 community monitors with GPS, drones, and cameras to oversee illegal activities.

10. Real-Time Monitoring and GPS-Linked Alerts for Forest Guardians

- Forest Guardians: Deploy 20,000 guardians to manage forest areas.

- Equipment: Provide vehicles, boats, and real-time monitoring tools.

- Command Centers: Coordinate forest protection and response from 20 command centers.

11. Health Care Program for Remote Amazon Communities[3435]

- Education: Train housewives and community leaders on common diseases and remedies via video classes and practical workshops of touring healthcare workers.

- One local person gets trained as a basic healthcare worker with a basic pharmacy and liaising for larger problems.

- E-medical passport connected to identity, with medical records via the smartphone.

- E-Diagnosis: Telehealth system for remote diagnosis via smartphones.

- Mobile Health Clinics: Trucks and boats with medical facilities to reach remote communities.

- Mobile Hospitals: Equipped for emergency services and surgeries.

- Preventive Health Campaigns: Vaccination drives, sanitation, hygiene, and maternal health programs.

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[34] Improving rural health care reduces illegal logging and conserves carbon in a tropical forest | PNAS

[35] Health In Harmony

12. Solar Panel Program for Schools and Families, and Solar-Powered Boats

Objective: Equip all 1.5 million smallholder families' homes and 50,000 schools in the Amazon with solar panels for sustainable energy. Also, convert all boats used in healthcare and forest monitoring programs to solar-powered vessels.

Solar Panels for Homes

- Target: Install solar panels for 1.5 million homes across the Amazon, ensuring clean and sustainable energy for smallholder families.

- System Size: Each home receives a 3 kW solar system to meet basic energy needs (lighting, phone charging, small appliances, etc.).

- Cost per Home: Estimated at $3,000 per system, which includes solar panels, batteries, and installation.

Solar Panels for Schools

- Target: Install solar panels for 50,000 schools to provide energy for educational needs such as lighting, communication devices, and small-scale food production (e.g., fish ponds, tree nurseries).

- System Size: Each school receives a 5 kW solar system to meet energy needs for classrooms and outdoor activities.

- Cost per School: Estimated at $5,000 per system, including panels, batteries, and installation.

Solar-Powered Boats

- Target: Convert the 10,000 boats used for healthcare and forest monitoring to solar-powered vessels.

- System Components: Each boat will be equipped with solar panels and electric motors for clean energy use.

- Cost per Boat: Estimated at $10,000 per boat to retrofit with solar panels and electric motors.

Solar-Powered Businesses, Governments, Hospitals etc

- Target: Install solar panels for 100,000 businesses, government offices, hospitals etc across the Amazon, ensuring clean and sustainable energy for smallholder families.

- System Size: Each home receives a 3 kW solar system to meet basic energy needs (lighting, phone charging, small appliances, etc.).

- Cost per Home: Estimated at $5,000 per system, which includes solar panels, batteries, and installation.

BUDGET FOR THE PLAN

1. Payments to Smallholder Families

- Annual cost: 1.5 million families x $500* x 12 months = $9 billion

** average income connected to MRV process.*

- One-time Starlink installation: 50,000 stations x $500 = $25 million

- Annual Starlink subscription: 50,000 x $50 x 12 months = $30 million

Total for Smallholder Families: $9.055 billion annually, $7.5 million one-time

2. Protection and Regeneration Contracts

- Indigenous Territories (200 million hectares): 20,000 people for land stewardship, forest use, and biodiversity monitoring. Annual cost: $250 million.

- Protected Areas (150 million hectares): 7,500 people for co-management, sustainable livelihoods, and biodiversity monitoring. Annual cost: $100 million.

- National Parks (50 million hectares): 1,000 people for guardianship, eco-tourism, restoration, and research. Annual cost: $10 million.

the salary component of 500 USD per month is already budgeted under point 1.

Total Annual Cost: $360 million

3. School Program

- One-time Costs:
  - Agroforestry setup: $10,000 per school = $500 million
  - Fish ponds: $5,000 per school = $250 million
  - Tree nurseries: $3,000 per school = $150 million
  - Permaculture training: $2,000 per school = $100 million
- Annual Maintenance: $2,000 per school = $100 million annually

internet and solar installations are budgeted elsewhere

Total for Schools: $1 billion one-time, $100 million annually

4. Fire Brigades and Equipment

- One-time Costs:
  - Firefighting vehicles: 10,000 x $50,000 = $500 million
  - Equipment: 10,000 x $10,000 = $100 million
  - Training: $50 million
- Annual Maintenance: $2,000 per brigade = $20 million
- Annual (additional) Salaries: $50 million

The salary component of 500 USD per month is already budgeted under point 1.

Total for Fire Brigades: $650 million one-time, $70 million annually

5. Network of Seed Collectors

- One-time Costs:

  - Seed Banks: 1,000 x $50,000 = $50 million

- Annual Seed Collection: $50 million

Total for Seed Collectors: $50 million one-time, $50 million annually

6. Cattle Buyback Program

- One-time Costs:

  - Buyback: 5 million cattle at $300 = $1.5 billion - minus resale = $0.5 billion

  - Land Restoration: 5 million hectares x $500 = $2.5 billion

Total for Cattle Buyback and Land Restoration: $3 billion one-time

7. Phase Out Monoculture Crops

- One-time Costs:

  - Transition support for 200,000 farmers: $2 billion

- Annual Monitoring: $50 million

Total for Monoculture Ban: $2 billion one-time, $50 million annually

8. Control Entry Points

- One-time Costs:

  - Control Posts: 1,000 x $200,000 = $200 million

  - Drones: 2,000 x $10,000 = $20 million

- Upgrading aircraft monitoring $1.5 billion.

- Annual Salaries: 10,000 officers x $25,000 = $250 million

- Annual Expenses for personnel, data management, satellite and radar system maintenance, energy costs, and ongoing system upgrades.Salaries: = $250 million

Total for Entry Control: $1,720 million one-time, $500 million annually

9. Community Empowerment and Governance

- One-time Costs:

  - Local Councils: 1,000 x $50,000 = $50 million

  - Community Monitors: 10,000 x $5,000 = $50 million

- Annual Governance: $20 million

Total for Community Empowerment: $100 million one-time, $20 million annually

10. Real-Time Monitoring and Forest Guardians

- One-time Costs:

  - Vehicles: 10,000 x $50,000 = $500 million

  - Boats: 10,000 x $20,000 = $200 million

  - Drones: 1,000 x $10,000 = $10 million

  - Command Centers: 20 x $500,000 = $10 million

- Annual Salaries: 20,000 guardians x $6,000 = $120 million

The salary component of 500 USD per month is already budgeted under point 1.

Total for Real-Time Monitoring: $720 million one-time, $120 million annually

11. Health Care Program

- One-time Costs:
  - Education for Housewives: $150 million
  - E-Diagnosis Setup: $50 million
  - Mobile Clinics: $175 million
  - Mobile Hospitals: $100 million
- Annual Costs:
  - E-Diagnosis Maintenance: $10 million
  - Mobile Clinics Staffing: $100 million
  - Mobile Hospitals Staffing: $70 million
  - Preventive Campaigns: $40 million

Total for Health Care: $455 million one-time, $220 million annually

12. Solar Panels

- One-time Solar Panel Costs:
  - Solar Panels for Homes: $4.5 billion
  - Solar Panels for Schools: $250 million
  - Solar-Powered Boats: $100 million
  - Solar-Powered Businesses etc: $500 million

- Total One-time Solar Program Costs: $5.35 billion

13. Satellite Monitoring Costs

- One-time Costs: $40 million

- Annual Costs: $13.5 million per year

GRAND TOTAL INCLUDING 10% OVERHEAD

- One-time Costs = $15.2 billion

- Annual Costs: $10.3 billion per year

BUDGET SUMMARY WITH POTENTIAL FINANCIERS

1. Payments to Smallholder Families:

- Cost: $9 billion annually

- Infrastructure Setup: $7.5 million (one-time)

- Starlink Subscription: $30 million annually

- Financier: Governments (National Budgets) International Financial Commitment (e.g., REDD+)

Green Bonds backed up by Future Carbon Credits

2. Protection and Regeneration Contracts:

- Total Annual Cost: $360 million

- Financier: Government (National Budgets), International Financial Commitment (e.g., Green Climate Fund), Green Bonds backed up by Future Carbon Credits

3. School Program:

- One-time Costs: $1 billion

- Annual Maintenance: $100 million

- Financier: World Bank, IADB, Government (National Budgets), International Financial Commitment

4. Fire Brigades and Equipment:

- One-time Costs: $650 million

- Annual Costs: $70 million

- Financier: Government, International Financial Commitment, Green Climate Fund

Green Bonds backed up by Future Carbon Credits

5. Network of Seed Collectors:

- One-time Costs: $50 million

- Annual Costs: $50 million

- Financier: IADB, Government, International Financial Commitment, Green Bonds backed up by Future Carbon Credits, Philanthropy

6. Cattle Buyback Program:

- One-time Cost: $3 billion

- Financier: Government, Investors, Green Bond, JBS and other meat packers.

7. Phase Out Monoculture Crops:

- One-time Costs: $2 billion

- Annual Monitoring: $50 million

- Financier: Investors, Green Bond, Government, Big Agro

8. Control Entry Points:

- One-time Costs: $1.72 billion

- Annual Costs: $500 million

- Financier: Government, International Financial Commitment, World Bank

9. Community Empowerment and Governance:

- One-time Costs: $100 million

- Annual Governance: $20 million

- Financier: IADB, Government, International Financial Commitment, Philanthropy

10. Real-Time Monitoring and Forest Guardians:

- One-time Costs: $720 million

- Annual Salaries: $120 million

- Financier: Government, Green Bond, International Financial Commitment, Companies

11. Health Care Program:

- One-time Costs: $455 million

- Annual Costs: $220 million

- Financier: World Bank, IADB, Government

12. Solar Panel Program:

- One-time Costs: $5.35 billion

- Financier: Investors, Green Bond, Government, Electricity Companies, Green Bonds backed up by Future Carbon Credits

13. Satellite Monitoring Program:

- One-time Costs: $40 million

- Annual Costs: $13.5 million

- Financier: International Financial Commitment, Green Bond, Government

TIMELINE HEADLINES

1. Preparatory Phase (Prior to COP16 - November 2024)
- Draft the plan, build a core team, seek key partners, kick off an advisory council and develop campaigns to highlight the urgency of Amazon protection.
- Engage stakeholders, finalize legal and financial frameworks, and establish project management and tech integration.

2. Project Launch (By COP30 - November 2025)
- Officially announce the project, secure initial finance, and form an alliance of key partners.
- Activate project management, set up local infrastructure, and deploy digital platforms.

3. Preparatory Phase (December 2024 - October 2025)
- Set up local pilot project hubs, train coordinators, and develop digital contracts and onboarding platforms.

4. COP30 in Belém, Brazil (November 2025)
- Launch the project with partners, secure large-scale financing, and announce future strategies.
- Initiate digital contract signing and first financial disbursements.

5. Phased Project Expansion (November 2025 - 2029)
- Gradually scale project, onboard families and organizations, and expand regional teams.
- Implement real-time monitoring and automated payment systems.

6. Progress Review and Scaling (2029 and Beyond)
- Secure continued funding, expand ecosystem restoration across Amazon and Orinoco, and enhance monitoring technology.
- Develop long-term management plans and regional support hubs to sustain and grow the initiative.

TIMELINE: FROM COP16 IN CALI TO COP30 IN BELÉM AND BEYOND

PRIORITY AREAS THAT NEED INTERVENTIONS

The biotic pump function of rainforests plays a critical role in sustaining rainfall by drawing moisture from the ocean inland. Protecting and restoring key areas of the Amazon is essential to maintain this hydrological cycle, preventing the forest from reaching a tipping point. Additional efforts are needed to halt deforestation in other biomes like the Cerrado and Caatinga and to stop toxic runoff from cities and agriculture, which threatens river, wetland, and coastal ecosystems. Securing land rights for Indigenous and traditional communities is also vital.

Key Areas for Reforestation and Ecosystem Restoration:

1. Deforested Regions in the Eastern and Southern Amazon:

- Eastern Amazon: Reforestation in Maranhão and Pará, especially near the Atlantic coast and Indigenous areas, is crucial for moisture transport. Priorities include protecting headwaters and riverbanks, especially around the Parnaiba River.
- Southern Amazon: Restoring forests in parts of Mato Grosso and Rondônia can mitigate the effects of deforestation from agriculture and cattle ranching. Educating agro-industries on the benefits of forest strips for crops is also needed.

2. Transition Zones Between Forest and Agricultural Lands:

- Reconnecting fragmented forests in the Cerrado-Amazon transition zone will aid moisture transport from the Atlantic, improving regional rainfall patterns.

3. River Basin Headwaters and Riparian Zones:

- Reforesting headwaters of major rivers like the Xingu, Tapajós, and Madeira is essential for regulating water flow. Restoring riparian corridors will stabilize water cycles, reduce erosion, and enhance evapotranspiration.

4. Degraded Areas in the Central Amazon:

- Restoring degraded land in the central basin (e.g., Amazonas and Acre) will support the Amazon's role as a rain generator, strengthening moisture flow across the basin.

5. Connectivity Corridors for Forest Fragments:

- Creating reforestation corridors in the "Arc of Deforestation" will enhance moisture flow and reduce localized drying, strengthening the biotic pump effect.

6. Reforesting from the Amazon waters to the Páramos:

- Objective: Restore ecosystems from the Andes to the Amazon basin and páramos to protect water sources, biodiversity, and the biotic pump. Focus on headwaters, mid-elevation biomes, lowland forests, riparian zones, and páramos.

7. Program for Bolivia:

- Objective: Reverse environmental degradation across Bolivia by restoring the Amazon basin, Chiquitano dry forest, Andean ecosystems, and riparian zones. Promote agroforestry and sustainable agriculture.

8. Program for the Orinoco Basin:

- Objective: Reforest and restore ecosystems across the Orinoco Basin, including headwaters, savannas, wetlands, and the Guiana Shield. Support sustainable livelihoods for local communities.

PILOT PROJECTS

Mosaico Gurupi and Arariboia

In this picture you see the two caciques Edivan Guajajara and Ronilson Guajajara, directors of the movie We Are Guardians. A large part of the documentary is about the struggle to save the forest by the Guardians in the Indigenous Territory of Arariboia, which is part of a group of five Indigenous Territories (IT) called the Mosaico Gurupi, largely situated in the state of Maranhao in Brazil.

A well worked out project has already been established since 2022 here. More details can be found in Supporting the restoring of Araribóia and the Mosaico Gurupi version October 2…

Amazon Sacred Headwaters Initiative

We propose to develop with the Sacred Headwaters Initiative a second project Peru. The Amazon Sacred Headwaters Alliance is a coalition of 30 Indigenous nations from Ecuador and Peru, united to protect 86 million acres of biodiverse tropical rainforests in the Amazon's headwaters. Established in 2017, the Alliance aims to safeguard these territories from industrial-scale resource extraction and promote a regenerative bioeconomy that honors Indigenous stewardship and the principles of 'Buen Vivir' (Collective Well-being). Their comprehensive strategy includes legal advocacy, forest restoration, and the development of sustainable livelihoods, all directed towards preserving the ecological and cultural integrity of the region.

Pilot Project in Colombia

This needs to be developed in cooperation with Gaia Amazonas. Gaia Amazonas is a Colombian non-governmental organization dedicated to the comprehensive protection of the Amazon rainforest through collaboration with its Indigenous inhabitants. For over three decades, the organization has developed socio-environmental and cultural strategies rooted in Indigenous governance systems and traditional knowledge. Their initiatives focus on empowering Indigenous communities, promoting sustainable development, and fostering intercultural policies to ensure the Amazon's resilience and preservation.

Cross-Cutting Initiatives for Ecosystem Resilience in South America

To tackle large-scale environmental challenges and enhance resilience in ecosystems like the Amazon, a coordinated approach across agroforestry, water management, community engagement, and land tenure reform is essential.

1. Agroforestry and Sustainable Land Use

Agroforestry systems integrating native trees with crops and livestock will be promoted across the Amazon basin, especially in the Llanos and Andean foothills. Training and financial incentives will help farmers adopt sustainable practices that increase biodiversity, reduce deforestation, and boost productivity. Addressing land tenure issues is critical to empower smallholders, secure long-term stewardship, and support sustainable land use.

2. Community Engagement and Indigenous Stewardship

Indigenous and local communities play a central role, receiving training, financial incentives, and technical support for sustainable land and fire management. In fire-prone regions like the Llanos, local fire brigades equipped with drones and satellite data will help prevent wildfires. Secure land tenure for Indigenous and local communities will reinforce their stewardship, protect biodiversity, and preserve cultural heritage, especially in areas like the Guiana Shield.

3. Water and Wetland Management

Implementing integrated water management systems in the Llanos and Orinoco floodplains will stabilize water flows, prevent flooding, and support ecosystem services. Reforesting riverbanks and wetlands will reduce sedimentation, protect water quality, and maintain seasonal river flows. Ensuring communities have secure land rights over these areas will strengthen their role in protecting water resources and wetlands.

4. Seed Banks and Reforestation Networks

Establishing networks for seed collection, distribution, and planting will support large-scale reforestation, crucial for restoring degraded lands. Secure land tenure is essential to encourage reforestation efforts and ensure that the benefits are sustained over the long term.

Through collaboration with communities, governments, and organizations, and by addressing land tenure challenges, these initiatives aim to protect South America’s unique ecosystems and secure sustainable livelihoods for future generations.

NATURE TECH IS CENTRAL TO THE PROGRAM

The essential role of nature tech

We define nature tech as any technology that enables, accelerates and scales the nature-positive transition.

By equipping stakeholders with the tools necessary for implementing effective nature-positive initiatives, Nature Tech can play a crucial role in climate change mitigation and adaptation, preventing biodiversity loss, and nature-related risk management.

Nature tech serves multiple purposes in supporting the transition to a nature positive future. The solutions that exist today could be categorized at a high level based on the following categories:

Deployment
Technologies that enable nature-based solutions (NBS) to be implemented at scale. This includes utilizing innovations like drone technology for reforestation or genetic modifications to enhance forest management.

MRV
Technologies which help track progress, provide data for reporting, and verify the effectiveness and outcomes of nature-based interventions. (Monitoring, Reporting, Verification). This includes technologies such as satellite monitoring and eDNA testing.

Transparency
Technology which supports clarity and openness in processes and data, enhances trust and accountability in carbon transactions and registries, and ensures stakeholders can easily access and understand information regarding carbon credits and environmental impact.

Connection
Technology which helps build links between local communities, information sources, and markets.

Published by Nature Tech Collective

SATELLITE MONITORING PROGRAM FOR THE AMAZON BASIN

Objective:

To establish a robust and real-time satellite monitoring system that tracks deforestation, fires, illegal activities, and environmental health in the Amazon Basin. This system will help protect the forest and enhance enforcement efforts, enabling quick responses to deforestation and illegal activities.

Components:

1. Satellite Infrastructure:

- Use existing high-resolution satellites (like NASA's Landsat, European Space Agency's Sentinel) to monitor deforestation, fires, and land use changes in real-time.

- Employ private sector satellite services, like Planet Labs, for enhanced resolution and frequency of data collection.[36]

2. Data Collection and Analysis:

- Frequency: Data will be collected daily, focusing on areas most vulnerable to deforestation and fire risks.

- AI and Machine Learning: Develop algorithms that can detect deforestation patterns, identify illegal activities, and assess ecosystem health from satellite data.

- Integration with Ground Data: Combine satellite data with ground-based sensors, drones, and community reports for cross-validation and enhanced accuracy.

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[36] Landsat Tracking Amazon Deforestation

3. Public Dashboard:

- Create an open-access, interactive platform where real-time satellite data is available for monitoring forest health, illegal activities, and ecological changes. This increases transparency and global engagement.

4. Alerts System:

- Set up GPS-linked alert systems for forest guardians, local authorities, and enforcement agencies to act quickly on deforestation and fire incidents. The people who carry a phone through the project will get automated alerts when fire or incursions are noted by the satellite in the area they monitor and in the immediate surroundings.

- Use drone fleets to investigate high-risk areas identified by satellite monitoring for more detailed assessment.

5. Capacity Building:

- Train local and indigenous communities on how to use satellite data and technology to monitor and protect their lands.

Budget Estimate for Satellite Monitoring Program for the Amazon Basin

1. Satellite Infrastructure:

- Cost: Leverage existing high-resolution satellites (NASA Landsat, ESA Sentinel) at no direct cost but employ private-sector satellite services for enhanced resolution and data frequency.

- Mapping systems like MapBiomas, explorer.land and Global Forest Watch

- Private Satellite Services (Planet Labs, Esri etc.): $2 million annually for data acquisition and monitoring contracts.

- Estimated Cost: $2 million annually.

2. Data Collection and Analysis:

- AI and Machine Learning Development: $5 million (one-time development cost).

- Ongoing Data Processing and Analysis (staff, servers, software): $3 million annually.

- Integration with Ground Data (drones, sensors): $10 million (one-time purchase), $1.5 million annually for maintenance and data integration.

- Estimated Cost: $5 million (one-time) + $4.5 million annually.

3. Public Dashboard:

- Development of Platform: $2 million (one-time).

- Maintenance, Updates, and Data Access Costs: $1 million annually.

- Estimated Cost: $2 million (one-time) + $1 million annually.

4. Alerts System:

- GPS-linked Alert System Development: $3 million (one-time) for design and deployment.

- Drone Fleet for High-Risk Area Monitoring: $20 million (one-time purchase for drones and control systems), $5 million annually for operations and maintenance.

- Estimated Cost: $23 million (one-time) + $5 million annually.

5. Capacity Building:

- Training for Local Communities and Indigenous Groups: $10 million for a multi-year training program (over 5 years).

- Ongoing Technical Support: $1 million annually.

- Estimated Cost: $10 million (spread over 5 years) + $1 million annually.

Total Budget Estimate:

- One-time Costs:

- AI/ML development and ground data integration: $5 million

- Public Dashboard Development: $2 million

- GPS-linked Alert System and Drone Fleet: $23 million
- Capacity Building (spread over 5 years): $10 million
- Total One-time Costs: $40 million

- Annual Costs:
  - Private satellite services: $2 million
  - Data Processing and Analysis: $4.5 million
  - Dashboard Maintenance: $1 million
  - Drone Fleet Operations and Alerts System: $5 million
  - Technical Support and Training: $1 million
  - Total Annual Costs: $13.5 million

Summary:

- One-time Costs: $40 million
- Annual Costs: $13.5 million per year

This estimate covers the creation and operation of a comprehensive satellite monitoring system for the Amazon Basin, including satellite infrastructure, data analysis, public engagement, and community training.

PAYMENT FOR ECOSYSTEM SERVICES (PES) PROGRAM

Objective:

To incentivize smallholder families, indigenous peoples, and local communities across the Amazon to protect and restore forests through direct payments, modeled after successful PES programs in Costa Rica.

Components:

1. Eligibility Criteria:

- Participants must own or manage land in key areas of ecological importance, including riparian zones, forest corridors, and vulnerable ecosystems within the Amazon.

- Priority is given to indigenous peoples, smallholder farmers, quilombolas, and riverine communities who actively engage in forest regeneration, biodiversity conservation, and fire prevention.

2. Payment Structure:

- Monthly Payments: Each family or participant will receive up to $500 per month for committing to protect and regenerate their portion of the Amazon. This amounts to $6,000 per year per family. While the initial downpayment will be in the form of a loan for individual land owners, in the case of Indigenous peoples, we offer a different financial structure based on an FPIC after which investors can participate via "Living Forest Shares," providing upfront capital and receiving returns from carbon offset sales or offset credits themselves. The monthly payments after a bridge period will be connected to results on the ground, through an automated MRV cycle on each polygon.

- Performance-Based Bonuses: Additional financial rewards for families and communities that exceed reforestation goals or participate in training programs for sustainable land management and conservation.

In Brazil the PIX system is the most advanced in all of the Amazon countries. It allows real time digital payments through a central platform managed by the Central Bank of Brazil.

In Peru the system will be online in 2027. Digital payments in Peru are available but with limitations.

Digital payments in Colombia similar to the PIX system in Brazil will be available from 2025.

The digital payment landscape in Bolivia, Ecuador, Venezuela, Guyana, Suriname, and French Guiana varies significantly due to differences in infrastructure, adoption, and regulatory frameworks:

- Bolivia: The introduction of QR BCB for instant QR-code payments marks progress, but cash still dominates, reflecting limited adoption of digital systems.
- Ecuador: A well-established interbank payment system (SPI) supports real-time transactions, with increasing digital adoption driven by government mandates and fee reductions.
- Venezuela: Economic challenges have spurred reliance on digital wallets and mobile payment apps like Zelle for foreign currency transactions, but infrastructure remains underdeveloped.

- Guyana and Suriname: Digital payments are in early stages, with limited penetration and dependence on cash, though regional integration initiatives are expected to encourage growth.
- French Guiana: As part of France, it benefits from European Union-level financial systems, with widespread access to SEPA transfers and advanced digital banking options.

Overall, while some progress has been made, disparities in digital payment adoption and access persist across the region, largely reflecting broader economic and infrastructural divides. But with the possibilities to adopt the payment systems in Brazil, Colombia, Peru, Ecuador and French Guiana between now and 2027, a lot of the Amazon can be covered. The problematic situation especially in Bolivia needs a separate approach.

3. Contractual Agreements:

- Participants will sign contracts to ensure they follow sustainable land-use practices, protect biodiversity, and avoid engaging in deforestation or illegal logging. The contracts will also include provisions for reforestation efforts, particularly in degraded or deforested areas. The initial loan will be part of the contract and will not have to be paid back if the conditions of the contract are kept. Disturbances that are not attributable to culpable behavior will be excluded through a system of mutual insurance.

4. Monitoring Compliance:

- Compliance will be verified through satellite monitoring, on-the-ground DIY inspections , and community reporting systems.

- Infractions such as illegal logging or land degradation will result in penalties, including reduced payments or expulsion from the program.

5. Support for Sustainable Practices:

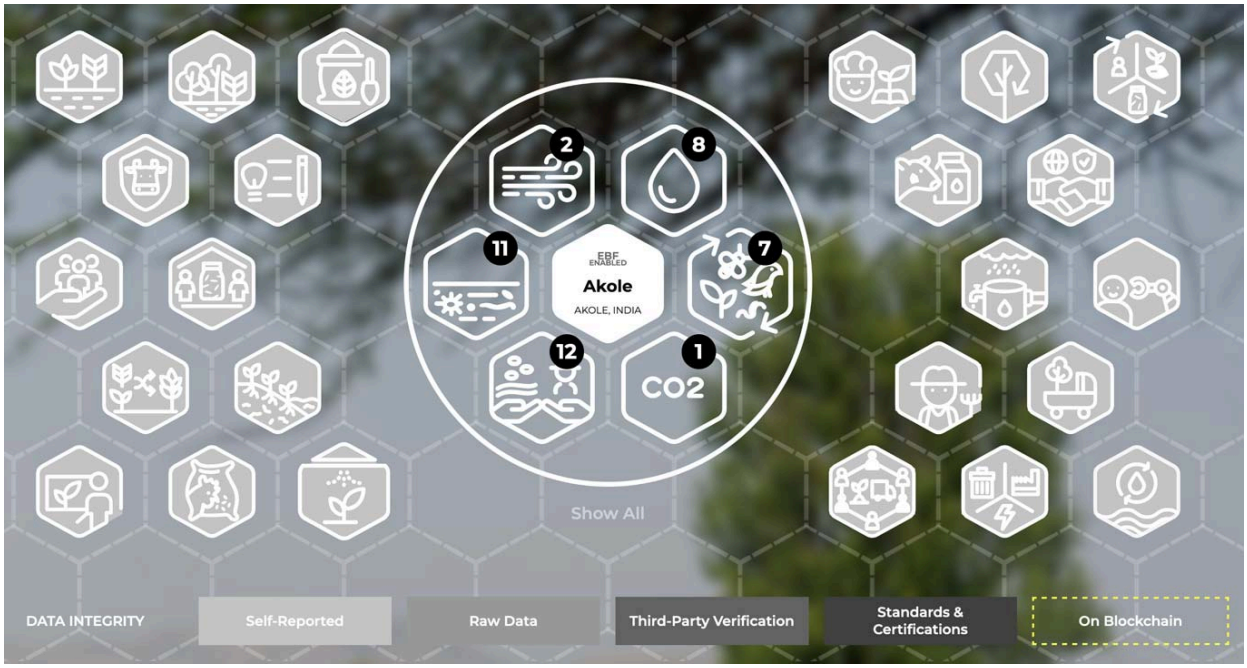
- along with seeds, tools, and technical assistance for reforestation and forest management.

- Provide participants with access to agroforestry, permaculture, and sustainable farming training, via video instructions.

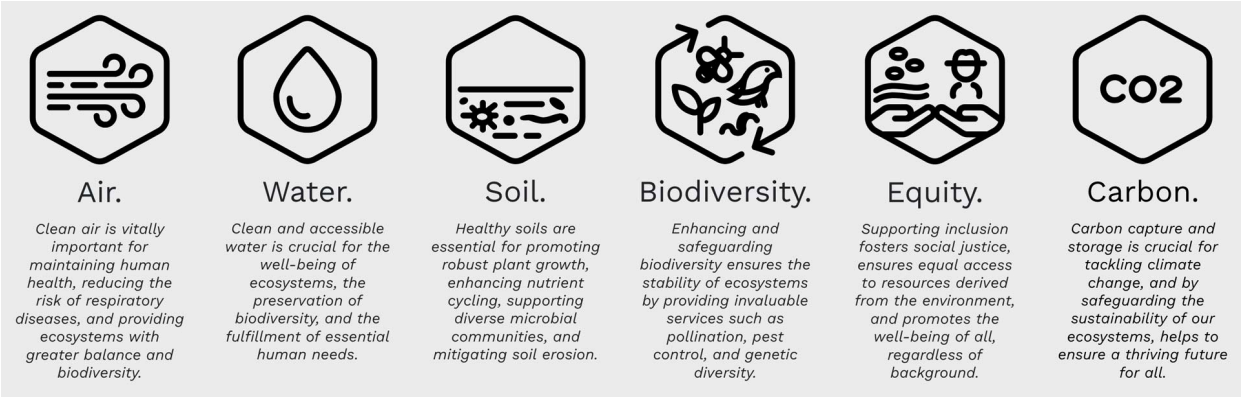
This combined Satellite Monitoring and Payment for Ecosystem Services program will help ensure that the Amazon’s vital ecological functions are preserved while providing financial stability to the communities that are key to its survival. This system is basically budget neutral as it falls under other budget items.

PARTNERING WITH NATURE POSITIVE SOLUTIONS

The most likely methodology we want to apply is that of [Nature Positive Solutions]



This system codes and aggregates every project into these six machine readable values, making them comparable, allows for forward modeling and attaches monetary values to them, making them the basis for the payment of eco-services and making them investable.



For more information on how it works, please check the website of this project.

ENGAGING COMMUNITY INVOLVEMENT AND LEADERSHIP

Engaging community involvement in environmental protection and restoration efforts, especially in regions like the Amazon, is essential for long-term success. Two key frameworks that can guide this process are Free, Prior, and Informed Consent (FPIC) and Brazil's Plano de Gestão (Management Plan). These frameworks ensure that local and indigenous communities are actively involved in decision-making processes related to land use, forest management, and conservation efforts.

1. FREE, PRIOR, AND INFORMED CONSENT (FPIC)

FPIC is an international legal standard that emphasizes the rights of indigenous and local communities to give or withhold consent before any development or conservation activities take place on their land. It's essential for ethical and sustainable community engagement. Here's how to implement it effectively:

Steps for Implementing FPIC:

1. Community Engagement and Dialogue:

- Initial Consultation: Begin by engaging the community through transparent discussions that provide complete information about the proposed activities, objectives, and potential impacts. This should be done in the local language and culturally appropriate ways.

- Trust Building: Develop trust with community leaders by demonstrating respect for their traditions, knowledge systems, and governance structures. This helps ensure that the FPIC process is not seen as coercive.

2. Free Consent:

- Ensure that communities can make decisions without any form of coercion, manipulation, or undue pressure. They must have the right to say no or request modifications to the plans.

3. Prior Consultation:

- Communities must be consulted before any project is initiated. This consultation should happen well in advance to allow for adequate decision-making time, ensuring they understand all aspects of the project, including risks and benefits.

4. Informed Consent:

- Provide communities with complete and accurate information regarding the project, including social, environmental, and economic impacts. This includes transparent data on how land, water, and resources will be used and the long-term benefits or consequences of such actions.

- Use workshops, community meetings, and materials that are accessible (including in indigenous languages) to inform people.

5. Ongoing Participation and Monitoring:

- FPIC is not a one-time process. Communities should have the opportunity to review progress and renegotiate terms as necessary. Their involvement in monitoring the project ensures that their interests are respected throughout its duration.

2. PLANO DE GESTÃO (MANAGEMENT PLAN) IN BRAZIL

Plano de Gestão, or Management Plan, is a formal framework used in Brazil to manage protected areas, including indigenous territories and conservation units. The plan typically includes measures for sustainable land use, forest management, and resource protection, with strong community participation in decision-making.

Steps for Engaging Communities Through Plano de Gestão:

1. Collaborative Plan Development:

- Initial Consultation with Community Representatives: Gather indigenous, local community, and quilombola leaders to identify the key objectives and needs of the management plan. Ensure that their priorities, such as protecting sacred areas or ensuring sustainable livelihoods, are central to the plan.

- Cultural Mapping and Knowledge Inclusion: Use cultural mapping to incorporate traditional knowledge and practices into the management plan, acknowledging the deep ecological wisdom of indigenous peoples.

2. Participatory Governance:

- Community Councils: Establish community councils to oversee the implementation of the Plano de Gestão. These councils should include representatives from different sectors of the local community, such as indigenous elders, women, youth, and smallholder farmers.

- Decentralized Decision-Making: Ensure that decisions are made locally, with the community having a decisive role in resource management and enforcement of the management plan.

3. Training and Capacity Building:

- Provide training for community members on sustainable land management, reforestation, agroforestry, and monitoring techniques. This strengthens the community's ability to actively participate in managing their territory and ensures they have the skills needed for long-term success.

- Technical Assistance: Offer ongoing technical assistance in areas such as satellite monitoring, fire prevention, and agroecological practices, which are part of the Plano de Gestão.

4. Economic Opportunities through Sustainable Use:

- Incorporate sustainable economic activities into the management plan, such as ecotourism, agroforestry, and non-timber forest product (NTFP) harvesting. This ensures that the plan provides direct benefits to the community.

- Incentive Programs: Create incentive programs (similar to Payment for Ecosystem Services) where community members are compensated for protecting and restoring the forest.

5. Monitoring and Accountability:

- Community Monitoring Teams: Train community members to monitor forest health, biodiversity, and compliance with the management plan. Equip them with GPS, drones, and access to satellite data.

- Adaptation and Feedback Loops: Allow for regular feedback sessions where the community can adjust the management plan based on environmental changes, successes, and challenges.

COMBINING FPIC AND PLANO DE GESTÃO FOR EFFECTIVE COMMUNITY INVOLVEMENT

1. Early and Meaningful Involvement: Engage the community from the outset through FPIC, ensuring their rights are respected and they are fully informed before projects begin. Use this consent to co-create the Plano de Gestão for their areas and assign funds to implement their needs, which will be partly covered by one of the 11 programs above but may need additional elements such as road access or support for creating Indigenous owned super markets, bioeconomy elements, bamboo furniture production etc.

2. Inclusive Decision-Making: Both frameworks emphasize the importance of community-led decision-making. The Plano de Gestão formalizes this through structured councils and committees, while FPIC ensures that all key decisions are made with the community's agreement.

3. Shared Ownership of the Process: By using FPIC and Plano de Gestão together, the community is not just consulted, but fully empowered to co-manage their land and resources, creating a sense of ownership over both the protection and sustainable use of their environment.

By integrating FPIC with Brazil's Plano de Gestão, you ensure that communities are fully involved in all aspects of environmental management, from the initial decision-making to long-term monitoring and adaptation. This approach respects indigenous rights, fosters trust, and builds local capacity for sustainable land management. These costs are budget neutral as they are in the 10% overhead.

SMART CONTRACTS FOR EXECUTION AFTER DECISION-MAKING

Applying smart contracts to connect decision-making, payment for ecosystem services (PES), and the execution of environmental plans can create a transparent, automated, and accountable system. Smart contracts, built on blockchain technology, ensure that predefined conditions and actions are automatically executed without intermediaries, which can improve the efficiency of conservation efforts and PES programs. Here's how to structure this approach:

Smart contracts can formalize the decision-making process by linking actions or outcomes to specific criteria. For community-based environmental management (such as through FPIC or Plano de Gestão), this can include:

1. Community Consensus: The community decision-making process (based on FPIC or other governance structures) can be recorded on a blockchain. A smart contract would only proceed with the next steps (such as funding release or project execution) after a majority vote or agreement is reached.

- Approval of Plans: If a plan (such as reforestation or land management) is approved through the community governance structure, a smart contract triggers the next phase, such as funding disbursement or material supply.

2. Linking Payment for Ecosystem Services (PES) with Smart Contracts

Smart contracts can automate the distribution of payments for ecosystem services, ensuring payments are made once agreed-upon milestones or conditions are verified.

How It Works:

- Monitoring and Verification: Satellite monitoring, drones, or on-the-ground sensors track environmental parameters such as reforestation, carbon sequestration, water quality, or fire prevention efforts. These inputs can be fed into the smart contract system.

- Automatic Payment Trigger: When the satellite data or other monitoring tools verify that agreed-upon environmental actions have been carried out (e.g., a certain number of trees planted or forest cover maintained), the smart contract automatically releases the corresponding payment to the landowner, community, or stakeholder. For instance:

  - If a family or community successfully reforests a set area or maintains forest health over time, the smart contract would release the PES of $500 per month or the equivalent incentive directly to the participant's digital wallet.

- Decentralized Verification: To ensure transparency, verification could come from multiple independent sources, such as local community monitors or third-party environmental auditors who certify progress. These certifications are uploaded to the blockchain, and once verified, the payment is triggered.

3. Execution of Environmental Plans

Smart contracts can automate the implementation of Plano de Gestão or other management plans, ensuring timely execution and delivery of resources based on milestones.

Example Applications:

- Resource Allocation: A smart contract can release funds for tree planting, firefighting equipment, or seed collection once specific steps of the management plan are achieved. For example:

  - After a community council approves a reforestation initiative, a smart contract allocates funding for tools and seeds based on the project timeline.

  - When satellite monitoring confirms that forest cover has increased by a certain percentage, the smart contract triggers the release of additional funds for further planting or expansion of the project.

- Payments to Service Providers: In the case of external service providers (e.g., contractors for reforestation or technology suppliers for satellite monitoring), smart contracts can ensure they are paid based on delivery and verification of services. This reduces the risk of delays or non-compliance.

4. Performance-Based Bonuses and Penalties

Smart contracts can reward or penalize communities and stakeholders based on their performance in environmental stewardship.

Bonus Payments:

- If the community exceeds environmental restoration targets, additional payments or bonuses can be triggered automatically by smart contracts.

- For example, if a community restores 20% more forest than required, the smart contract can release a performance bonus directly to their accounts.

Penalties for Non-Compliance:

- If monitoring reveals that agreed-upon actions (such as avoiding deforestation or maintaining biodiversity) were not completed or violated (e.g., illegal logging occurred), the smart contract could automatically reduce payments or apply penalties, which would be recorded transparently on the blockchain.

5. Transparency and Accountability

One of the biggest advantages of using smart contracts and blockchain for PES and environmental plan execution is transparency:

- All transactions, decisions, and outcomes are recorded on a tamper-proof blockchain, which can be reviewed by all stakeholders, including government agencies, donors, and local communities.

- Communities and stakeholders can track their payments and project progress in real-time, creating trust and reducing administrative overhead.

6. Scaling the Model

This model can be scaled across regions and applied to multiple communities, indigenous groups, or conservation areas by:

- Customizing Contracts: Each smart contract can be tailored to specific community agreements, environmental targets, or ecosystem services provided. Contracts can be modified based on local contexts and priorities.

- Integration with Broader Initiatives: Smart contracts can be integrated with carbon credit programs, biodiversity conservation incentives, or global environmental initiatives like REDD+ (Reducing Emissions from Deforestation and Forest Degradation) to automate payments tied to international funding.

7. Security and Access

Smart contracts ensure that only authorized participants (communities, government agencies, third-party auditors) can access or trigger actions in the system. However, because smart

contracts are self-executing and transparent, all stakeholders can review the progress and funds disbursed.

Example Workflow:

1. Step 1: Community engages in FPIC or Plano de Gestão process and agrees on an environmental action plan.

2. Step 2: A smart contract is created, stipulating that certain environmental actions (e.g., reforestation, fire prevention) must be verified by satellite or local monitors.

3. Step 3: Monitoring tools feed data into the smart contract system.

4. Step 4: Once milestones are reached and verified, the smart contract automatically releases payments to the participants, such as smallholder families or local communities.

5. Step 5: As further progress is made (such as maintaining forest health over time), additional payments are triggered or bonuses are released.

By integrating smart contracts with PES and environmental management frameworks like FPIC and Plano de Gestão, it's possible to create a transparent, efficient, and automated system that ties environmental outcomes directly to incentives. This system builds trust, ensures compliance, and empowers communities by giving them a direct stake in the protection and restoration of ecosystems, all while providing them with timely financial support.

RESOURCE DEPLOYMENT: A COMPREHENSIVE PLAN TO DEPLOY THESE RESOURCES EFFECTIVELY

(Chapter under construction, and also completely conditionally to consultation rounds)

GOVERNANCE BOARD STRUCTURE FOR AMAZON RESTORATION PLAN

The governance board structure for the Amazon restoration plan is designed to integrate the full spectrum of stakeholders, including federal, state, and local governments, military and police forces for security, Indigenous peoples (with veto power), companies and community organizations. This approach ensures balanced representation, fosters transparent decision-making, and promotes inclusive governance across the Amazon Basin. The goal is to protect the world's largest rainforest while ensuring ecological, cultural, and economic resilience.

1. Governance Board Composition

The Amazon Restoration Governance Board needs to be designed by ACTO in collaboration with policy makes. These stakeholders will likely have representation:

- Federal Government (9 Amazon Basin countries)

- State/Provincial Government
- Local Government
- Indigenous Peoples (with veto power)
- Military and Police
- Community Organizations
- Environmental and Technical Experts

The Amazon restoration plan spans nine countries (Brazil, Colombia, Peru, Venezuela, Ecuador, Bolivia, Guyana, Suriname, and French Guiana) and operates across four languages (Portuguese, Spanish, English and French). The project's backbone is a digital-financial architecture integrated with satellite monitoring and satellite internet tools, enabling real-time management, financial transparency, and ecological accountability. This system ensures that resources are deployed effectively and that project milestones are verified through automated, data-driven processes. The following outlines the project management structure, workgroup roles, and division of labor, built around these technologies.

1. Executive Management Team (EMT)

Roles:

The EMT will oversee the entire operation, ensuring that the digital-financial and satellite systems are central to the project's execution. The team manages high-level decision-making, inter-country coordination, and the flow of resources, ensuring that operations are seamless across the nine countries and that all communications and actions are multilingual (Portuguese, Spanish, and French).

Key Positions:

- Project Director: Leads the project, ensuring alignment between strategic goals and execution, while overseeing the integration of satellite and digital-financial tools. The director also engages with governments, Indigenous leaders, and international donors.

- Chief Operating Officer (COO): Oversees day-to-day operations, ensuring the satellite monitoring system and digital-financial platform operate smoothly across regions. The COO manages the workgroup leaders and ensures that the entire project is data-driven.

- Chief Technology Officer (CTO): Manages the satellite monitoring tools, digital infrastructure, and blockchain technology. Ensures the digital-financial framework and satellite data are synchronized for real-time resource deployment and environmental tracking.

- Chief Financial Officer (CFO): Oversees all financial aspects of the project, ensuring that payments, investments, and carbon credits are handled via the digital-financial platform with full transparency and compliance with local regulations.

- Chief Community Officer (CCO): Ensures that local and Indigenous communities are empowered, using the digital tools to manage funds, monitor their lands, and participate in decision-making processes.

Responsibilities:

- Ensure strategic alignment and execution through real-time digital-financial tools.

- Coordinate with governments and Indigenous communities to manage cross-border operations using a common technological platform.

- Oversee transparent financial operations, ensuring resources are disbursed based on satellite-verified milestones.

- Ensure multilingual communication across the team and local communities, adapting the tools to local needs.

2. Workgroup Structure and Division of Labor

The workgroups are structured to integrate satellite monitoring and digital-financial tools into every facet of operations. Each workgroup will have multilingual capacities to ensure effective communication across Portuguese, Spanish, and French-speaking regions, and will use technology to automate, monitor, and manage the project.

2.1. Environmental and Restoration Workgroup (ERW)

Role:

The ERW leads on-the-ground restoration efforts, but these are closely monitored and verified through satellite data. The group's operations are driven by satellite-monitored milestones, where payments, resources, and tools are released via the digital-financial system based on data confirmation of reforestation, fire prevention, and biodiversity restoration efforts.

Key Positions:

- Restoration Manager (Multilingual): Oversees the integration of restoration work with the satellite monitoring system, ensuring that progress is tracked and verified digitally. Coordinates with local teams in each country to ensure that restoration goals are met according to environmental and cultural contexts.

- Biodiversity Specialist (Regional Leads): Manages species recovery efforts across the Amazon, with progress verified via satellite and local data inputs. Ensures biodiversity restoration is part of the satellite-tracked metrics.

- Forestry Technicians (Country Teams): Oversee seed collection, tree nurseries, and reforestation, ensuring that every activity is tracked through satellite systems and integrated into the overall progress metrics.

- Fire Management Coordinator (Regional Teams): Coordinates satellite-monitored fire brigades, using real-time data to prevent and respond to forest fires.

Responsibilities:

- Oversee reforestation and restoration efforts, driven by satellite-verified data and automated digital payments.

- Coordinate fire prevention and biodiversity restoration, with progress monitored in real-time via satellite.

- Ensure that local teams adapt global restoration strategies to their specific environmental contexts, but always tied to the digital-financial framework.

2.2. Technology and Monitoring Workgroup (TMW)

Role:

The TMW manages the satellite monitoring and digital-financial platforms, ensuring that the real-time data flows from satellites, local ground sensors, and drones are fully integrated into the project management system. This data serves as the backbone for decision-making and financial transactions.

Key Positions:

- Satellite Operations Manager (Regional Leads): Ensures that high-resolution satellite data is collected and processed in real-time, covering deforestation, fire outbreaks, and biodiversity recovery across all regions.

- Data Analysts (Country-Based Teams): Process data from satellite monitoring systems, verifying progress and triggering the release of funds or resources based on smart contract agreements.

- Digital Infrastructure Manager: Oversees satellite internet connectivity to ensure remote areas are fully connected to the central management system. This guarantees that local teams and communities can access real-time data and communicate.

- Blockchain Specialist: Manages the blockchain-based financial system that automates payments, smart contracts, and carbon credit transactions across borders.

Responsibilities:

- Manage satellite monitoring tools to track environmental progress in real-time.

- Process data to verify milestones that trigger automatic payments through the digital-financial system.

- Ensure that satellite internet infrastructure is in place, allowing continuous communication and data flow from the remotest regions of the Amazon.

2.3. Finance and Resource Management Workgroup (FRW)

Role:

The FRW ensures the efficient flow of resources, governed by the digital-financial platform. All financial transactions, including payments to local communities and the generation of carbon credits, are automated through blockchain-based smart contracts, which are triggered by verified environmental outcomes.

Key Positions:

- Budget Manager (Regional Leads): Oversees budget allocation, ensuring funds are distributed based on satellite-verified project milestones and financial compliance across all countries.

- Payments Coordinator (Country Teams): Manages the release of payments via smart contracts to smallholder families, local communities, and contractors, ensuring transparency through the blockchain.

- Carbon Credit Manager: Oversees the sale and tracking of carbon credits generated by reforestation efforts, ensuring they are verified through the digital system and linked to environmental outcomes.

Responsibilities:

- Oversee all financial transactions via the blockchain system, ensuring that payments are tied directly to verified satellite data.

- Manage carbon credit transactions to generate additional revenue for restoration efforts.

- Ensure financial transparency and regulatory compliance in all nine countries.

2.4. Community Engagement and Governance Workgroup (CEGW)

Role:

The CEGW ensures local communities and Indigenous peoples are fully integrated into the digital-financial and satellite monitoring frameworks. Communities will use the digital platform to monitor land, manage funds, and engage in decision-making processes, while the system guarantees transparency and accountability.

Key Positions:

- Community Liaison Officer (Multilingual): Engages Indigenous and local community leaders across the nine countries, ensuring they have access to satellite data and financial resources through user-friendly digital tools.

- Indigenous Rights Specialist (Regional Leads): Ensures that FPIC (Free, Prior, and Informed Consent) principles are respected, and that Indigenous communities are able to monitor project progress and manage funds through the digital-financial system.

- Governance Manager (Regional Teams): Coordinates local governance councils and ensures their integration into the digital-financial framework, enabling them to participate in project decisions using real-time data.

Responsibilities:

- Ensure communities are empowered to manage resources and track progress through the digital platform.

- Guarantee that FPIC principles are respected and that Indigenous communities can engage with project management via satellite tools and digital infrastructure.

- Train local councils on using satellite data and the digital-financial system to make decisions on resource allocation and land management.

2.5. Legal and Regulatory Workgroup (LRW)

Role:

The LRW ensures compliance with the legal frameworks of all nine countries, while managing the legal recognition of the Amazon and Orinoco basins as legal persons. The team integrates the digital-financial and satellite systems to ensure that legal rights are respected and that progress is verifiable.

Key Positions:

- Legal Counsel (Multilingual): Oversees legal compliance across all countries, ensuring that project operations respect national and international laws, and that the digital-financial system tracks compliance.

- Regulatory Specialist (Regional Teams): Works with governments to secure necessary approvals, ensuring that the digital systems are compliant with country-specific regulations.

- Indigenous Rights Advocate: Focuses on securing and protecting Indigenous land rights through the legal personhood of the Amazon, while using satellite data to monitor compliance with these rights.

Responsibilities:

- Ensure legal and regulatory compliance in all nine countries, using data from the satellite monitoring system to verify compliance.

- Manage the legal personhood status of the Amazon/Orinoco basin and ensure its protection through data-driven enforcement mechanisms.

- Oversee cross-border legal challenges related to environmental laws and financial regulation.

2.6. Public Relations and Fundraising Workgroup (PRFW)

Role:

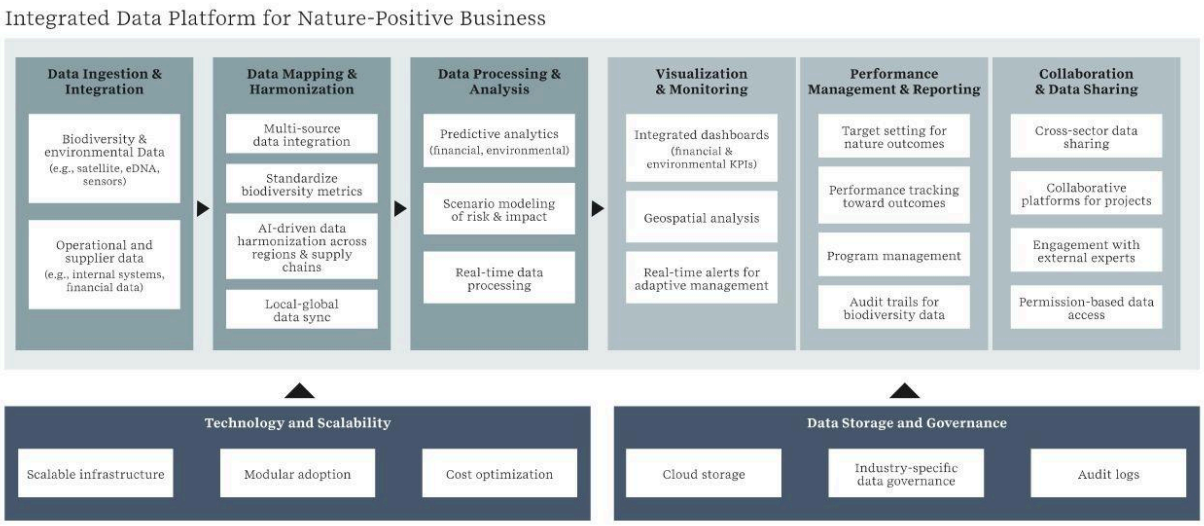
The PRFW manages global communications and fundraising, ensuring that digital-financial transparency and satellite-verified outcomes drive international support. The group promotes the project using real-time reporting from the dashboards and story telling.

SATELLITE-MONITORED, SATELLITE INTERNET-RUN, DIGITAL-FINANCIAL ARCHITECTURE FOR PROJECT MANAGEMENT

This outline provides a comprehensive framework for a satellite-monitored, satellite internet-run, and digital-financial architecture designed to manage and execute the large-scale restoration and protection of the Amazon. The system ensures real-time monitoring, transparent financial transactions, and seamless communication across the vast Amazon Basin, enabling effective project management, resource deployment, and accountability.

Hereunder you find a good example of the structure we will apply to automate the baseline-MRV-dashboard and pay out platform:

Infographic 3: A unified dashboard for nature-related data



Expected characteristics of an integrated platform approach for nature-related data at a leading performance organization.

1. Satellite Monitoring System

The satellite monitoring system will serve as the primary tool for tracking environmental conditions, verifying project milestones, and ensuring compliance with reforestation and restoration goals.

1.1. Components

- Satellite Imaging: Leverage high-resolution imagery from both public agencies (NASA, ESA) and private companies (Planet Labs, ESRI, Maxar) to monitor deforestation, land use, fire outbreaks, and ecosystem restoration efforts.

- MapBiomas and Global Forest Watch, advanced mapping systems that provide critical tools for environmental monitoring. MapBiomas specializes in analyzing land use and land cover changes, particularly in regions like the Amazon, offering detailed annual data on deforestation, agriculture, urban expansion, and more. Global Forest Watch focuses on near-real-time forest monitoring worldwide, using satellite imagery to detect deforestation, forest degradation, and fires.

- Geospatial Data Analysis: Use AI and machine learning algorithms to analyze satellite imagery for real-time insights into forest health, biodiversity, reforestation progress, and ecosystem degradation.

- Environmental Indicators: Set measurable indicators such as tree density, carbon sequestration, moisture levels, and biodiversity richness to trigger project management decisions.

1.2. Functionality

- Real-Time Monitoring: Continuously monitor critical areas of the Amazon for deforestation, illegal activities, and fire risks. Data will be updated in near real-time to ensure rapid response to emerging threats.

- Automatic Alerts: When satellite data detects deviations (e.g., deforestation or fire risks), automatic alerts will be sent to local fire brigades, community monitors, and management teams via satellite internet.

- Verification of Progress: Satellite data will be integrated with ground-based observations to verify that reforestation and land restoration goals are met before releasing payments or resources.

2. Satellite Internet Infrastructure

Satellite internet will ensure connectivity across the remote and vast areas of the Amazon, enabling real-time communication, data transfer, and financial transactions for the project's participants.

2.1. Components

- Starlink or Similar Networks: Deploy satellite internet services to provide high-speed connectivity to remote areas of the Amazon Basin where terrestrial infrastructure is limited.

- Internet Access Points: Establish community hubs with satellite-connected devices (smartphones, tablets, and computers) for local governance councils, fire brigades, seed collectors, and forest guardians to access data and communicate.

2.2. Functionality

- Decentralized Communication: Local communities, Indigenous groups, and project teams will use satellite internet to access project data, report progress, and receive updates. This decentralization will empower community-led monitoring and decision-making.

- Data Transmission: Real-time satellite monitoring data will be transmitted to central command centers and shared with local teams to coordinate efforts such as reforestation, fire prevention, and resource allocation.

- Digital-Financial Transactions: The satellite internet infrastructure will support secure financial transactions, enabling local participants to receive payments based on performance metrics.

3. Digital-Financial Architecture

A digital-financial system built on blockchain technology will underpin all financial transactions, ensuring transparency, accountability, and the efficient distribution of funds.

3.1. Components

- Blockchain-Based Smart Contracts: Use smart contracts to automate payments for ecosystem services (PES), with conditions tied to satellite-verified data on reforestation, fire prevention, and other project outcomes.

- Digital Wallets: Each participant (smallholder families, Indigenous communities, seed collectors, etc.) will have a secure digital wallet linked to their project efforts, where funds will be deposited automatically upon the completion of milestones.

- Carbon Credit Tracking: Integrate a carbon sequestration tracking mechanism into the blockchain to generate and trade carbon credits based on verified restoration outcomes, providing additional revenue streams for participants.

3.2. Functionality

- Automated Payments: Payments will be released based on satellite-monitored milestones, such as hectares reforested, fire control success, or biodiversity improvements. Smart contracts will trigger these payments without manual intervention, reducing delays and ensuring that participants are paid promptly.

- Transparent Fund Tracking: All financial transactions will be recorded on the blockchain, creating an immutable and transparent record accessible by donors, investors, governments, and communities. This will ensure that funds are spent as intended and that results are verified before payment.

- Carbon Sequestration Markets: Carbon credits generated from reforestation efforts will be tokenized and tracked on the blockchain, allowing companies and governments to purchase verified carbon offsets, creating an additional incentive for restoration efforts.

4. Command Centers and Governance

To coordinate all operations, a network of command centers will be established across the Amazon Basin, each linked to satellite data, local communities, and financial systems.

4.1. Components

- Regional Command Centers: 20 command centers distributed strategically across the Amazon, each responsible for managing a specific region and coordinating local efforts.

- Local Governance Councils: Establish 1,000 local councils, led by Indigenous and community representatives, to oversee day-to-day project execution and ensure community engagement.

- Real-Time Decision Support Systems: Each command center will be equipped with decision support tools that integrate satellite data, financial transactions, and community inputs for real-time decision-making.

4.2. Functionality

- Data Consolidation: Command centers will receive and consolidate satellite data, financial reports, and community feedback to track the overall progress of restoration efforts.

- Resource Allocation: Based on real-time data, command centers will coordinate the deployment of resources, such as fire prevention equipment, reforestation tools, or funds for local governance councils.

- Community-Led Decision Making: Local councils will have direct access to project data and financial tools, empowering them to make decisions about resource use, project priorities, and governance.

5. Performance Monitoring and Accountability

The architecture must include robust mechanisms for performance monitoring and ensuring accountability, both for environmental outcomes and financial transparency.

5.1. Components

- Real-Time Performance Dashboards: All stakeholders, from local communities to global donors, will have access to a performance dashboard that tracks progress in key areas like forest restoration, fire control, and biodiversity protection.

- Third-Party Audits: Independent environmental and financial auditors will be engaged to verify that the satellite-monitored results align with the blockchain-recorded payments, ensuring that both environmental and financial goals are met.

5.2. Functionality

- KPI Tracking: The dashboards will track key performance indicators (KPIs) such as forest cover, fire suppression success rates, carbon sequestration levels, and biodiversity metrics. These will be linked to financial disbursements via the digital-financial system.

- Community Feedback Loops: Communities will be able to provide real-time feedback through the satellite internet system, ensuring that issues such as resource shortages or mismanagement can be addressed quickly.

- Automatic Adjustments: If progress falls short or unexpected challenges arise (e.g., fires, flooding), the command centers can automatically reallocate resources or adjust project timelines to respond in real-time.

6. Scaling and Adaptation

To ensure scalability and adaptability, the architecture must be flexible enough to grow as the project expands and able to integrate additional funding mechanisms, technologies, and regions.

6.1. Components

- Modular Expansion: The digital-financial and satellite infrastructure can be expanded to other regions or ecosystems, adapting to different restoration or conservation projects worldwide.

- Integration with Additional Funding Sources: As the project scales, it can integrate with additional carbon credit markets, green bonds, and public-private partnerships to attract more funding and scale impact.

6.2. Functionality

- Scalable Design: The satellite and blockchain systems will be designed to handle increased data flows, more participants, and larger geographic areas, ensuring that the infrastructure can grow alongside the project.

- Continuous Innovation: The system will be designed to incorporate emerging technologies, such as drones for more localized monitoring, AI for predictive analytics, and new financial tools for fundraising and investment.

This satellite-monitored, satellite internet-run, and digital-financial architecture will form the backbone of the Amazon restoration project's project management system. By integrating real-time data, automated financial transactions, and decentralized decision-making, the architecture ensures that resources are deployed efficiently, transparently, and with full accountability to all stakeholders. This model not only supports large-scale restoration in the Amazon but also sets a new standard for managing global environmental projects in the digital age.

Best Reforestation Techniques for Tropical Rainforests and Rich Savannas