PPA
PARCEIROS PELA AMAZÔNIA

CLIMATE CHANGE AND AMAZONIAN RESILIENCE

Analyses on Territorial Development and Climate Adaptation, Mitigation, and Resilience across the operating territories of the Partnership Platform for the Amazon (PPA)

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EXECUTIVE SUMMARY

Climate change is one of the greatest challenges of our time, with especially severe effects in the Amazon. Shifts in rainfall patterns, more frequent extreme events, and higher temperatures directly affect ecosystems and people's lives across the region.

This study, conducted by the Partnership Platform for the Amazon (PPA), maps the main climate impacts in eight territories where PPA is or has been present through its portfolio of initiatives and projects.

The goal is to analyze the interplay between climate change, community practices of territorial development, and the actions implemented—bringing together challenges, opportunities, and good practices based on collected data and interviews with a range of actors involved in supported programs and projects.

By highlighting the particularities of each territory, the research aims to provide inputs for effective, tailored strategies capable of strengthening the resilience of Amazonian communities and ecosystems to climate change.

The analysis shows that initiatives grounded in the bioeconomy and participatory territorial management, for example, help soften the impacts of climate change while fostering income generation, forest conservation, and community empowerment.

Climate resilience in the Amazon is directly linked to the capacity of local populations to adapt and transform, together with the commitment of public and private sectors to scale and sustain these actions.

A central point is the valuing of traditional knowledge by integrating it with scientific-technical know-how and public policy. This approach, combined with community engagement, economic diversification, and investment in adaptive infrastructure (such as water and energy systems), forms the basis for a more effective response to climate impacts.

Despite recurrent challenges (such as geographic isolation, food insecurity, and logistics hurdles), the territories analyzed display solutions that can be replicated. These include strengthening community organizations, offering training through workshops, courses and advancing women's empowerment. Adaptation strategies feature restoration of degraded areas, implementation of Agroforestry Systems (AFS), use of more resilient seeds, and expansion of sustainable economic activities like meliponiculture, fish farming, and handicrafts.

Among the main learnings, the study highlights the importance of respecting the "Amazon's own pace," adapting initiatives to local rhythms, contexts, and priorities, and ensuring community leadership from planning through results assessment. Diversifying sales channels, strengthening organizational capacity and training young leaders emerge as key to continuity and sustainability of outcomes.

By documenting these experiences, PPA seeks to inspire new partnerships and public policies, showing that protecting the Amazon necessarily involves valuing its peoples and territorial governance. In this way, climate adaptation can turn vulnerabilities into leadership, helping build a more sustainable and just future.

CLIMATE CHANGE AND AMAZONIAN RESILIENCE

EXECUTIVE DIRECTOR'S MESSAGE

Facing climate change begins with recognizing the scale of the challenge before us. In the Amazon, its effects are already deeply felt: increasingly irregular rainfall, prolonged droughts, floods, and high temperatures that directly impact economic and social dynamics.

PPA undertook this study across eight Amazonian territories to better understand these impacts and point to viable pathways. Above all, we found a mosaic of solutions, creativity and resilience.

In each territory, community leaders, entrepreneurs, and local organizations show that it is possible to pursue dreams with our feet on the ground. Whether through bioeconomy, sustainable extractivism, or agriculture they are honing techniques and capacities to combine income generation, territorial protection and forest conservation. The experiences so far teach us that true climate resilience is born from the wisdom of communities. Dialogue, diversity and active participation build the solid foundation needed to confront the crisis and ensure a more prosperous and just future.

This study reaffirms PPA's role as a convener of solutions for the Amazon, connecting actors from multiple sectors around a common cause. More than listing challenges, it shows that cooperation and trust yield concrete, replicable results.

We know the coming years will demand even more courage, innovation and collaboration. We will press on, inspired by the certainty that protecting the Amazon means protecting all of us. Where the climate crisis hits hardest, hope for a better future also springs.

Augusto Corrêa
PPA Executive Director

CLIMATE CHANGE AND AMAZONIAN RESILIENCE

01

CLIMATE CHANGE: KEY CONCEPTS

Climate change refers to long-term alterations in climate patterns resulting from natural processes and, above all, human activity—as underscored by the IPCC. Its impacts affect ecosystems, economies, and societies, demanding clear understanding and urgent responses.

The UNFCCC stresses that human activities such as burning fossil fuels are changing the composition of the atmosphere and accelerating these transformations. Major effects include global warming, changes in rainfall regimes, sea-level rise, biodiversity loss, and more frequent extreme weather events.

The Paris Agreement, signed in 2015 during COP21 by 194 countries, aims to limit global warming to well below 2°C (preferably 1.5°C) relative to pre-industrial levels. Signatories must reduce greenhouse gas emissions through national plans and targets (Nationally Determined Contributions, NDCs), seeking carbon neutrality in the second half of the century.

"Climate change" encompasses interconnected and complex shifts in the Earth system that go beyond temperature rise: changes in precipitation and humidity patterns; increased frequency and intensity of extreme events (storms, floods, droughts, wildfires); changes in atmospheric and oceanic currents; and more.

The impacts cut across society (in rural and urban zones alike) affecting agricultural production, public health, urban infrastructure, and commerce. Though climate change recognizes no borders, traditional populations and socio-economically vulnerable groups are typically the first and most intensely affected, exposing long-standing inequalities in the distribution of climate risks.

WHAT DO MITIGATION, ADAPTATION, AND CLIMATE RESILIENCE MEAN?

For this study, PPA uses the following definitions:

Concept	Definition	Practical examples
Climate change mitigation	Measures to reduce the concentration of greenhouse gases (GHGs) in the atmosphere, either by reducing emissions or increasing carbon capture and storage.	Reforestation of Permanent Preservation Areas (PPAs) and degraded areas.
Climate adaptation	Adjustments in natural or human systems to reduce vulnerabilities to ongoing or expected climate impacts.	Cultivating species better suited to new climatic conditions.
Climate resilience	The capacity to prepare for, absorb, and recover from climate impacts while maintaining essential functions and transforming in the face of adversity.	Strengthened territorial governance, with organizations engaged in collective solutions.

METHODOLOGY

The research was structured to understand both the impact of climate change in each operating territory and the practices developed within the supported projects. Beyond data collection, it sought to interpret how communities, local organizations, and partners have responded: identifying pathways, challenges, and experiences that could inspire new resilience strategies.

Three complementary stages guided the work:

1. CONTEXT REVIEW AND ANALYSIS

Climate data, recent documents, and literature on climate impacts in the Amazon (especially from the last five years) were examined. This helped map key effects of extreme events, identify common challenges and local specificities, and analyze public policies related to the climate agenda and their influence on socio-economic and environmental development and the promotion of the bioeconomy.

2. SYSTEMATIZATION OF RESILIENCE STRATEGIES

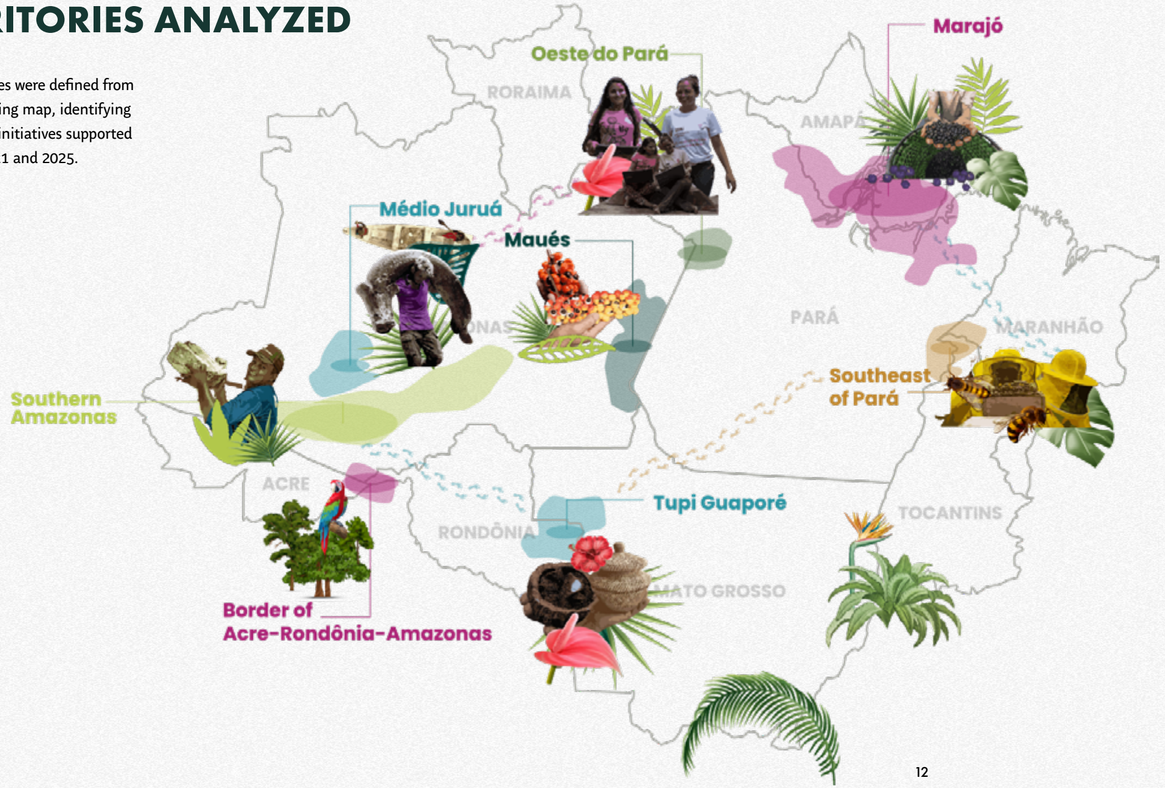
Interviews with implementing partners and beneficiaries were conducted to understand how initiatives have affected the territories. These dialogues surfaced local perceptions of challenges and benefits, as well as good practices and lessons with replication potential.

3. CONSOLIDATION OF FINDINGS

Results were organized into strategic recommendations to strengthen communities' climate resilience. The analysis considered not only project-specific activities but also the territories' socio-economic and environmental contexts, enabling an integrated view of how initiatives connect to local realities and external factors.

TERRITORIES ANALYZED

The territories were defined from PPA's operating map, identifying locations of initiatives supported between 2021 and 2025.



The initiatives are at different stages—kickoff, in development, and completed—but share a common purpose: to expand, improve, and strengthen community-led activities while implementing new solutions aligned with local potential.

Municipalities of Southern Amazonas

Project: Rubber Extractivism Revitalization

Médio Juruá, Amazonas

Project: Médio Juruá Territory Program

Maués, Amazonas

Projetcs: Guaraná Alliance of Maués; Amazon Crowdlending Platform; Sociobioeconomy in the Amazon

Juruti, Pará

Indicators of Sustainability and Management in the Amazon (INGÁ)

Southeast of Pará, (Dom Eliseu, Abel Figueiredo, Bom Jesus do Tocantins, Rondon do Pará e São João do Araguaia)

Rondon do Pará e São João do Araguaia)
Paricá Program
Projetcs: Co-Labora - Fostering a Sustainable and Inclusive Economy; Rural Territorial Development via Agroforestry Systems; Strengthening Marketing Networks and Opening Markets

Marajó, Pará e Amapá

Project: Sociobioeconomy in the Amazon

Carbon Territory, border of Rondônia, Acre & Amazonas

Project: Carbon Insetting

Tupi Guaporé, 09 Indigenous Lands across Rondônia & Mato Grosso

Project: Our Forest Our Home

PROFILE OF INTERVIEWEES

In total, 25 people were interviewed, with at least three representatives from each territory. The selection, led by the PPA coordination, sought to encompass diversity in gender, age and performance ensuring representation of different voices:

10 men and 15 women

5 young people under 30 years old, 16 people between 31 and 50 years old and 4 over 50 years old (up to 76 years old)

17 direct beneficiaries and 8 representatives of implementing partner organizations

The interviews, conducted mostly remotely, were conducted according to the script in Annex II of this document. A list of each interviewee's full name, organization, and territory is available in Annex III.

OBSERVATIONS

Given the limited number of interviewees relative to Amazonian diversity, the results do not capture all existing realities. Even so, the study offers relevant inputs on climate-resilience strategies and territorial development, documenting significant experiences and pointing to promising future pathways.

02

CLIMATE IMPACTS AND APPLIED SOLUTIONS IN PPA TERRITORIES

CLIMATE CHANGE AND AMAZONIAN RESILIENCE

SOUTH OF AMAZONAS AND THE REVIVAL OF NATURAL RUBBER

Working with syringes is something I enjoy doing and I've been doing well. I wake up early, around 4 a.m., and go to the forest to extract rubber, watch the day break and listen to the birds sing. In the afternoon, I have free time to rest or play soccer. I'm living well and I don't think about going back to mining.

Dario Nascimento
Bom Suspiro Community - Manicoré.

The Manicoré River region, in the south of Amazonas state, is marked by an abundance of natural resources, such as gold, timber, and fish. Its most prominent urban centers are Humaitá and Manicoré, which together have about 113,000 inhabitants.

In Indigenous and traditional communities, daily life is deeply tied to agriculture, with products like manioc flour, Brazil nuts, and maxixe (West Indian gherkin). More recently, the revival of natural rubber tapping has opened new prospects for the territory.

This activity had disappeared completely between 2016 and 2022, after the last buyer in the region passed away. With no alternative, many extractivists turned to other sources of income, such as hunting, illegal mining, and predatory logging. The increase in these pressures on the forests of Humaitá and Manicoré led, in 2023, to the inclusion of both municipalities on the priority list of the Federal Government's Union with Municipalities Program for Reducing Deforestation and Forest Fires in the Amazon. In Humaitá, the economy was then strongly dominated by agribusiness and gold mining.

In 2023, PPA arrived to boost and strengthen the territory. The Revitalizing Rubber Extractivism initiative, run in partnership with WWF, the Michelin Foundation, the Chico Mendes Memorial, the National Council of Extractivist Populations (CNS) and local organizations fostering a collectively built strategy to enhance the sustainable value chain.

The project supports associations and cooperatives, encourages environmental conservation, strengthens participatory territorial governance, and expands income opportunities for families. In a short time, Manicoré has reemerged as the state's largest hub for natural rubber production.

RUBBER BEYOND THE PRODUCT: A SYMBOL OF RESISTANCE

The revival goes beyond the economy: it is tied to community autonomy, well-being, and governance. With the project's support, cooperatives and associations have grown stronger and secured important rights for the territory.

One such gain was territorial security through a Concession of Real Right of Use (CDRU), obtained in 2021. The collective title reinforced community unity; today they organize participatory meetings to protect the territory from land-grabbers, wildcat miners, and illegal loggers.

Mobilization brings together community and religious leaders, health workers, teachers, partner institutions, and representatives of the Legislative and Executive branches, depending on the issue at hand. This coordination is vital in a region where access is a challenge: some communities are as far as 15 days by boat from the municipal center, a distance that renders them invisible to public policies and basic services.

While the Community Use Area (CUA) safeguards the forest, the revival of the value chain shows it is possible to reconcile income generation and conservation, placing the communities (holders of centuries-old knowledge) at the center of the solution.

CLIMATE CHANGE AND STRATEGIES ADOPTED

Producers report noticeable climate shifts: prolonged droughts, excessive heat, irregular rainfall, and out-of-season floods.

In the 2024/2025 harvest, output of 156 tons fell short of what the project's 11 organizations had forecast. The main factor was severe drought, since rubber trees reduce or stop latex production. Heat inside the forest was as intense as in urban areas, limiting work to at most 9 a.m. (previously, it was possible to keep going until 11 a.m.).

With rivers dry or at very low levels, isolated communities struggled to move their products and access clean water, which also affected fishing and the production of perishable foods. The drought made it harder to reach extraction areas, and longer, more irregular floods devastated rubber stands and crops.

Márcia Pinheiro, finance secretary of the Association of Agro-extractive Workers (ATRAMP), reports that the unpredictability of drought and flood cycles makes planning difficult:

> It used to be easier to predict droughts and floods, but today everything is very unpredictable, which makes it hard to prepare for what's coming.

ATRAMP adopted measures to protect workers' income, such as reducing the deduction applied to the rubber's weight (traditionally used to account for natural moisture loss). With transport delays, the material was arriving drier than usual, and the change could not ensure fairer pay. On the Pauini River, a partnership with a local merchant optimized transport: taking advantage of his boat, which returned empty after selling goods along the river route, rubber is now picked up directly in the communities, moving up to 5 tons per harvest and lowering costs and risks. "The initiative has worked very well," celebrates Márcia, as it not only benefits agro-extractivists but also secures extra income for the merchant.

Another important action is preserving lakes that do not dry up, ensuring water and fishing even during critical periods. For Matheus Wallisson, from the Southern Amazonas Youth Communicators Collective (JOCSAM), it is also essential to alert and raise awareness about the recurrence of extreme events:

> Many still believe that events like the great flood of 2014 are isolated cases, but the reality is that they will recur.

MAIN RESULTS OF THE INITIATIVE

With actions ranging from youth engagement to the adoption of fairer commercial policies, the project promoted the sustainable management of 145,000 hectares of forest and reduced pressure on deforestation.

All 90 members of one cooperative left illegal mining to make a living exclusively from rubber. The price per kilo, previously sold for R$2 to R$3, rose to around R$20. The donation of 40 tapping kits (essential for latex collection) lowered costs for extractivists and helped keep the activity viable.

Improvements implemented include installing a solar panel with internet access, which provides electricity and connectivity for the entire community; acquiring a motorboat for emergencies; and holding integration events such as the Municipal Gathering of Extractivists. The boat has been crucial for quick transport in medical cases, expanding access to healthcare.

Youth also took on a leading role with JOCSAM, a network that monitors environmental threats by satellite. For Matheus, from the Esperança do Rio Manicoré community, taking part in the monitoring course was a milestone:

> What struck me most in this project was the monitoring course,it opened our eyes to what is really happening in the territory. Seeing the satellite images was very impactful.

THE SURGE IN NATURAL RUBBER PRICES

Previously sold for only R$2 to R$3 per kilo, natural rubber from southern Amazonas has begun to fetch around R$20 with the new marketing model and the support of subsidies. The increase has restored pride and economic viability to the activity, strengthening communities and encouraging forest conservation.

CLIMATE CHANGE AND AMAZONIAN RESILIENCE

MÉDIO JURUÁ: A CASE OF COMMUNITY ORGANIZATION

> Before all the community-organization work there was a lot of rural exodus. Today, people are returning to their families, and others are coming from the city in search of a better life quality.

Fernanda de Araújo Moraes
President of AMAB.

The Médio Juruá Territory, in Amazonas state, spans areas of the municipalities of Carauari, Itamarati, Tapauá, and the far north of Lábrea. Comprising the Médio Juruá Extractive Reserve (RESEX), the Uacari Sustainable Development Reserve (SDR), and the Deni do Rio Xeruã and Matatiben Indigenous Territories (ITs), the territory has about 3,500 inhabitants and preserves extensive areas under sustainable management and native vegetation.

Recognized by UNESCO as a Ramsar Site for its ecological importance, Médio Juruá combines unique biodiversity with strong social organization, which sustains livelihoods alongside community cohesion. In the past, it was the setting of the rubber-estate system, when families lived under the control of bosses. After these bosses left, traditional peoples remained and found in the environment the basis for an autonomous and dignified life. This turning point gained strength in 2014 with the creation of the Association of Agro-extractivist Residents of the Lower Médio Juruá (AMAB). AMAB strengthened collective resource management,starting with the pirarucu (arapaima) fishery. Today, ten communities are part of the fishing agreement (previously limited to two) and former conflicts with commercial fishers were overcome through dialogue.

Between 2021 and 2025, PPA worked in the region as part of the Médio Juruá Territory Program (PTMJ), which covered over 1 million hectares and 60 extractivist and riverside communities, plus five Indigenous villages. The program supported value chains such as oilseeds, açaí, and pirarucu, as well as turtle protection, bringing together environmental conservation, territorial governance and sustainable development.

Its management (coordinated by Sitawi in partnership with PPA, Natura, and the Médio Juruá Territory Forum) was based on collective

decisions and on priorities defined by the territory itself and its six local implementing organizations: ASMAMJ, AMECSARA, AMARU, CODAEMJ, ASPROC, and ASPODEX.
Although the project has concluded, the bond with the territory remains. After four years of joint action, data collection and knowledge exchange, PPA is better equipped to develop initiatives in the Amazon region. A track record that reinforces credibility, ensures consistent impact evaluations, and reaffirms the importance of networked collaboration.

CLIMATE CHANGE AND STRATEGIES ADOPTED

> We had never seen our river run dry.

Francisco Solivan
President of AMARU.

In recent years, extreme weather events have profoundly altered life in Médio Juruá, breaking natural cycles and demanding urgent adaptation. The oilseed harvest cycle (which traditionally starts with andiroba and is followed by murumuru) has been reversed in some areas, forcing communities to buy seeds of both species at the same time, raising costs and requiring more planning.

The 2023 drought was the most severe on record. Rivers dropped to critical levels, isolating communities and making pirarucu (arapaima fish) management (the main source of food and income) unfeasible. Without the floods needed for fish reproduction, fishing declined, and excessive heat made catches even more difficult.

The once-predictable rhythm of floods and droughts has been disrupted. Floods have weakened, droughts have intensified, and forest fires have begun to threaten communities, burning for up to two weeks in some cases. Francisco Solivan, AMARU's president, describes the day-to-day hardship:

> In the dry season, we can't even stand the fan's breeze because it's so hot. We feel the intense heat on our skin. After 10 a.m., it's already hard to keep working—we have to stop.

Extreme heat restricts daily routines and, during drought periods, many families must resort to buying processed foods— a more expensive and less healthy option.

To face these challenges, communities have sought alternatives that combine traditional knowledge, public policies, and support from local associations. Turtle protection, for example, has strengthened food security and community autonomy.

Associations hold workshops, circles of dialogue, and trainings on climate change, bringing together specialists and extractivists to combine science and traditional wisdom. This dialogue encourages low-impact practices, such as safer field management and a reduction in slash-and-burn fires.

Youth engagement is a priority: three recent trainings have formed new leaders, ensuring continuity of community actions. In addition, annual sectoral meetings and local gatherings make it possible to discuss demands and turn them into collective actions, strengthening social organization.

Interviewees suggest several mitigation and adaptation measures. One is drilling artesian wells, together with the need for continuous monitoring to ensure water is of good quality and fit for everyone's consumption.

They also emphasize strengthening IDAM's support in adopting more efficient agricultural techniques, such as crop rotation in upland (terra firme) areas that require less water. Another proposal is to plant drought-resistant species capable of surviving even during prolonged dry spells.

Moreover, they stress the importance of mapping the economic and social losses already affecting communities. These data can guide public policies and support initiatives more precisely, aligned with the territory's own needs and priorities.

MAIN RESULTS OF THE INITIATIVE

> What in 2012 seemed like a distant dream is now a reality for 144 families and more than 500 people directly benefited.

Fernanda de Araújo Moraes
President of AMAB.

The PTMJ consolidated sustainable pirarucu (arapaima fish) management in Médio Juruá, with concrete advances for the communities. Modernizing monitoring and capture made fishers' work easier, while the purchase of tricycles optimized fish transport, replacing manual hauling and increasing efficiency. Institutional strengthening—with the ratification of the Fishing Agreement and mediation by the Fishermen's Colony—reduced conflicts on managed lakes and created a cooperative environment.

The results are visible: lakes managed by ASPROC show larger pirarucu populations compared to others. The initiative also expanded turtle (chelonians) conservation, with 57 local monitors protecting 19 nesting sites (sandbanks), and it opened new fronts of sustainable income, such as the first licensed turtle fair in 2025.

In the oilseed value chain, the inclusion of extractivists in PGPM-Bio (Price Guarantee Policy for Sociobiodiversity Products — a Brazilian federal program that supports traditional and Indigenous communities by ensuring a minimum price for key sociobiodiversity products) and the construction of an agro-industry facility by AMARU, along with equipment upgrades at CODAEMJ, strengthened production. Technical workshops and collective gatherings reinforced productive capacity and community organization.

The social impact is equally significant: many families achieved homeownership, and women assumed central roles in management,taking part in decision-making and technical tasks such as pirarucu counting. The Médio Juruá Territory Forum (FTMJ), which periodically brings together organizations, partners, and authorities, has consolidated itself as a space for collaborative, transparent governance, becoming a regional reference for resilience and development.

CLIMATE CHANGE AND AMAZONIAN RESILIENCE

MAUÉS AND THE LIVING CULTURE OF GUARANÁ

Maués, one of the oldest and most populous cities in Amazonas state, carries a history marked by ethnic and cultural diversity. Originally inhabited by `Indigenous peoples, the region received Portuguese, Syrian, Jewish, English, and Italian influences, forming a unique mosaic of traditions and identities.

With a vast territory,roughly the size of the state of Rio de Janeiro,Maués is mostly formed by uplands with few floodplains. Its waterfalls, archaeological sites, and natural riches reveal strong tourism and bioeconomy potential, though logistics and high transport costs pose challenges for the 300+ communities spread across the municipality.

The local economy is diverse, particularly agriculture, fishing, and handicrafts. Guaraná plays a central role, not only as a crop, but as a symbol of culture and ancestry. Cultivation, begun by Indigenous peoples and passed down through generations, is also present in local crafts, music, dance, and Maués' identity. To honor this tradition, the Guaraná Alliance of Maués (AGM) was created in 2017. Currently, in partnership with Ambev, PPA, the Alliance of Bioversity & CIAT, and Instituto Terroá, the initiative promotes sustainable development and brings public, private, and community sectors together around local quality of life.

The arrangement strengthens AGM as a collaborative network, offering training and operating the AGM Fund, which finances small projects. Six initiatives are supported across three main pillars: strengthening the guaraná value chain, building community nurseries, and community-based tourism, which generates income while preserving natural resources.

CLIMATE CHANGE AND STRATEGIES ADOPTED

Historically, wildfires were Maués' biggest environmental challenge, harming public health and forest integrity during the Amazonian dry season. Over the last three years, however, another imbalance has grown even more severe.

> A huge river that runs through the region, full of water, actually dried up completely. Some people had to dig holes in the ground to get water. If it rained, the holes filled in and they had to dig again. It's very sad to see what's happened in recent years.
>
> **Paula Renat**
> President of the Association of Artisans – Maués (AM)

Changes in the Amazon River's hydrology, worsened by deforestation in the Madeira River basin, the construction of the Santo Antônio and Jirau dams in 2008, and successive extreme droughts (2005, 2010, 2015, 2020, 2023, and 2024), have directly affected local life.

Data from Brazil's National Water Agency show that in Itacoatiara,a neighboring municipality and reference point for regional river dynamics,the amplitude between low and high waters has fallen 25% since 2008. Reduced depth and a shift in the Amazon's main channel, aggravated by siltation and by bank-collapse events known as "terras caídas", have created a new hydrological baseline already affecting Maués.

The 2023 drought was a turning point. In Itacoatiara, the river dropped to just 84 cm, falling below 1 meter for the first time in the historical series. The following year set a new record low at 32 cm, a scenario that halted commercial navigation and exposed sandbanks along the riverbed.

In Maués, important waterways disappeared. Routes once covered in one hour by boat began to require six hours of slogging through mud. Many families were isolated, without access to food, water, and medicine. Reliance on water purchases from other communities (or on direct intake) increased gastrointestinal illnesses, especially among children.

Impacts extended to the economy and culture. Tourism declined, and the traditional Guaraná Festival had to be canceled in 2023 and moved earlier in 2024 due to drought. Fish scarcity reduced incomes and food security for riverside communities, while illegal gold mining contaminated rivers that were once dark and pristine.

In addition, ongoing deforestation in rural areas intensified siltation and contributed to the disappearance of animal species, further upsetting the ecosystem. Hotter temperatures and the loss of predictable seasons,once clearly marked by flood and ebb, are already altering day-to-day agriculture and community life.

Climatically, Maués faces major shifts. Since 1979, the area has seen average warming of 1.2°C, the second-highest among the territories analyzed, behind only Southeast Pará. Rainfall has fallen about 7% over the period, reaching up to 50% reductions in critical years such as 2023 and 2024.

The guaraná tree, the municipality's emblematic plant, is directly affected. Water deficit causes flowers to wither early and prevents proper fruit development, resulting in losses of up to 80% of recent harvests. This production collapse hit family incomes, deliveries to the National School Feeding Program (PNAE), and transport costs, as shipping routes doubled travel time and fuel prices rose.

To confront these challenges, communities are pursuing alternatives that blend tradition and new solutions. Fishing, hunting, swidden fields (roçados), and manioc-flour production remain central subsistence strategies, reducing reliance on city purchases. Small-scale poultry has taken hold as a viable way to secure protein and supplemental income during lean periods.

Another practice is collective contracting of transport: families organize to pay a boatman monthly to bring supplies from the municipal center, reducing costs and ensuring deliveries even during drought. This community organization has been vital to lessen isolation in the most remote localities.

AGM plays a strategic role in this process. Beyond encouraging productive diversification and strengthening handicrafts, it maintains active communication channels, such as the Hora AGM (AGM Hour) radio program, which spreads information on climate change, reforestation, and community rights. The institution's credibility with local leaders makes a difference: trust in the work leads to initiatives being more readily accepted and rooted in communities.

Debated solutions include installing artesian wells to expand access to drinking water, relocating families to areas more suitable for planting, and reforesting floodplains, which today are degraded by deforestation. There are also calls for adequate housing, food stockpiles for drought periods and stronger local associations as instruments of resilience.

Environmental initiatives, such as the reintroduction of turtles into rivers, help restore ecological balance and reinforce the ancestral bond between communities and biodiversity. These actions show that, despite the severity of the crisis, paths of adaptation are possible. With institutional support and community organization, Maués seeks to turn vulnerability into resilience in the face of an increasingly uncertain climate future.

THE SECOND--WARMEST

Maués recorded the second-largest warming among the territories analyzed. 2015 and 2024 set historical records, with anomalies of +1.3°C and +1.2°C, respectively.

MAIN RESULTS OF THE INITIATIVE

The Guaraná Alliance of Maués (AGM) has been a catalyst for change, uniting environmental protection with community strengthening. The reintroduction of turtles into rivers helps restore ecological balance and adds value to forest reserves. At the same time, support for handicrafts creates alternative income, reducing dependence on predatory practices and bolstering local autonomy.

Farmers gained organizational structure within their associations, guaraná cultivation was revitalized, and rural life improved, reviving the regional economy and culture. With design consulting and partnerships such as Sebrae, handicrafts gained visibility in other capitals. Many artisans reached new markets and achieved advances such as home internet access. AGM also supported community tourism, equipping an Indigenous village to receive visitors.

Ítalo Mamud, from Instituto Terroá, highlights the power of networked action: "This engagement makes it possible to connect local initiatives with public and private institutions, paving the way for sustainable value chains.". Synergy increased after three events that brought communities together,even in areas where AGM was previously unknown. "Dialogue is more open than ever," says Ítalo.

This awareness shows that true development is born from active listening and collective work. By uniting diverse voices in concrete actions, AGM proves that transforming realities begins with respect and collaboration.

> We'll only truly be able to care for the Amazon when we understand it isn't just forest and rivers. The Amazon is made by Amazonians: the Indigenous peoples, the riverside dwellers, the people who live here.

Ismael Pinheiro,
Master of Culture at AGM – Maués (AM)

CLIMATE CHANGE AND AMAZONIAN RESILIENCE

JURUTI: RESILIENCE AND ADAPTATION IN THE FACE OF MINING

Juruti, in western Pará, is part of the Tapajós region and lies near the border with Amazonas. With about 60,000 inhabitants, the municipality preserves 76.6% of its territory under forest cover and occupies a strategic position on the banks of the Amazon River, where one of the state's largest ports operates.

The local economy historically developed through extractivism (such as artisanal fishing, timber, açaí, and Brazil nuts) complemented by family farming and small-scale cattle raising. These activities remain essential for many families' livelihoods, although in recent decades they have lost ground to mining.

The arrival of Alcoa (global mining company) in 2006 changed the city's trajectory. Bauxite mining brought revenue and jobs, but also social and environmental impacts, such as rural exodus and the need for sustainable territorial management. In this context, various conservation and agro-extractive areas were created, including PAE Juruti Velho (2005), Gleba Curumucuri (2010), and APA Jará (2019).

This meeting point, between the modernization brought by mining and the forest as a socio-cultural heritage, also spurred initiatives in dialogue and territorial governance, such as the Instituto Juruti Sustentável (IJUS), a local organization that is a reference in collaborative governance in the Amazon.

Projects like Indicators of Sustainability and Management in the Amazon (INGÁ), implemented by IJUS in partnership with PPA and other institutions, seek to reconcile economic development, environmental conservation, and community strengthening.

CLIMATE CHANGE AND STRATEGIES ADOPTED

> The lake is our life. In the past, it didn't dry up completely, there was up to a meter of water. Over the last three years, the water dried out, the lakebed surfaced, and the front of the community turned to mud. When it fills, the water rises above normal.
>
> **Eudes Gomes**
> Teacher and resident of the rural community Monte Sinai.

Climate change is already being felt intensely in Juruti, altering community routines. In 2023 and 2024, the Amazon River recorded the worst droughts in recent history: at Óbidos, the nearest gauge, river levels reached –0.67 m and –1.02 m (ANA, 2025). In some stretches, canoes ran aground on sandbars, and families had to walk long distances over cracked riverbeds to reach boats.

When the water returns, it arrives as violent torrents. The flood record occurred in 2012 (8.5 m), followed by 2022 (8.36 m), when 1,900 families were affected and 500+ were displaced (ANA, 2025). These oscillations,once rare, have become frequent. Today, communities live between two extremes: droughts that isolate schools and reduce fishing, and floods that invade homes and fields.

A decrease in rainfall also contributes. Since 1979, Juruti has seen a cumulative 10.5% drop in annual precipitation, the second largest among the territories analyzed (Meteoblue, 2025). In 2024, rainfall was 40% below the historical average, and in 2023, 25% below. This reduction directly affects agriculture and fish reproduction.

The forest shows signs of imbalance. Some trees dry out early or bear fewer fruits. Common fruits, such as papaya and mango, are found infested with larvae — a reflection of pest outbreaks associated with deforestation. "On the way to the municipal center, where there used to be dense forest, today I see roads and cleared areas," Eudes reports, painting a picture of pressure on natural resources.

Fire worsens the situation. Two years ago, wildfires destroyed homes, crops, and livestock, driving up the price of manioc flour and leaving families homeless. In some places, the fire burned for weeks before being controlled. In 2023, SEMA (State Secretariat for Environment and Sustainability of Pará) acted to reduce hotspots, but the climate remains unpredictable: prolonged droughts alternate with torrential rains that flood entire communities.

Impacts are also visible in aquatic fauna. Turtles such as tartarugas and tracajás are rarer, and at Lago do Jará residents

report declines in fish quantity and quality, aggravated by siltation of the streams. Land-use data show that although 76.6% of the territory is still forested, mining and urban areas already occupy more than twice the area of preserved floodplains (MapBiomas, 2025).

In response, practical solutions are being implemented. Solar kits and water filters were distributed, improving drinking water and reducing the use of salt for food preservation, cutting costs and improving health. In areas like PAE Juruti Velho, communities are encouraged to preserve one hectare of forest without clearing and to limit land use to two years, allowing natural regeneration.

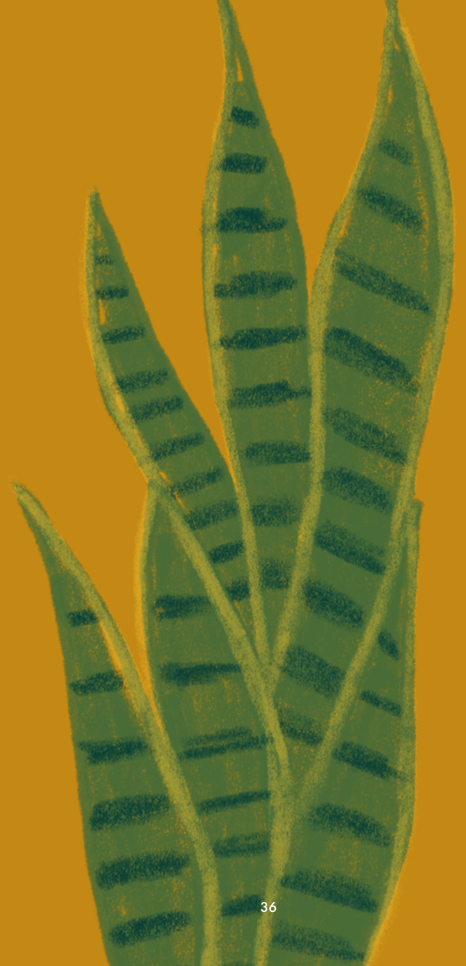
Agroforestry Systems (AFS) are emerging as a promising alternative. Farmers report that AFS help reduce burning, promote reforestation, and strengthen sustainable agriculture. "This is the best alternative for small farmers — those forgotten by the public sector — because it doesn't yield immediate returns," says Eudes.

Even so, restoring degraded areas remains a major challenge. Many seedlings don't survive the extreme dry seasons, and the lack of inputs (such as quality fertilizers and irrigation systems) limits production. Some farmers use fuel-powered water pumps, but high costs and the seasonal disappearance of streams make the practice unviable.

Artesian wells appear as a more stable alternative, although still not very accessible. A recurring issue is the lack of adequate machinery, such as brushcutters: without this equipment, many farmers end up resorting to fire as a last resort.

Community cohesion has made a difference. In São José, Vila Souza, and Santa Maria communities, collective chicken-raising bolsters income and social ties. Product diversification increases resilience to droughts and losses in traditional agriculture.

Awareness of the need to protect forests and rivers grows each year. "Knowledge has to be shared, and I also need to pass on what I've learned," says Tatiana de Souza, from Gleba Curumucuri. This collective spirit underpins local strategies to reconcile development and sustainability in Juruti.



MAIN RESULTS OF THE INITIATIVE

The INGÁ project has been consolidating sustainable farming practices in Juruti, restoring degraded areas and showing that it is possible to integrate crops without compromising the forest. Farmers who once distrusted the proposal are now reaping benefits, increasing income and improving food security. One farmer, for example, started with a small garden and now maintains five, selling the surplus in town.

To ensure quicker returns, the project distributes short-cycle seeds such as watermelon, papaya, and squash (jerimum) which provide immediate harvests.

Workshops teach everything from planting to agroforestry management, covering pruning, soil preparation, and the use of natural fertilizers. These gatherings also strengthen knowledge exchange and bridge science with traditional knowledge.

Workshops also address climate education and waste management. In one activity, residents built trash bins donated to the local school, accompanied by discussions on the impacts of improper disposal.

> In town, the problem isn't a lack of information, but the absence of a mindset of caring about waste and of collective action.
>
> **Yves Andrade**
> IJUS technician.

Community leadership is deemed essential. "Many activities still depend on outside mobilization. Residents themselves need to organize to keep workshops and knowledge exchanges going, so good initiatives aren't lost," argues community member Eudes Gomes.

Product diversification is also advancing. Meliponiculture (stingless-bee keeping) has emerged as a promising alternative, followed by training in partnership with the local university. The next step is to set up community meliponaries, increasing incomes and diversifying production.

Another pillar is strengthening associations. Organized structures make it possible to access public policies, projects, and benefits that would otherwise be unattainable. IJUS provides legal and administrative support, ensuring that collective achievements become new opportunities for sustainable development.

SOLAR ENERGY THAT TRANSFORMS

Installing solar kits with freezers has changed daily life for many families. Now they can preserve fruit and other foods for longer, avoiding waste and reducing the use of salt, a limited preservation method that is harmful to health.

SOUTHEAST PARÁ: BUILDING RESILIENCE AND STRENGTHENING PRODUCERS

> From 100 km ahead you don't see forest, only a few reserves along the rivers. People have been complaining about the heat, but we keep adapting.

Zélia Souza,
Coordinator at COOAGRO – Dom Eliseu (PA)

The Southeast Pará Territory comprises five municipalities in the state's southeast analyzed in this study where PPA begins activities in 2025: Abel Figueiredo, São João do Araguaia, Bom Jesus do Tocantins, Rondon do Pará, and Dom Eliseu. Together, they total about 150,000 inhabitants.

The local economy is driven by agropastoral production, ranging from large ranches to small family farms, the latter providing an important share of school-meal supplies. Agribusiness took hold from the 1970s with the National Integration Plan (PIN), which encouraged occupation of the Amazon under the slogan "lands without men for men without land."

Strategic highways, such as BR-010 (Belém–Brasília) and BR-230 (Transamazon Highway), spurred migration and the expansion of agricultural frontiers. Coupled with government-subsidized credit, the sector grew. This process, however, was marked by land-tenure disorder, lack of proper surveys, and forged titles, which fueled large-scale land-grabbing and land conflicts (Tavares, 2008).

Deforestation advanced rapidly: in 1985, forests covered 80% of the territory; by 2018, pastures and croplands surpassed native cover (MapBiomas, 2025). Today, 43% of land is pasture, 36% forest, and 17% agriculture, the latter focused on silviculture and especially soybean cultivation.

With soybean expansion, Dom Eliseu and Rondon do Pará became major producers in the state. Despite economic gains, environmental pressure led to the Soy Moratorium, an agreement that prohibits buying soy from areas illegally deforested after 2008. Although it reduced the direct conversion of forests to cropland (GTS, 2024), between 2022 and 2023 still 40.6% of deforested areas in Dom Eliseu and 15.6% in Rondon do Pará were converted to irregular plantings, totaling 16,405 hectares (GTS, 2024).

Rapid land appreciation, market requirements, climate-change pressures, and limited access to technical training have led family farmers to sell to large landowners. This trend intensifies land concentration and heightens social and environmental vulnerability.

It is in this context that the Paricá Program emerged (an initiative by PPA in partnership with Suzano, a Brazilian paper company) to strengthen smallholders through environmental conservation, income generation, and participatory governance. Developed with partner organizations, the Program acts on three fronts.

In Dom Eliseu, the project Strengthening Marketing Networks and Opening Markets, in partnership with the Instituto Fronteiras do Desenvolvimento (IFD), expands market access for family farmers, integrating environmental conservation, sustainable economic development, and participatory governance.

The project Rural Territorial Development via Agroforestry Systems, in partnership with Agenda Pública, operates in all five municipalities, strengthening participatory governance and promoting AFS (Agroforestry Systems) as a sustainable solution for rural development.

Meanwhile, Co-Labora: Fostering a Sustainable and Inclusive Economy, implemented by Instituto Terroá, promotes autonomy and income generation through mapping value chains and leadership, commercialization support, technical training, and the formation of multiplier agents.

As part of the Program, the Local Solutions (Small Grants) initiative boosts small-scale projects by community organizations, focusing on innovative actions with immediate socio-environmental impact in the municipalities.

With an initial duration of 18 months, the Paricá Program is expected to directly benefit 750 people and indirectly impact another 3,000, stimulating sustainable economic alternatives and strengthening community resilience to the pressures of deforestation and extensive ranching.

CLIMATE CHANGE AND STRATEGIES ADOPTED

Southeast Pará is feeling the effects of climate change more and more intensely. Rapid forest loss is directly associated with intensifying droughts (QIN, 2024).

Since 2012, all annual precipitation anomalies have been negative relative to the historical average, revealing a consistent downward trend. In 1979, average rainfall was 2,030 mm/year; by 2024, it had fallen to 1,564 mm/year, a 23% reduction. Among the territories analyzed, this is the largest drop, suggesting a possible aridification scenario (Meteoblue, 2025).

High temperatures further aggravate the situation. Since 2001, the region's annual averages have been above historical norms, rising from 26.1°C to 27.5°C. By reducing shaded areas, deforestation intensifies heat stress on herds, undermining beef and milk production and affecting animal reproduction (EMBRAPA, 2016).

Impacts are not limited to livestock: in 2024, prolonged drought reduced Brazil's soybean productivity by 4.6%, while in the territory family farmers reported losses in crops such as squash and cassava (manioc), planted off-season due to unstable rainfall.

Climate irregularity also affects everyday perceptions. Polyana Souto, vice president of Associação Marajoara, recalls that farmers used to orient themselves by seasonal markers, the "cashew rain" or "mango rain", that coincided with crop cycles.

Today, seasons have lost predictability: rains that once ended in May have stretched into July in some years, while in others the wet season arrives late. This disrupts the agricultural calendar and widens inequality in the countryside, as large producers with irrigation can mitigate losses, unlike smallholders.

Drought's effects extend to rivers. The Tocantins River, which runs past São João do Araguaia and Bom Jesus do Tocantins, has shown consistent declines in mean water levels. Over the last two years, intense droughts dropped the river to historic lows, impairing navigation (a traditional transport route) and even power generation at the Tucuruí Hydroelectric Plant (ANA, 2025). At the same time, the reduced frequency and intensity of floods confirms a structural shift in river behavior.

Community accounts reinforce these data. Zélia Souza of COOAGRO in Dom Eliseu says few forest areas remain: "People have been complaining about the heat, but we keep adapting." Darci Batista, from Colônia Progresso, adds that preserved areas on his property help maintain a cooler microclimate, but in town the heat has become unbearable.

In response, some adaptation strategies are emerging. In Dom Eliseu, families are investing in chicken-raising and small-scale fish farming, building community ponds. Tilapia farming, besides generating food and income, helps with biological control of dengue mosquitoes, while using agricultural residues as feed. Through exchanges with other communities, they learn seed collection techniques and beekeeping.

Adaptation, however, has limits. Proposed solutions, such as drilling artesian wells and installing irrigation systems, require high costs and technical support. Polyana cites a local papaya grower who invested R$60,000 in a well, planning for medium/long-term returns. For most families, reality is short-term survival, requiring closer accompaniment and structural public policies. As Darci sums up:

> We need long-term actions and public-sector involvement. Reforesting degraded areas would be a first step—giving the land back what belongs to the land

Darci Batista,
Presidente da Associação de Produtores Rurais da Colônia Progresso (ASPROP)

His words echo the sense that while local initiatives are valuable, the scale of the problem demands public policy, technical support, and sustained investment for territories to build real climate resilience.

OPPORTUNITIES FOR TERRITORIAL DEVELOPMENT

Implementing AFS is a central strategy, alongside strengthening existing value chains such as fish farming and beekeeping, and rewarding producers who preserve forest areas. For Polyana Souto, creating mechanisms that deliver tangible benefits to these farmers is key so they remain on their land and avoid selling to large ranchers.

Territorial development also depends on projects aligned with local reality. In the case of Associação Marajoara, investing in the fruit-pulp agroindustry is a priority, upgrading current facilities before opening new fronts.

Fish farming is already expanding in Colônia Progresso, recognized for its benefits to food security, income diversification, and disease control. Beekeeping, driven by COOAGRO, shows high growth potential, current production of 8 tons of honey could reach 20 tons next year.

According to Darci Batista, expanding technical knowledge and production planning is essential for farmers to overcome market barriers. This is one of the bets of the Paricá Program, which combines participatory diagnostics, training, multiplier formation, and commercialization support to generate income, strengthen governance, and consolidate a sustainable development model in the region.

EVER PRICIER LAND

In just over a decade, land prices in Southeast Pará have surged. An alqueire (2.42 hectares) that once cost under R$20,000 can now reach R$150,000, pressuring small farmers and favoring the expansion of large estates.

MARAJÓ AND THE RIVERS THAT CONNECT LIVES

The Marajó archipelago brings together 16 municipalities located between Pará and Amapá, totaling over 480,000 inhabitants. The diversity of ecosystems in the region (mangroves, natural grasslands, streams (igarapés), floodplain and upland forests) sustains traditional livelihoods and a wide web of species.

The region's per-capita GDP is below the state average, accompanied by low schooling rates and uneven health outcomes. There are internal disparities, with some municipalities showing strong GDP but low education indicators, while others combine lower per-capita GDP with better health and education.

Rivers fully structure life in the archipelago. With no logistical alternative to river transport, it is hard to move agricultural products and to access markets or technical assistance.

While some communities are only 20 minutes by voadeira (amazonian motorized canoe) from the municipal seat, others are up to 16 hours away. This distance sharpens inequalities and isolates entire areas from services and opportunities.

The main economic activity is agropastoral production, with an emphasis on buffalo ranching. In addition, plant extractivism, agriculture, and tourism play important (though less prominent) roles. Açaí is the main crop, and local organizations and cooperatives are working to diversify production and strengthen food and economic security.

A large share of the territory is covered by INCRA (Brazilian National Institute for Colonization and Agrarian Reform) recognized settlements, the result of Brazil's ongoing agrarian reform. Family farmers organized in cooperatives are able to access programs such as Pronaf, aimed at small producers.

Life in these areas, however, is marked by land and socio-environmental conflicts. Ranchers and illegal loggers encroach on protected areas, expanding devastation. Although large-scale agribusiness and ranching are not traditional in the region, their expansion brings pressures and threats against community leaders who resist.

In some riverside areas, energy access has improved, but cooperatives still face management challenges, often led by older leaders who juggle multiple volunteer roles.

Local organizations and partners work to strengthen value chains and protect the territory. Communities report municipal authorities either omitting themselves or aligning with opposing interests, at times taking actions to weaken territorial management entities and leave families more vulnerable to selling their land.

Despite natural wealth and cultural diversity, Marajó is a region marked by deep social inequalities. The historic concentration of land in a few hands has created a backdrop of land disputes, where traditional populations fight for recognition of their territories (BULHOSA et al., 2021). In addition, the pressure of economic interests, such as agribusiness and logging, combined with political clientelism, hinders the realization of a fair, sustainable agrarian reform (CARVALHO et al., 2019).

Regarding forest cover, the territory is highly preserved, as it lies almost entirely within Protected Areas and Indigenous Lands. With over 60% forest cover and about 30% seasonally

CLIMATE CHANGE AND AMAZONIAN RESILIENCE

flooded wetlands, the region also encompasses the Mouth of the Amazon River, the world's largest, forming a complex of islands, mangroves, and sediment banks that support unique biodiversity.

Against this backdrop, PPA and Conexsus coordinated the Sociobioeconomy in the Amazon initiative, supporting Marajó cooperatives such as COPAVEM (São Sebastião da Boa Vista), Manejaí (Portel), and COOPAM (Gurupá). Actions included facilitating access to finance, encouraging women's participation in productive markets, training youth, teaching sustainable management to producers, and strengthening governance, scaling up açaí commercialization.

CLIMATE CHANGE AND STRATEGIES ADOPTED

The Marajó ecosystem plays a crucial role in climate-change mitigation. Much of its forests are mangroves, capable of storing more than twice as much carbon as terrestrial forests (BERNARDINO et al., 2024). Converting one hectare of mangrove to another land use emits three times more than converting one hectare of upland forest, underscoring the urgency of protection.

The rainfall regime in the region behaves differently from most territories analyzed. While others suffer declining rainfall, the archipelago shows an annual increase of 20% since 1979 (Meteoblue, 2025), albeit with anomalies, such as 1992 drought (–44%) and 1999 excess (+55%).

Even with this increase, residents weren't spared the prolonged drought of 2023 and 2024. Water scarcity and excessive heat caused buffalo and fish die-offs, and flooded areas turned into dry pastures.

Changes have also been observed in river behavior. The Amazon River has two important tributaries, the Xingu and Jari, both showing historical oscillations in water levels. On the Jari, the series since 2011 shows both the highest flood and lowest low-water marks in the past three years. On the Xingu, the record flood of 2022 was followed by the severest drought in 2023 and 2024, revealing strong hydrological instability.

Temperature increases have also set records. Since 2001, the region has recorded positive temperature anomalies, i.e., values above the historical average, the largest in 2024 at +1.0°C.

Studies warn that Marajó Island is among the most vulnerable areas in Brazil to sea-level rise: a 2-meter increase could submerge 28% of its territory. Coastal erosion is already visible, forcing villages to reorganize and highlighting the importance of mangroves as a natural barrier against climate extremes.

Impacts reach communities directly. Açaí production halved in 2024, and the price per liter surpassed R$100, a consequence of heat drying the fruit on the palms. Shrimp catches, the second-largest income source, vanished in many places due to warmer waters and salinization. Meanwhile, a drop in pollinators has drastically reduced Brazil nut productivity.

Environmental degradation worsens the picture. Deforestation and burning dry up springs and pollute rivers, making water unfit and raising gastrointestinal and skin diseases. Family farming suffers from rainfall irregularity and prolonged waterlogging of floodplains, which renders subsistence plots unviable. Many families must purchase food in towns, where prices are higher.

Despite the challenges, adaptation strategies are taking shape. Families participate in ecological restoration, seed collection, and AFS implementation, using species more resistant to the new climate regime. Partnerships aim to integrate nurseries with community production. Initiatives in fish and poultry raising diversify production and strengthen food security.

Simple technologies, such as bucket-and-ceramic-candle water filters, are in early

stages. Access to credit and economic improvements, like purchasing “rabetas” (long-tail boat motors) for transport, alleviate some difficulties. Autonomous initiatives, such as sustainable copaíba tapping, show strong organizational capacity.

The community view is clear: facing the climate crisis requires continuous public support. Training environmental agents, allocating municipal resources for appropriate technologies, and implementing integrated policies in education, health, sanitation, and family farming are seen as essential to strengthen community resilience in Marajó amid climate change.

MAIN RESULTS OF THE INITIATIVE

The Sociobioeconomy in the Amazon initiative consolidated significant gains for cooperatives and communities, combining improved management with sound governance practices, resulting in more sustainable, profitable production.

One highlight was strengthening cooperative capacities. According to Bruna Oliveira, community business advisor, COPAVEM doubled the amount of açaí delivered to industry from one year to the next, even amid a poor harvest and extreme climatic conditions.

COOPAM, which had no revenue in 2023, accessed support programs in 2024 and plans to expand operations next year. Credit access, enabled by socio-productive registries, brought greater contract security and planning capacity.

The initiative also fostered women’s and youth leadership. Many youth serve as credit activators, while women began occupying leadership roles in associations, supported by minimum women’s participation requirements in slates and training processes.

In practice, these changes meant more income and quality of life: families acquired boat engines, renovated homes, accessed medical treatments, and expanded their diets with local foods such as porridges, sweets, and prepared dishes.

Community events exceeded expectations, a gathering planned for 150 people welcomed 261 in a single day, offering documentation services, workshops, and financial education.

In the field, areas that once produced one ton of açaí now yield three. A forest assessment revealed potentials such as cacao and Brazil nuts, while the introduction of AFS and low-impact management dispelled the notion that monocultures are always more productive. Partnerships with Embrapa (Brazilian Agricultural Research Corporation) opened new fronts like meliponiculture (stingless-bee keeping), and training local multipliers ensures knowledge spreads despite the scarcity of public extension agents.

The revival of collective work practices (‘mutirões’) strengthened social bonds and generated impacts that now reach families not directly linked to the organizations.

Thus, an action initially focused on cooperative management evolved into a movement for dignity, food sovereignty, and territorial development. As Gracionice Silva, president of Cooperativa Manejaí, summed up:

> The project emerged as a true gateway to new possibilities. We’ve already gained access to some important spaces, but there are still many paths to travel and doors to open.

COMMUNITY CARBON TERRITORY: PRODUCTION AND CONSERVATION ON THE AMAZONIAN FRONTIER

The Community Carbon Territory is located in the AMACRO region, at the tri-border of Amazonas, Acre, and Rondônia, an area with some of the highest deforestation rates in the Brazilian Amazon. At the same time, it hosts innovative sustainable development initiatives driven by a diverse, resilient population.

The first inhabitants were former rubber tappers left from the rubber boom in the early 1900s. Later came migrant farmers, mainly from southern Brazil, drawn by the expansion of the agricultural frontier in the 1980s. More recently, intra-regional migration has increased, with residents of cities like Rio Branco and Porto Velho seeking new opportunities. This flow created a mixed population where different traditions and knowledges interweave. RECA (Consortium for Dense Economic Reforestation) is the heart of this dynamic.

The cooperative is a reference in participatory governance and organizes members into family-based groups called "ramais." Each ramal elects representatives, and nine coordinators serve four-year terms for collective decisions.

Operations are efficient: on the first Friday of each month, a coordination meeting is held at headquarters to present accounts, analyze reports, and discuss actions. The following week, each ramal holds its own assembly, ensuring decisions are validated or revised collectively. Community relations in Nova Califórnia are marked by hospitality and collaboration. Mutirões (collective work parties) for road and equipment maintenance bring together co-op members, ranchers, merchants, and even loggers, making up for the lack of public investment in infrastructure.

Water management is a critical challenge. Although the region is the headwaters for important Amazon tributaries, it faces severe water scarcity during the dry season, when even artesian wells can dry up.

In this context, the Carbon Insetting initiative, a partnership among PPA, RECA, and Natura (a Brazilian cosmetics company), has gained traction. More than a carbon-compensation

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instrument, it combines reduced deforestation, forest restoration, institutional strengthening, and farmer mobilization for collective solutions. It's a model that aligns production, conservation, and community organization, pointing to pathways for Amazon's future.

CLIMATE CHANGE AND STRATEGIES ADOPTED

Communities in Nova Califórnia have been experiencing climate shifts that affect the environment and agricultural production. Rains have become irregular, and temperatures swing between mild days and periods of extreme heat—especially in deforested areas, where the microclimate is more unstable. Excess heat shortens workdays in the fields and increases physical strain on producers.

Climate unpredictability leaves farmers uncertain. Traditional knowledge that guided planting and harvest no longer guarantees good results. In heavily deforested areas, springs have dried up. This year's good harvest (1.3 million kilos of cupuaçu fruit gathered in a single month) is seen as an exception amid years of uncertainty. Diseases are also reemerging. Malaria, once a problem at the start of agricultural settlement, has returned, pulling families away from the fields and causing deaths. Cupuaçu fruit, RECA's main crop, illustrates the changes: previously, harvest began in November; in recent years the cycle has shifted, and in 2024 it only started in March. Without irrigation, everything depends on the timing of the rains. Heat has also favored new pests and diseases, some unknown even to Embrapa.

The community recognizes the direct link between these impacts and human actions: deforestation for ranching, paving (asphalt) expansion, and soil compaction. Preserving the forest and adopting more resilient practices are seen as essential to guarantee production and life in the territory.

RECA has invested in concrete solutions. A pilot irrigation system will be installed on 10 properties with access to rivers, cisterns, or lakes, reducing losses during droughts. In partnership with INPA (National Institute for Amazonian Research) and Embrapa, efforts are underway to improve cupuaçu genetics toward more productive, resilient varieties. Soil management is also a priority. Producers receive guidance to keep fertilized, healthy plots, increasing plant resilience. Revitalizing AFS includes pruning, liming, composting with agroindustry residues, and organic fertilization, improving water retention, restoring springs, and lowering local temperatures.

Restoring PPAs (Permanent Preservation Areas) and degraded lands contributes to the microclimate and water availability. But scaling these actions requires public policies, machinery, technical assistance, and funding. Without viable alternatives, some producers resort to deforestation for cattle ranching, the dominant activity in the region.

Strengthening the cooperative and diversifying income are central strategies to keep families on the land. Meetings and partnerships broaden governance, involving about 3,000 students in educational activities on legal ranching and productive diversification.

For the community, preserving the Amazon depends on a tripod: local effort, investment, and consistent public policies. With proper support, sustainable production becomes not only viable but more advantageous than predatory activities.

RECORD HARVEST

In just one month, RECA producers harvested 1.3 million kilos of cupuaçu fruit, a historic result for the cooperative that showcases the territory's productive potential even amid an increasingly unstable climate.

MAIN RESULTS OF THE INITIATIVE

> An important aspect is that PPA doesn't try to reinvent the wheel, but adds to what already exists and complements local initiatives.

Sérgio Lopes
ECA cooperative member.

For decades, RECA members have produced in harmony with the forest through AFS (Agroforestry Systems), maintaining areas better preserved than the regional norm. For a long time, this stance didn't bring financial returns. The Carbon Insetting project changed that, offering economic compensation for conservation and reinforcing that standing forest is a valuable asset.

Sérgio considers the project one of the most successful he has seen and regrets it didn't arrive earlier, as it could have prevented more deforestation. Today, some producers depend on this income, while others use it to diversify and improve rural life. Aldênia Santos, also a cooperative member, values the collective nature: "It's like having the forest work for me."

Part of the resources goes to a community fund, invested in equipment, fertilizers, and property improvements. Beyond income, the project enabled fences, spring restoration, and incentives for organic production. Land regularization also advanced through mutirões (collective efforts). Gicarlos Souza, RECA's commercial manager, highlights a mindset shift:

> Before, many saw no advantage in keeping the forest standing. Today, even non-members in other municipalities show interest.

Initial skepticism has given way to active demand for the project. For Aldênia, a milestone was Natura's recognition (a RECA partner since 2001)of local producers' work. This reciprocal relationship shows it is possible to reconcile production and conservation.

With strong governance and well-structured projects, RECA proves that a preserved forest not only protects the environment but also transforms lives.

MOSAICO TUPI TERRITORY: INDIGENOUS RESISTANCE AND ADAPTATION IN THE FACE OF THE CLIMATE CRISIS

> If the world acted like Indigenous peoples, caring for the land instead of exploiting it, we might not be in this crisis.
>
> **Lana Suruí**
> Artisan and community member.

The Mosaico Tupi encompasses 10 Indigenous Territories located between Rondônia and Mato Grosso. This study focused on activities carried out in the Sete de Setembro Indigenous Territory, one of the largest in the Mosaic, with 248,000 hectares, demarcated in 1983. The territory stands out for hosting a significant number of Indigenous organizations and associations.

The Suruí people, who inhabit the area, were the first to establish contact with Funai in the early 1970s. Over the years, they have faced conflicts with other ethnic groups and with non-Indigenous people. During the COVID -19 pandemic, they lost many elders, at one point counting only 200 individuals.

Today, they number around 1,500 people, distributed across 40 villages. Each community organizes its activities autonomously (especially when it has a representative institution) but they also develop joint projects that span the entire territory.

The main economic activities are agriculture (manioc, heirloom corn, yam, banana, and coffee) Brazil-nut extractivism, and handicrafts. Some families also raise chickens, pigs, and cattle, the latter on a smaller scale. Part of production is marketed through Indigenous cooperatives such as COOPAITER and COOPSUR.

The growing influence of agribusiness, especially from Mato Grosso state, worries community leaders, as does the advance of illegal ranching within Indigenous Territories. Although prohibited, leasing land for cattle has led to deforestation and the conversion of forests to pasture.

Currently, the states of Mato Grosso and Rondônia retain 53% of their remaining forest cover, while 38.5% of the area has already been converted to agriculture and ranching — mainly pastures, soy, sugarcane, and corn (MapBiomas, 2025). Amid the devastation, the Mosaico Tupi maintains 96% of its forest untouched. The contrast underscores an undeniable fact: protected areas are the only effective barriers against total deforestation.

To confront this scenario, PPA supported the Our Forest, Our Home project, implemented by Forest Trends and aligned with PNGATI (National Policy for Territorial and Environmental Management of Indigenous Lands). The initiative is organized around three pillars: strengthening Indigenous value chains; supporting territorial economic governance; and building bridges between Indigenous production and companies committed to ethical trade, in accordance with biocultural protocols. The goal is to reduce dependence on degrading activities and increase economic autonomy, reinforcing the value of the forest and ecosystem services.

CLIMATE CHANGE AND STRATEGIES ADOPTED

Prolonged drought and frequent burning disrupt natural cycles in the Mosaico Tupi, affecting agriculture, hunting, and fishing. Field productivity has fallen, and crops like cacao have already lost entire harvests. Fruits once abundant are now scarce; streams and lakes have dried up, affecting wildlife; and the fish breeding season has shifted.

Scarcity of resources also affects handicrafts. Fronds and fibers dry out, nuts rot, and raw material becomes harder to obtain. Rather than turn to outside inputs, artisans prefer to halt production when they cannot collect within their own territory, an act of cultural resistance.

In the fields, reviving agroforestry has been a way to secure food, protect soils, and reconnect with ancestral practices. Initiatives such as fish farming help offset the decline in fishing.

Restoration also extends to areas degraded by ranching. But leaders know they must go further: invest in water-storage technologies, expand dialogue about the global causes of the climate crisis, and seek support to strengthen their initiatives.

MAIN RESULTS OF THE INITIATIVE

Our Forest, Our Home has brought concrete advances from restoring degraded areas to valuing handicrafts as a source of income. On 20 hectares previously occupied by pasture, the muvuca technique sowed native species, mimicking natural regeneration.

In handicrafts, women expanded their portfolios and learned to set prices that include time and skill. Market access was facilitated through partnerships and by adapting products to commercial standards. Management of Indigenous associations also improved, with workshops that filled organizational gaps. Exchanges between

communities revealed opportunities, such as extracting vegetable oils from previously underused species.

Mapping of Brazil-nut stands with GPS and building a storage shed increased the product's sale value. Predatory practices were replaced by sustainable methods, and families shifted from cattle ranching to agroforestry systems.

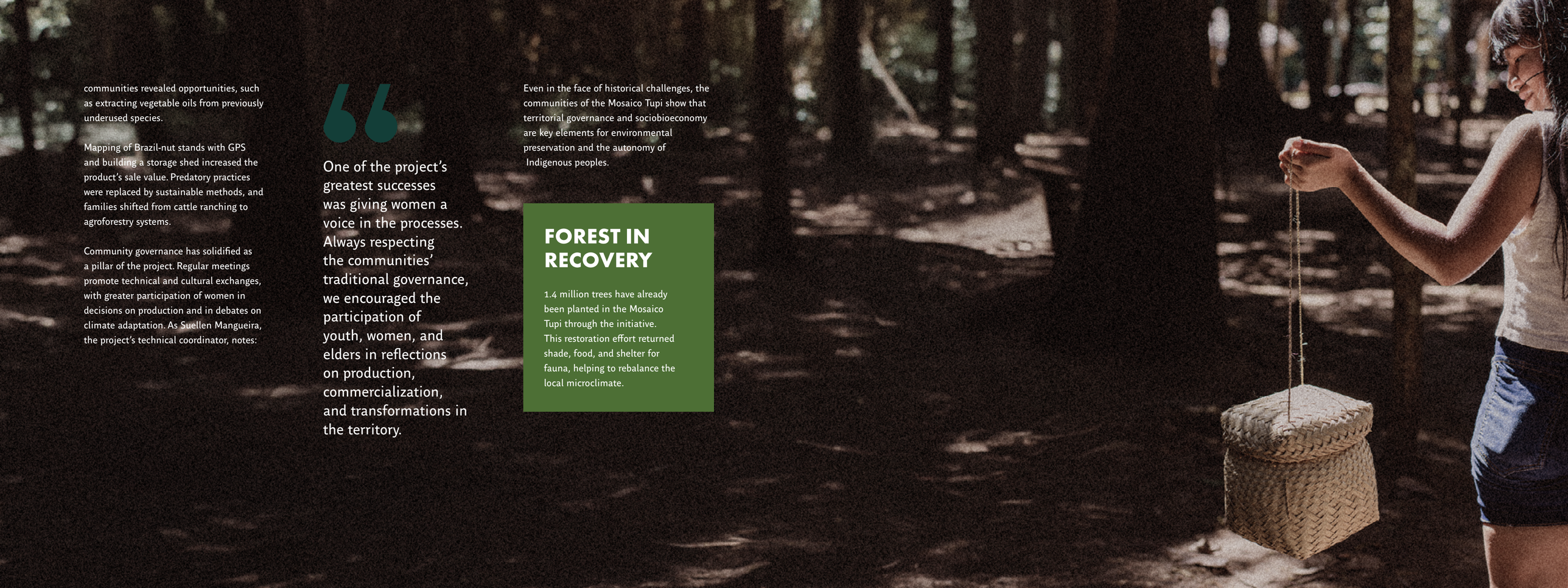
Community governance has solidified as a pillar of the project. Regular meetings promote technical and cultural exchanges, with greater participation of women in decisions on production and in debates on climate adaptation. As Suellen Mangueira, the project's technical coordinator, notes:

> One of the project's greatest successes was giving women a voice in the processes. Always respecting the communities' traditional governance, we encouraged the participation of youth, women, and elders in reflections on production, commercialization, and transformations in the territory.

Even in the face of historical challenges, the communities of the Mosaico Tupi show that territorial governance and sociobioeconomy are key elements for environmental preservation and the autonomy of Indigenous peoples.

FOREST IN RECOVERY

1.4 million trees have already been planted in the Mosaico Tupi through the initiative. This restoration effort returned shade, food, and shelter for fauna, helping to rebalance the local microclimate.



03

CHALLENGES EXACERBATED BY CLIMATE CHANGE

RIVER TRANSPORT

In many Amazonian territories, rivers are the main (and often the only) transport route. Some communities are as far as 15 days by boat from urban centers, making logistics one of the biggest hurdles in daily life. This already means high costs and long journeys, and it's getting worse with climate change.

Prolonged droughts drastically lower river levels and, in some cases, cause tributaries to run dry for the first time in recent history. When that happens, entire communities become isolated, without access to basic supplies, health services, or ways to ship their production.

Beyond distance, other factors compound the difficulties:

- High fuel costs, which make transporting people, inputs, and goods more expensive, directly impacting the local economy;
- Climate vulnerability, as erratic rainfall and extreme droughts make navigation increasingly unpredictable. At times, families are forced to walk long distances across dried floodplains or rely on even longer alternative routes.

This reality especially affects four of the eight territories analyzed: Maués, Marajó, Médio Juruá, and Southern Amazonas. In these regions, dependence on river transport, combined with climate change, creates a growing risk of logistical isolation, raising living costs and undermining both food security and communities' productive capacity.

ACCESS TO DRINKING WATER AND ELECTRICITY

The lack of a public water-supply network (one of the biggest barriers to drinking-water access in the Amazon) is worsened by river droughts. In territories such as Maués, Médio Juruá, Nova Califórnia, and Manicoré, families depend on rivers, cisterns, or artesian wells for direct intake, which become insufficient during droughts. Interviewees report that in Nova Califórnia the wells do not ensure supply in critical periods.

In Marajó and Juruti, the main challenge is contamination: the absence of basic sanitation, combined with river droughts, concentrates pollutants, making water unfit for human consumption. This exposes communities to health risks and worsens water vulnerability.

Collective arrangements and programs are installing wells, water tanks, and treatment systems, but they have not yet reached sufficient scale. Many localities still lack safe access to drinking water. Water insecurity also undermines the bioeconomy, affecting value chains such as agro-industries and fruit processing.

Access to electricity is also uneven and fragile. Only four territories in this analysis (Mosaico Tupi, Nova Califórnia, Southeast Pará, and Juruti) are connected to Brazil's National Interconnected System (SIN), with Juruti integrated only in 2023. Most communities depend on Isolated Systems, diesel or gas-powered grids serving about 200 localities in Brazil, mostly in the North. While essential, this option is costly and polluting.

In remote areas, small solutions like solar panels and diesel engines ease the problem but provide limited power, usually a few hours a day. These sources don't reliably support productive activities and prove fragile amid climate instability. Prolonged droughts raise diesel prices, as they hinder riverine fuel distribution, increasing the cost of supplying regional thermal plants. On the SIN (National Interconnected System), falling river levels reduce hydropower generation, requiring more fossil-fueled thermoelectric dispatch. The result is higher tariffs and greater greenhouse-gas emissions, feeding back into the climate crisis.

[18] EMPRESA DE PESQUISA ENERGÉTICA (EPE). Sistemas isolados. Disponível em: https://www.epe.gov.br/pt/publicacoes-dados-abertos/publicacoes/sistemas-isolados. Acesso em: 28 set. 2025.

FOOD INSECURITY

Food insecurity was observed in all territories analyzed, the result of pressures that directly affect food production and access.

First, the increasingly unpredictable climate undermines family farming: harvests are delayed or lost to floods and droughts, raising prices of staples like manioc flour and pushing families to processed foods in place of what they used to produce.

Another challenge is logistics stemming from river droughts, the main transport route in many regions, which limits access to municipal markets and neighboring communities.

Finally, there is reduced availability of animals traditionally present in local diets, such as shrimp in Marajó, pirarucu in Médio Juruá, and game in Juruti and the Sete de Setembro IT.

This scarcity has been linked to abnormally warm waters, expanding deforestation, prolonged drying of streams, and lower forest-fruit production, which disrupts the regional food web.

COMMUNITY ENGAGEMENT

Community engagement across the Amazon still faces barriers tied to a history of organizational fragility. Unfulfilled promises by companies, governments, and even local leaders have left scars of mistrust that hinder participation in new initiatives.

This is not just the past, it's a current challenge that weakens social cohesion and undercuts collective capacity to deal with external pressures, including climate change. In Juruti, technicians from the Instituto Juruti Sustentável (IJUS) initially met resistance in communities affected by mining. Through continuous presence and active listening, mistrust was reversed, and today residents seek out the Institute for support.

In Southeast Pará (Dom Eliseu), skepticism is compounded by limited experience with structured processes to access markets. Many give up in the face of difficulties, although innovative producers are inspiring change. Soy expansion has weakened cooperatives and social cohesion; PPA-supported initiatives address this with training, governance, and commercialization support. In Maués, participation is high, but mistrust persists after past misuses of funds in previous projects. In Marajó, COPAVEM still contends with low trust due to former representatives and digital-communication hurdles, leading the current board to prioritize in-person mobilization.

This fragmentation and low trust deepen social vulnerabilities and reduce adaptive capacity to climate change. Divided communities struggle to organize joint responses to droughts, floods, or supply crises. Overcoming accumulated frustrations and strengthening social cohesion are therefore essential steps to enable adaptive, lasting solutions.

Aware of this, PPA works through steady on-the-ground presence, investing in rebuilding ties and local leadership. The Juruti case shows that with listening, respect, and commitment, it is possible to reverse mistrust and lay solid foundations for collaborative relationships.

Rebuilding is crucial not only for new projects to thrive, but also for communities to be better prepared and more resilient in the face of climate change.

CHALLENGES EXACERBATED BY CLIMATE CHANGE

LOGISTICS & TRANSPORT

River droughts
River transport is the main (often only) mode for most localities; some are up to 15 days by boat from urban centers.

Isolation
Where communities depend entirely on rivers, prolonged droughts leave families without access to food and public services.

High fuel prices
Low water hampers fuel distribution, making fuel—and therefore river transport—more expensive.

Territories with the most reports of difficulties: Maués, Marajó, Médio Juruá, and Southern Amazonas.

ACCESS TO ENERGY

Public grid
Half of the territories analyzed are not connected to the National Interconnected System (SIN).

- This is the case for Tupi Guaporé, Marajó, Médio Juruá, and Southern Amazonas.
- In others, interconnection is recent, such as Juruti in 2023.

Isolated systems
There are ~200 localities with isolated electric systems in Brazil, mostly in the North.

- Diesel or natural-gas thermal plants
- Polluting
- High operating cost
- Limited reach over short distances

Solar panels
Already a reality in some territories, despite limitations.

- Limited number per community
- Cost requires subsidies for purchase, installation, and maintenance

“Light motors”
Small diesel generators that operate only 3–4 hours per night to avoid high fuel costs.

CLIMATE CHANGE AND AMAZONIAN RESILIENCE

WATER SCARCITY & CONTAMINATION

Precarious supply
Most territories analyzed are not served by a public water-distribution network.

Direct intake
Without piped supply, families draw water directly from rivers during drought, increasing contamination cases.

Extreme drought
Worsens conditions where supply is already precarious.

Well installation
Initiatives are expanding wells, tanks, and treatment systems, but coverage remains limited.

Impact on economic activities
Agro-industry, fruit processing, and other essential activities require stable, safe water.

- Maués, Médio Juruá, and Manicoré report many families without access to artesian wells facing critical scarcity during droughts.
- In Nova Califórnia, even wells are insufficient to ensure supply in the dry season.
- In Marajó and Juruti, people faced serious water-contamination problems.

FOOD INSECURITY

Lost or delayed harvests
Increasingly unstable flood and drought periods disrupt crops.

- Extreme heat prevents reproduction/growth of foods, increasing scarcity.

Rise in processed foods
Without staples they used to produce, many families turn to towns and industrialized options, facing higher food and transport costs and health impacts.

- River drought can worsen the situation for communities dependent on river transport.

Water contamination
Without basic sanitation, direct intake from dried rivers/lakes without proper treatment leads to infections.

Main imbalances observed in fauna:
Marajó - Shrimp
Médio Juruá - Pirarucu
Juruti & TI Sete de Setembro - Hunt

- Possible causes: warmer waters, deforestation, drying of streams (igarapés), scarcity of forest fruits.

COMMUNITY ENGAGEMENT

Youth engagement

Weakened community organizations

Sensitivity
Unfulfilled promises in past efforts generate caution.

- **Juruti**
  Initial resistance in areas impacted by mining
- **Southeast of Pará**
  Unkept promises by local companies and state/municipal governments

  Soy expansion weakens cooperatives
- **Maués**
  Past mismanagement in projects fuels concern
- **Marajó**
  Low familiarity with digital technologies

04

GOOD PRACTICES AND REPLICABLE ACTIONS

CLIMATE MITIGATION AND ADAPTATION STRATEGIES

Amazonian communities have implemented responses that combine traditional knowledge and technical innovation to face prolonged droughts, extreme floods, and shifts in productive cycles.

Restoring degraded areas and implementing agroforestry systems (AFS) have reconciled agricultural production with environmental recovery, with experiences in territories such as Community Carbon, Juruti, Marajó, and the Sete de Setembro Indigenous Land. The rescue and selection of resilient seeds and varieties has also been key: Suruí peoples are reintroducing yam cultivation; Tikuna peoples select cassava and fruit adapted to extreme heat; and RECA invests in genetic improvement of cupuaçu.

Water management has become central amid prolonged droughts. In Maués, artesian wells and cisterns ensured water during severe dry spells. In Médio Juruá, Southern Amazonas, and Marajó, preserving perennial lakes secured fishing and supply. In Nova Califórnia, RECA is restoring springs and installing irrigation systems in AFS.

Economic diversification has reduced predatory pressures and promoted financial security. Meliponiculture has taken hold in Southeast Pará, Marajó, and Juruti; fish farming in Mosaico Tupi, Dom Eliseu, and Marajó; poultry in Maués, Juruti, and Southeast Pará; and there is stronger handicrafts and community-based tourism in Maués and Southeast Pará.

Climate education and collective dialogue are present in assemblies, workshops, and community radio. In Marajó and Juruti, gatherings have focused on awareness of sustainable agricultural practices. In Médio Juruá, dialogue circles bring technicians and communities together. In Southern Amazonas, youth use satellite imagery and WhatsApp groups to monitor deforestation. In Mosaico Tupi, there is growing interest in climate-change information, and in the Sete de Setembro IT listening spaces were created to expand the participation of women, youth, and elders in discussions about environmental impacts and adaptation strategies.

These experiences show that medium and long-term adaptive actions are essential to strengthen territorial resilience, while emergency responses (such as water and food distribution) are necessary in critical situations but do not reduce structural vulnerability.

CAPACITY DEVELOPMENT AND PRODUCTIVE INNOVATION

Training through courses and workshops have become one of the highest-impact actions across territories. They increased productivity in value chains such as latex in Southern Amazonas, oilseeds in Médio Juruá, açaí management in Marajó, and agricultural production in Juruti. They also spurred economic diversification, such as handicrafts in Maués and meliponiculture in Southeast Pará.

Institutions like Embrapa and Emater were fundamental, bringing technical knowledge adapted to local realities and complementing traditional and ancestral knowledge. These encounters strengthened social ties, expanded collective innovation capacity, and created spaces for exchange.

A recurring interview point was the importance of PPA amplifying practices that already exist, combining innovative, sustainable technologies with local knowledge to generate tangible improvements. This pairing strengthens not only productivity but also adaptive capacity in the face of climate change.

In a context of an increasingly unstable climate, these training sessions are even more relevant. They encourage practices that maintain or increase productivity despite adversity, as in COPAVEM, which doubled açaí deliveries in the last harvest despite region-wide declines caused by drought. They also promote activity diversification, reducing families' dependence on a single income source. Farmers who also raise small animals or keep stingless bees, for example, suffer fewer financial shocks in periods of low agricultural productivity, increasing resilience to the climate crisis.

STRENGTHENING SOCIAL COHESION AND GOVERNANCE

Territories achieving the most consistent results share a common trait: strong local organizations, with consolidated governance processes and broad community participation. In the Community Carbon Territory, RECA became a central development agent, founded on self-management and collective effort. The cooperative consolidated exemplary governance practices that ensure high engagement and community leadership.

In Médio Juruá, the creation of the Extractive Reserve and the Uacari Sustainable Development Reserve marked the start of collective organization, strengthened by public policies and the 2017 fishing agreement. Engagement is notable today: families return drawn by quality of life; youth increasingly value community knowledge; and local organizations invest in training residents themselves.

These experiences show that social cohesion and organizational strengthening are pillars of successful territorial management and essential bases to withstand climate impacts. Workshops, exchanges, institutional strengthening, and steady partner presence were decisive in consolidating this picture. Traditional cooperation practices, such as mutirões and puxirum, reinforce community bonds and (where weakened) should be valued or revived. They not only strengthen local governance but also expand collective adaptive capacity in a changing climate.

WOMEN'S LEADERSHIP STRENGTHENS COMMUNITY RESILIENCE

Women's engagement has proven essential for project sustainability and for strengthening community resilience. In Maués, handicrafts transformed artisans' lives, generating income, self-esteem, and recognition. In Mosaico Tupi, listening spaces enabled women, youth, and elders to take part in community decisions, broadening representation.

In the Sete de Setembro Indigenous Land, handicrafts were reframed as cultural and identity expression, strengthening collective self-esteem. In Médio Juruá, women joined pirarucu management (once a men-only domain) assuming leadership and decision-making roles. In Marajó, minimum women's quotas in electoral slates and training are an initial step to expand leadership.

In Marajó, women also stand out for their ability to mobilize and the cohesion of their groups. As Danielle Miranda, regional organizer, notes, women's groups are organized, committed, and crucial for consistent results.

> One of the most striking moments was seeing women recognized and benefiting. Witnessing women's leadership gain strength, having more voice, being valued, making decisions, and showing their capability, was profoundly transformative.
>
> **Fernanda de Araújo Moraes,**
> President of AMAB – Association of Agro-extractivist Residents of the Lower and Middle Juruá

These experiences reinforce that women's inclusion and leadership are not just equity agendas but fundamental conditions for community adaptation to climate change. Active female presence ensures greater diversity of perspectives and strengthens social cohesion.

PPA has already deepened the discussion on diversity and inclusion in other studies, such as the publication Inclusion of Diversity in the PPA Portfolio 2023, which can be consulted to broaden this reflection.

GOOD PRACTICES AND REPLICABLE ACTIONS

CLIMATE ADAPTATION & MITIGATION

- **AFS and restoration of degraded areas**
- **Resilient seeds and crop rotation**
- **Reservoirs and spring protection**
- **Economic diversification (honey, fish farming, poultry, tourism)**
- **Climate education and territorial monitoring**

Examples:

- RECA with resilient cupuaçu fruit
- JOCSAM youth monitoring deforestation in Southern Amazonas

CAPACITY DEVELOPMENT

Courses, workshops, and trainings

- + productivity
- + engaged youth
- + product diversification
- + stronger community bonds

Benefited value chains

Latex - Southern Amazonas

Oilseeds - Médio Juruá

Açaí managemen - Marajó

Agricultural production - Juruti

Handicrafts - Maués

Meliponiculture - Southeast Pará

STRENGTHENING SOCIAL COHESION

Local organizations with strong governance and broad participation.

- + community engagement
- + durability and efficiency in project and initiative outcomes

Community Carbon Territory develops self-management and community identity

Médio Juruá reports families returning, more trained youth, and fishing agreements

WOMEN'S LEADERSHIP

Inclusion of women in productive and decision-making processes.

- + Income generation for families
- + Women in leadership roles
- + Women's autonomy

Handicrafts in Maués

Sete de Setembro Indigenous Land

Women in pirarucu management in Médio Juruá

50% women's quotas in Marajó

OPPORTUNITIES FOR IMPROVEMENT

The initiatives carried out in Amazonian territories have generated significant advances and revealed the transformative potential of collective action. The results highlight the strength of local mobilization and communities' ability to promote solutions aligned with their realities, strengthening value chains and sustainable practices.

At the same time, these experiences reveal points of attention that could further amplify their impacts such as ensuring greater community participation from project design, guaranteeing long-term continuity of actions, and engaging new leaders. Addressing these issues is an opportunity to consolidate hard-won gains, increase local resilience, and ensure that benefits endure for future generations.

BENEFICIARY PARTICIPATION IN PROJECT DESIGN

Ensuring that projects reflect the real needs of communities is essential for effectiveness and sustainability. Active listening from the conception phase increases engagement and ensures initiatives are applicable and relevant to day-to-day life. In Médio Juruá, for example, leaders pointed to the absence of calls for proposals that include fundamental priorities such as territorial surveillance and connectivity, deemed indispensable for environmental monitoring and community mobility. The lack of access to resources for these topics generates frustration and limits impact.

Another recurring challenge is when investments do not dialogue with local ways of life. Although some techniques are recognized for their environmental benefits, they are not the most suitable for communities' cultural and productive practices. As Chief Uraan, from the Sete de Setembro IT, emphasized, there is still a need for more real models of dialogue and effective proximity with Indigenous communities, who should be seen as partners in project construction and implementation.

A similar situation occurred in Juruti. When information about the project reached the region, the community mobilized intending to carry out all stages collectively, as has always been their traditional way of working. In Eudes's community, for example, when someone needs to clear a plot, everyone helps and participates together, a practice known as pixurum. They also maintain a community area called "borra de terra preta," where they grow food jointly.

However, the proposal received required an agroforestry (AFS) model that was not very compatible with the collective dynamic, in addition to insufficient machinery. The mismatch in expectations led some residents to lose motivation and invest only in their own plots, turning an action designed for the collective into a more individualized experience.

These examples demonstrate the importance of aligning objectives, methods, and constraints at the outset of each project. Transparency and continuous dialogue turn beneficiaries into co-responsible actors, strengthen trust, and prevent frustration.

LONG-TERM CONTINUITY OF ACTIONS

The sustainability of initiatives also depends on strategies that ensure continuity over time. In many territories, cooperatives are heavily dependent on a single buyer, which increases vulnerability. ATRAMP, for instance, sells all its rubber to Michelin; if the partnership ended, the cooperative's survival would be at risk. Diversifying buyers and sales channels is therefore a priority to ensure financial stability and reduce uncertainty.

Another critical aspect is strengthening organizational management. Many associations still concentrate responsibilities on a few leaders, overburdening directors and limiting efficiency. Training other members in cash-flow control, financial and administrative management, bureaucratic procedures, and market best practices not only improves day-to-day efficiency but also ensures the organization keeps functioning if leaders are absent.

Leadership succession remains a structural gap. Aside from Médio Juruá and Nova Califórnia, few territories have formal strategies to engage youth and prepare them to assume responsibilities in the future. Many end up migrating to study and do not return due to a lack of local opportunities. Investing in training, hands-on learning, and job placement is key to creating conditions that encourage their permanence and leadership. Where territories offer a favorable environment, youth tend to return and contribute to community development.

05

KEY LEARNINGS FROM COMMUNITIES AND INITIATIVES

TERRITORIAL GOVERNANCE IS THE FOUNDATION OF CLIMATE RESILIENCE

Territorial governance comprises the set of norms, policies, and institutional arrangements that guide land use and management, involving local actors, the private sector, government, and civil society. When well structured, it enables integrated decisions and actions, strengthening participation and coordination across levels.

In the climate-change context, governance becomes even more relevant, as it expands territories' resilience (their ability to withstand, reorganize, and transform in the face of crises). Community leadership rooted in knowledge of local challenges and potentials is central to building adapted, socially accepted, and long-term sustainable solutions.

Beyond a management tool, territorial governance reflects the degree of social cohesion. Dialogue, trust, and belonging strengthen collective engagement, enabling joint responses to climate challenges. Investing in its consolidation is thus fundamental to turn vulnerabilities into leadership and ensure effective adaptation strategies.

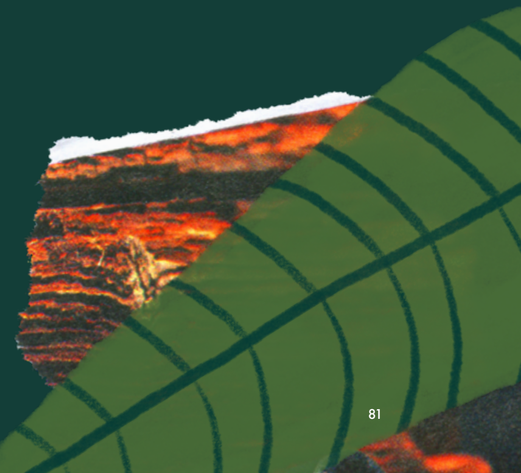
BIOECONOMY AS AN ALLY IN PROTECTING THE TERRITORY

The bioeconomy has proven powerful for keeping populations in their territories, offering dignified livelihoods and valuing traditional knowledge. By promoting sustainable value chains (such as pirarucu management, açaí cultivation, and rubber tapping) the bioeconomy generates income, reinforces cultural identity, and expands community autonomy, integrating people into an economy that respects the forest and ensures the right to a prosperous life on their lands.

This study shows that when viable income alternatives are offered, community members tend to abandon illegal or predatory practices. Concrete examples were observed in different regions: rubber tappers in Southern Amazonas who left wildcat mining to resume rubber extraction; Indigenous peoples in the Mosaico Tupi who replaced ranching with açaí cultivation; fishers in Médio Juruá who shifted from predatory fishing to sustainable pirarucu management; and producers in Nova Califórnia who began earning carbon credits while keeping the forest standing.

These experiences brought not only improved quality of life but also a renewed sense of purpose and environmental awareness. Many community members report they would only return to old practices if no alternative existed, demonstrating the effectiveness of initiatives that unite sustainability and dignity. In addition, active territorial monitoring and sharing of best practices among residents reinforce community organization and territorial protection.

Today, there is clearer understanding that individual and collective actions directly impact the environment and, by extension, communities' futures. In this context, PPA-supported projects play an essential role by fostering responsibility, long-term vision, and climate resilience. The results point to a viable path of higher productivity and income diversification, reducing dependence on degrading activities and showing that it is possible to harmonize development and conservation, protecting the Amazon's greatest heritage: its biodiversity and its people.



UNDERSTANDING "AMAZON TIME"

Projects implemented in Amazonian territories bring new knowledge, practices, and approaches that can strengthen communities, but adoption is not immediate. Incorporating innovations requires time, patience, and above all respect for the region's own rhythm and that of its people. Along the way, it is natural for some actions to encounter obstacles or lose momentum, underscoring the importance of ongoing presence and dialogue, adjusting strategies whenever needed.

Experience shows that hands-on activities play a central role, as they facilitate assimilation and help solidify learning. Yves Andrade, a technician in Juruti, notes that periodically revisiting and reinforcing knowledge is essential, especially for older people, who face greater difficulties. She learned that success depends on tailored communication with each community and trusting relationships with local leaders, the gateway for any initiative.

Without this bond, resistance and distrust toward outside presence often prevail. Suellen Mangueira, from the Our Forest, Our Home project, shares the same lesson. For her, understanding "the communities' time" transformed not only her professional practice but also her worldview. Instead of rushing to meet targets, it was necessary to pause, observe, listen, and build genuine relationships. The focus, she says, must always be on people, and results become a natural consequence of a process guided by active listening, respect, and committed presence.

Taciana Coutinho, professor at UFAM (Federal University of Amazonas), reinforces this perspective by stating that "Amazon time is unlike any other. The Amazon teaches you patience. Nothing happens immediately; everything follows the forest's rhythm. Solutions aren't simple, and coordinating actions here is very complex." This view captures the essence of territorial work: for initiatives to flourish consistently, one must understand that results are built at the forest's and its peoples' pace.

STRATEGIC RECOMMENDATIONS AND PUBLIC POLICIES

The results of this study reinforce a clear reality: climate change is already a fact in Amazonian territories, with rising temperatures, altered rainfall regimes, and more frequent extreme events. These impacts worsen historical vulnerabilities and pose risks such as food insecurity, water scarcity, and threats to public health.

In this context, PPA's vision of "Amazon(s) with quality of life, rich biodiversity, and sustainable use of natural resources" depends directly on strengthening climate resilience. Territorial experience shows this resilience is not built in isolation, but through integrated, inclusive territorial development sustained by governance.

PPA's commitment goes beyond one-off projects: it seeks to leave a legacy of territorial development capable of enduring even after direct support ends. In this sense, it sees territorial development as a requirement by tackling inequality and poor infrastructure; as a means by driving innovative solutions and strengthening local coordination; and as an end by ensuring prosperous, inclusive, and sustainable territories.

Thus, the Platform's role is to catalyze a resilient ecosystem, engaging with public and private sectors to create political, financial, and technical conditions that can scale local strategies. The recommendations in this report are therefore a practical roadmap for companies, governments, and organizations, integrating mitigation, adaptation, and sustainable economic alternatives for Amazon development.

WHAT IS THE ROLE OF LARGE CORPORATIONS?

Global shifts in markets and the environment are pressuring companies to go beyond short-term profit, taking on socioenvironmental responsibility commitments. Investors, regulators, consumers, and civil society demand transparency and sustainable practices, a trend reinforced by Larry Fink, CEO of BlackRock, who advocates integrating ESG criteria as a condition for long-term value creation.

This pressure is already reflected in new rules. The European Union Deforestation Regulation (EUDR) will require, as of 2025, proof of legal and sustainable origin for commodities exported from Brazil. Likewise, Brazil's CVM (Securities and Exchange Commission of Brazil) has incorporated ISSB international standards, making disclosure of socioenvironmental indicators mandatory in 2026 for publicly traded companies, positioning the country as a Latin American reference.

Beyond regulatory compliance, sustainability has shown financial and reputational returns.

A study of 162 Brazilian companies found that those with better socioenvironmental performance did better during the pandemic. On the demand side, 57% of Brazilian consumers prefer to buy from companies that support environmental protection, and 58% prioritize products with traceable, transparent origin. In this context, sustainability ceases to be a cost and becomes a catalyst for innovation, competitiveness, and business longevity.

INTEGRATING SUSTAINABILITY INTO CORPORATE POLICIES

A key learning from the second phase of the study is that when communities have dignified access to sustainable income, predatory practices tend to be abandoned. This shows that conserving the Amazon depends on creating viable economic models able to compete with activities such as extensive cattle ranching, large-scale monocultures, and illegal logging. Keeping the forest standing requires impact investments that boost sustainable value chains and strengthen community autonomy. More than a moral choice, it's an economic and climate equation: reducing deforestation-related GHG emissions is essential to address the climate crisis. Given this context, several strategic recommendations stand out for the private sector:

Adopt rigorous responsible-sourcing criteria, excluding suppliers involved in deforestation, land-grabbing, or violations of Indigenous and traditional community rights.

Implement carbon insetting policies, as in the Natura–RECA partnership, tying emissions compensation to local projects in reforestation, management, and restoration. Companies internalize climate responsibility while generating concrete benefits for Amazonian territories.

Value diversity as a driver of innovation, recognizing that multiple perspectives (gender, race, ethnicity, age, sexual orientation, cultural background) expand creativity and improve responses in complex contexts. This must pair with inclusive cultures that ensure not just presence but effective participation in respectful, collaborative, innovative environments.

Foster adaptive innovation, combining new arrangements with reinterpretation of established practices, including traditional and ancestral knowledge. In this process, the development of products with Amazonian identity stands out (goods and services whose narratives carry community history and culture) valorizing sustainable income alternatives and expanding Amazonian presence in niche markets. This recognition strengthens local economies and directly contributes to keeping the forest standing.

[22] O consumidor pós-pandemia: Quatro tendências globais de segmentação dos compradores. Global Consumer Insights Pulse Survey. Resultados do Brasil. Maior de 2021.

COMMERCIAL PRACTICES

Relationships between large companies and local organizations should be built on balance, transparency, and shared value. Such partnerships are strategic to strengthen fair, sustainable value chains while contributing to climate-change mitigation. To be truly beneficial, solutions must be co-created, reconciling interests—e.g., contracts with fair adjustment clauses or technology/knowledge-sharing models. These mechanisms yield concrete benefits and create conditions for communities to remain agents of forest conservation.

Recommendations include:

Prioritize direct partnerships with cooperatives, associations, and local producers, removing intermediaries that erode fair remuneration.

Establish long-term contracts with prices reflecting real production costs, ensuring stable income and discouraging the abandonment of sociobiodiversity activities in favor of more degrading practices.
Invest in territories based on local needs: support infrastructure improvements, training, and small agro-industries to expand productive capacity, reduce post-harvest losses, and create shared value for communities and companies,consolidating lasting partnerships.

Recognize socioenvironmental attributes in procurement processes, acknowledging good practices in conservation, gender equity, and social inclusion.

Build capacity so community organizations can meet certification, traceability, and quality requirements, strengthening the chain and access to differentiated markets.

Diversify sales channels and partners, reducing dependency on a single buyer. Public procurement, private partnerships, and even e-commerce platforms can open space for differentiated products (wild honey, vegetable oils, traditional crafts).

Foster collaborative networks (multisector alliances, trade fairs, and innovation hubs) to facilitate commercial connections, encourage knowledge exchange, spot consumption trends, and co-develop systemic solutions to climate and territorial challenges.

A PEOPLE-CENTERED APPROACH

True sustainability in partnerships with traditional communities begins with genuine, ongoing dialogue. From the first contact, it's essential to create open, transparent channels for short or long-term projects. Communities must fully understand objectives, benefits, and implications of proposed initiatives.

Shared understanding strengthens belonging, allowing community members not only to receive information but also to bring local knowledge, ask questions, suggest adjustments, and collectively take ownership of the process. This approach is both social and climatic: when communities participate actively, conservation actions are more effective, reducing deforestation, burning, and GHG emissions.

Many initiatives still focus exclusively on the forest, rivers, and biodiversity, overlooking the human component. Cultures, histories, and ways of life are as intrinsic to the Amazon as its vegetation. It is therefore crucial to adopt a holistic territorial perspective.

As defined in PPA's Theory of Change (ToC), territory encompasses tangible elements (natural resources, infrastructure, economic capital) and intangible ones (histories of resistance, solidarity networks, traditional knowledge, and the interaction between technical knowledge and local practices). This understanding increases initiative effectiveness and strengthens climate adaptation.

Accordingly, companies and institutions need to draw closer to territories: ensure physical presence through community visits; use inclusive language and accessible communication formats; and build horizontal dialogue that balances institutional goals with local needs.

To make this concrete, key recommendations include:

Active, continuous listening with periodic consultations and participatory methods; Flexible, co-created calls for proposals with communities;

Integrating traditional knowledge with technical know-how;

Valuing and remunerating existing sustainable practices, such as environmental services; Documenting and showcasing locally led success stories.

When communities feel seen, heard, and respected, partnerships gain depth and durability, overcoming fragmented, short-term efforts. A landmark example is the 20+ year partnership between Natura and RECA, marked by constant dialogue and reciprocity. It shows how companies that adopt this approach build collective stories of positive transformation, aligned with PPA's ToC.

WHAT IS THE ROLE OF THE PUBLIC SECTOR?

CLIMATE FINANCE

Tackling the climate crisis requires planning, coordination, and — above all — financial resources. The IPCC defines climate finance as resources mobilized to address the effects of climate change, whether public or private, provided as loans or grants, and flowing at local or global scale, with emphasis on international flows to developing countries.

However, climate finance remains one of the biggest bottlenecks in international negotiations and a recurring source of impasse and disagreement among countries at the Conference of the Parties (COP).

Pledges made by developed nations have largely not been fully met, undermining the implementation of actions at the scale required. Despite this scenario and the long road ahead, Brazil already has important initiatives and opportunities in place, including both international and domestic resources. See the "Practical recommendations" section for some of the main available Investment Funds.

To strengthen access to climate finance and conservation programs, the following is recommended:

01 Dissemination and access to information:
Encourage project-implementing partners to share information on climate-finance opportunities and socioenvironmental programs with producers and community organizations, since many people still do not know or know only superficially these programs.

02 Support in choosing suitable programs:
Provide technical guidance so families and communities can identify programs best suited to their reality, bearing in mind that in some cases benefits from multiple programs cannot be combined.

03 Support for documentation regularization and registrations:
Establish partnerships with public and private institutions to support regularization of essential documents such as the CAR (Rural Environmental Registry) and CadÚnico, among other relevant records. Documentation is decisive for producers and associations to become eligible and access resources.

04 Capacity-building and autonomy to access calls for proposals: Develop training programs for producers, associations, and community leaders focused on project management, proposal writing, and participation in public calls. The goal is that, in the medium and long term, communities and local organizations themselves can access financing and incentives autonomously, strengthening their institutional capacity.

PUBLIC POLICIES AND ENGAGEMENT WITH GOVERNMENT ENTITIES

In recent years, Brazil has made significant progress in designing and implementing climate policies, coordinating actions in mitigation, adaptation, and ecosystem conservation. Among the key instruments is the new Climate Plan, under development since 2023, which will underpin the National Policy on Climate Change (Law 12,187/2009). It guides the new Nationally Determined Contribution (NDC) with targets through 2035 and is being built with broad social participation via public consultations initiated in 2024.

Also in 2023, the federal government relaunched the PPCDAm (Action Plan for the Prevention and Control of Deforestation in the Legal Amazon), restoring its central role in deforestation control, and created the Union with Municipalities Program for Reducing Deforestation and Forest Fires (UcM), aimed at 70 priority municipalities. The initiative combines enforcement and control with investments in sustainable development, goods and services, and payments for environmental services. In the states of Legal Amazonia, all already have their own climate-change policies, but still lack complementary instruments: only Acre is preparing a GHG emissions inventory, and none has an adaptation plan in force, although Acre, Amapá, and Tocantins are drafting theirs.

These plans are urgent in light of visible impacts such as extreme droughts, wildfires, and changes in rainfall patterns. Building adaptation policies makes it possible to anticipate risks, protect vulnerable communities, and reduce environmental and economic damage. In this context, sociobioeconomy emerges as a strategic alternative by integrating environmental conservation, social justice, and economic development. It breaks with the historic predatory cycle, keeps the forest standing, and contributes to mitigation by reducing deforestation-related emissions.

The current scenario opens a window of opportunity to establish sociobioeconomy as a pillar of national climate policy. Recent advances include the creation of the National Secretariat for Bioeconomy, the National Bioeconomy Strategy (Decree 12,044/2024), and the National Bioeconomy Development Plan (PNDBio), now in development.

Other milestones include the National Program for Productive Forests (Decree 12,087/2024), the National Program to Strengthen Sociobiodiversity (Pró-Sociobio) (MDA Ordinance 10/2025), and the Program for Valuing Sociobiodiversity and Extractivism (Decree 12,539/2025).

This maturation of public policy consolidates the standing forest as an economic and climate asset, strengthening local value chains, generating income, promoting social inclusion, and increasing the resilience of Amazonian territories.

POLICY FOR MINIMUM PRICES FOR SOCIOBIODIVERSITY PRODUCTS (PGPM-BIO)

Created in 2008, PGPM-Bio guarantees minimum prices for extractive sociobiodiversity products, reducing income instability for producers and valuing local production. When market prices fall below the defined minimum, Conab (the National Supply Company) covers the difference, ensuring fair remuneration. The policy currently includes products such as açaí, andiroba, babassu, rubber, Brazil nuts, and managed pirarucu, among others.

ACCESS TO ECONOMIC SUBSIDIES

In the field of promotion, subsidies and financial benefits have proven decisive for increasing the competitiveness of the sociobioeconomy against predatory activities, making sustainable production more viable and attractive. Beyond improving income, these initiatives restore community self-esteem by recognizing and valuing their role, encouraging people to remain in their territories. Successful cases include subsidies linked to the rubber-tapping revitalization project in Southern Amazonas, as well as in the oilseed and pirarucu value chains in Médio Juruá.

Even so, more than a decade after their creation, many extractivists have only recently begun to access these benefits. In Médio Juruá, for example, andiroba producers were included thanks to a partnership between Memorial Chico Mendes and the Association of Agro-extractivist Residents of the Uacari SDR (AMARU), with ICMBio support for mapping and registration.

To expand the reach of this public policy, information needs to be widely shared. Many communities are unaware of the existence or requirements for accessing benefits, and local organizations can play a strategic role in communication, explaining required documentation and the responsible agencies.

Training community leaders to act as multipliers also increases effectiveness. Another central point is to map and register producers and extractivists, a task that can be carried out by local associations with support from institutions and public agencies. Successful experiences include task forces by the Secretariat of Production in Southern Amazonas, which regularized the Family Farming Registry (CAF) and rural producer IDs, and the work of ICMBio and unions in Marajó, speeding up registrations directly in communities. These actions bring public policies closer to local realities, expanding impact and inclusion of beneficiaries.

ACCESS TO CREDIT

Among financial opportunities for small producers, the National Program to Support Family Farming (Pronaf) stands out for offering credit to individual or collective projects that generate income for family farmers and agrarian-reform settlers. In the 2023/2024 season, the program granted over R$ 62 billion in loans, with average financing amounts steadily rising.

Pronaf has specific lines (Bioeconomy, Agroecology, Forest, Youth, Women, and Eco) and can finance everything from the implementation and maintenance of restoration areas to the purchase of seeds, seedlings, machinery, and equipment. It also covers construction and modernization of productive structures, nursery creation, training, technical assistance, and investments in sustainable forest management.

With some of the lowest interest rates on the market, Pronaf facilitates access to investment, accelerates productive activities, and enables mitigation and adaptation actions to climate change. This strengthens financial autonomy, increases production and marketing capacity,

and contributes to climate resilience in the territories.

A successful example is COPAM, in Marajó. Created in 2023, the cooperative quickly structured itself by accessing credit with Conexsus support under the Sociobioeconomy in the Amazon project. By participating in the Food Acquisition Program (PAA), it achieved the best performance among cooperatives in the portfolio, fulfilling 70% of the contract. COPAM also raised funds from Fundo Casa, completed a small agro-industry in partnership with the union, and expanded its marketing opportunities. The leap in organizational maturity was remarkable, the result of combining strategic investments and financial training.

TRAINING PROGRAM IN SOCIOBIOECONOMY AND AGROECOLOGY FOR RURAL CREDIT AGENTS (PFSA)

Launched in February 2025, the PFSA qualifies credit agents from financial institutions to act as financial-education promoters in traditional communities, expanding access to Pronaf and other credit lines, especially in the Amazon.

TERRITORIAL ENGAGEMENT WITH THE PUBLIC SECTOR

Public-sector action in the Amazon is still marked by one-off, weakly structured efforts, generating a sense of abandonment in many communities. Although there are initiatives such as input donations, regularization task forces, workshops on sustainable practices, and partnerships for program access, most lack continuity and integration. Cases such as land regularization in Marajó and fire-prevention brigades in Rondônia show progress, but also limits when consistent support is missing.

Experiences show that, despite relevant partnerships, many communities still feel invisible, especially amid climate crises such as severe droughts. Beyond the lack of coordinated policies, riverside and extractivist communities remain indignant at seeing large producers receiving more benefits than those who preserve the forest.

Overall, there is a call for public policies that go beyond combating deforestation, including dialogue forums, educational actions, enforcement against illegal activities, and — above all — valuing sustainable practices and the people who keep the forest standing.

RECOMMENDATIONS FOR INITIATIVES AND LOCAL ORGANIZATIONS

Some practices mentioned earlier should be reinforced and expanded, such as: training through courses and workshops, strengthening social cohesion and organizational governance, women's leadership in value chains, and climate mitigation/adaptation strategies that unite traditional knowledge and innovation.

FOOD SECURITY AND PRODUCTIVE DIVERSIFICATION

In the territories analyzed, food insecurity has worsened with climate change. Reduced availability of fish and game affects communities' protein base, while unstable rainfall and extreme events heighten uncertainty about crop success. In addition, prolonged droughts reduce navigability, isolate river-dependent communities, and raise the cost of accessing essential inputs. These factors compromise income and consumption, weaken short supply chains, increase nutritional vulnerability, and heighten dependence on external foods during critical periods—especially in remote communities, where logistics costs are higher and local supply is limited.

To address these challenges, productive diversity should be the guiding principle. Just as biodiverse ecosystems better withstand external threats, diversified farming systems ensure a continuous flow of food and income, improve soil fertility, favor natural pest control, reduce dependence on external inputs, and make communities less vulnerable to climate shocks.

Communities are already developing practices along these lines, such as seed selection and conservation and small-animal husbandry. It is recommended to consolidate and scale these initiatives through actions such as:

- Expanding implementation of biodiverse Agroforestry Systems (AFS), designed by strata and ecological succession;
- Adopting species and varieties resilient to local climate variability and to drought or prolonged rains;
- Broadening intercropping and planned rotation to reduce systemic harvest losses;
- Incorporating permaculture and agroecological practices (mulching/ground cover, green manures, rainwater harvesting);
- Strengthening seed banks and community seed houses, and promoting

seed/seedling exchange fairs;
Stimulating field schools and community exchanges, reinforcing peer-to-peer learning;

- Promoting food and nutrition education linked to the local production calendar;
Mapping alternative routes and defining flow protocols during droughts, in coordination with associations and public authorities;
- Planning seasonal stocks of inputs and strategic foods for severe dry periods;
- Supporting decentralized water solutions, such as cisterns, small retention weirs (barraginhas), and filtration systems;
- Offering courses on agroecological management, SAF design, seed conservation, and animal health;
- Encouraging adoption of Embrapa's "sisteminha" model, integrating kitchen gardens and productive backyards with small-animal rearing.

FINANCIAL EDUCATION

As important as accessible credit is ensuring that producer families have financial literacy. In many communities, income concentrates in harvest periods and must be managed carefully to sustain the rest of the year, when families rely on savings or seek other income sources.

The account of Bruna Oliveira, community business advisor at Conexsus, shows this is a strategic front, especially given the history of low savings culture. In Marajó, for instance, farmers who earned good income in the açaí harvest faced severe difficulties in the off-season, becoming dependent on government aid to cover basic needs.

Despite recent progress (better connectivity and training in digital banking) a significant digital-literacy gap persists, especially among older adults and remote communities.

Resistance to using apps, concerns about transaction security, and a preference for in-person service still hinder full adoption of tools like Pix. Overcoming these barriers requires ongoing awareness and close follow-up.

When done well, financial education amplifies the results of credit access, strengthens household autonomy, reduces the risk of over-indebtedness, and builds greater economic stability for the future, an essential pillar of individual and collective resilience amid climate change.

To expand positive impact and ensure sustainable credit use, it is recommended to:

- Map communities that still show financial and digital knowledge gaps;
- Offer hands-on trainings, combining financial education with digital-tools training;
- Align basic concepts such as spending plans, responsible borrowing, productive investment basics, and income-generation strategies;
- Create ongoing support mechanisms to consolidate new habits and reinforce confidence in using fintech tools;
- Expand outreach on credit lines, using accessible channels such as community radio, local associations, and territorial events;
- Integrate credit and technical assistance, ensuring resources are applied strategically for higher economic returns and more effective mitigation/adaptation actions.

SISTEMINHA: EMBRAPA'S SOCIAL TECHNOLOGY

Developed by Embrapa Meio-Norte, the Sisteminha integrates fish farming, poultry, and vegetable gardens in small spaces, ensuring low-cost food security. Adaptable to backyards and rural communities, it enables families to produce proteins and fresh vegetables and to generate income from the surplus.

PARTNERSHIPS WITH TECHNICAL INSTITUTIONS

Partnerships with universities, technical organizations, and private nonprofit entities have proven decisive for the success of initiatives in Amazonian territories. These institutions often fill gaps left by the public sector, offering technical support, training, documentation regularization, and access to public policies in hard-to-reach communities.

Examples abound: in Marajó, CECANE/UFPA strengthens school meals and Embrapa trains local multipliers; in the Tupi Mosaic, SENAI and Senar complement Emater's support; in Nova Califórnia, RECA maintains constant coordination with institutions and universities despite hurdles in documentation regularization; in Southeast Pará, producers receive limited Emater (Rural Extension and Technical Assistance Company) support and Sebrae (Brazilian Micro and Small Business Support Service) courses; in Maués, Sebrae and IFAM (Federal Institute of Education, Science and Technology of Amazonas) expand access to training; and in Juruti, universities promote research, workshops, and climate debates.

Beyond knowledge generation, these partnerships also bring youth closer to the territory, sparking interest in contributing solutions to local challenges. This interaction increases the likelihood that students will choose to stay and strengthen community resilience after completing their education.

LESSONS AND RECOMMENDATIONS

Experience across territories shows that the maturity level of institutional partnerships varies widely. In some places, technical assistance remains limited to one-off actions, while elsewhere we already see articulated networks capable of tackling structural challenges.

There are inspiring initiatives that demonstrate the potential of these articulations. Even so, there is ample room to strengthen and expand partnerships to consolidate results and build more enduring relationships.

Two recurring gap patterns stand out:

- Lack of on-the-ground agricultural technical assistance, even where documentation regularization has advanced; and
- Lack of documentation regularization, even where technical assistance is already robust.

These institutions also have an underexplored potential to take a more proactive role in climate adaptation—supporting the adoption of resilient agricultural practices that reduce dependence on irrigation and maintain or increase productivity under adverse conditions.

To strengthen and scale what's working, we recommend:

- Formalize and expand cooperation among community organizations, educational institutions, and other technical bodies; Invest in training local multipliers, extending knowledge reach into hard-to-access areas;
- Integrate agendas for producer registration, land regularization, and technical assistance, so progress in one front isn't undermined by gaps in another;

- Mainstream the climate agenda, ensuring adaptation and resilience sit at the core of agricultural and productive practices.

AMAZON FUND

- Managed by BNDES, it raises donations for deforestation prevention and combat, conservation, and sustainable use of the Amazon.
- It has already allocated over R$ 4 billion to 131 projects in 17 years.
  Examples supported alongside PPA:
- Projeto Juruá Sustentável e Solidário (ASPROC) – strengthens socioproductive value chains and riverside commerce through 2029.
- Projeto Concretizar (RECA) – implemented 300 ha of AFS, trained 443 people, modernized processing units, and structured fire brigades.

CLIMATE FUND

- Created by Law 12,114/2009, one of the main instruments of the National Policy on Climate Change.
- Operates with reimbursable resources (BNDES, the Brazilian Development Bank) and non-reimbursable resources (MMA, the Ministry of the Environment and Climate Change).
- In 2024, the credit budget jumped from R$ 400 million/year to R$ 10.4 billion, thanks to the issuance of sustainable bonds.
- Supports projects in green mobility, energy transition, sustainable industry, forests, and innovation.

FLORESTA+ AMAZON PROJECT

- Linked to the Green Climate Fund (GCF), a partnership between MMA and UNDP. Raised US$ 96 million for Payments for Environmental Services (PES) in the Legal Amazon.
- Benefits smallholders, Indigenous peoples, and traditional communities who conserve or restore native vegetation.
  Gender approach highlights:
  - 30% women beneficiaries in the Floresta+ Conservation axis.
  - 40% of projects in the Communities and Innovation axes must have female leadership or a majority of women beneficiaries.

BOLSA VERDE PROGRAM

- Relaunched in 2023 (Decree 11,635/2023). Benefits low-income families living in Sustainable-Use Protected Areas, differentiated settlements, and traditional territories.
- Pays R$ 600 quarterly, contingent on conservation commitments.
- Also includes technical assistance, socioenvironmental extension, and productive inclusion.
- Already reaches PPA-linked territories such as: RESEX Médio Juruá (AM), PAE Juruti Velho (PA), and Flona Pau Rosa (AM).

FINAL CONSIDERATIONS

Brazil is among the world's largest greenhouse gas emitters, with deforestation as the main driver. Beyond releasing large amounts of carbon into the atmosphere, destroying the forest reduces its capacity to absorb CO_2 and undermines environmental services essential to ecosystem balance and people's well-being. Keeping the forest standing is therefore an indispensable condition for global climate-mitigation efforts.

Bioeconomy emerges as a strategic alternative by reconciling conservation and income generation. Its production models act as mitigation mechanisms while also depending on the resilience of natural systems in the face of global warming. This dual relationship highlights both the bioeconomy's transformative potential and the challenges of consolidating it amid intensifying climate impacts.

In recent years, the country has built a robust policy and legal framework, such as the National Plan for Climate Change Mitigation and Adaptation and the National Bioeconomy Policy. The challenge now is to ensure these advances translate into concrete results on the ground, guaranteeing that resources reach local actors and support sustainable investments, infrastructure, and capacity building.

Climate adaptation and territorial development go hand in hand: resilience can only be built with solid governance, grounded in dialogue, participation, and solutions suited to local realities. Sustainable territorial development requires transforming social, symbolic, productive, and institutional structures, creating conditions to expand economic opportunities, diversify income, and value each territory's unique assets.

PPA understands territorial development as a requirement to overcome historical barriers, a means to drive innovative and inclusive solutions, and also an end in itself, in the sense of achieving prosperous, diverse, and sustainable territories.

Today, the Amazon is a key player in the fight against climate change not only for Brazil, but for the planet. It is time to turn commitments into action, uniting governments, companies, community organizations, and civil society around a common agenda: protect the forest, strengthen communities, and ensure that this global heritage remains alive for future generations.

CLIMATE CHANGE AND AMAZONIAN RESILIENCE

ANNEX

ANNEX I. SEMI-STRUCTURED INTERVIEW GUIDE

General information about the interviewee

1. Name, Age, and Gender
2. Place of Birth
   If not born in the territory, what motivated the move and how long have you lived in the region?
3. Do you live in a rural or urban area?
4. What is your role in the territory/in the initiative in partnership with PPA?
5. What is your occupation? Please describe your activities.
6. How long have you been engaged in this activity?
7. Collaboration: Do you usually interact or join with other people or groups in the community to talk about the project? Does this happen informally in daily life, or is there an organized group, meeting, or space where you gather to discuss it? Who makes the decisions?
8. Interviewee's perceptions about the territory (history, social dynamics, most relevant local institutions, etc.)

Information about the territory and perceptions of change

9. Water supply (public network, artesian well, spring, etc.)
10. Energy access (public grid, off-grid solar system, diesel generator, etc.)
11. Are transportation and mobility mainly by land or by river?
12. Have you noticed changes in the socioeconomic dynamics of the region in recent years?
    For example: urbanization and construction, traffic, population inflow and outflow, etc.
13. Have you noticed changes in the regional climate in recent years?
    For example: changes in rainfall patterns, temperature, river behavior, extreme events, etc.
14. Have you observed other environmental changes in the region in recent years?
    For example: deforestation, fires, fauna (any animals becoming more common or disappearing), flora (plant diversity, plants becoming more or less common), etc.

Impacts and adaptation strategies

15. How have these changes affected your life/the life of other community members/the project?
    a) Impact on your activity (agriculture, fishing, etc.)
    b) Income source and cost of living
    c) Quality of life, health, and leisure
    d) Transportation and mobility
    e) Serious impacts (e.g., forced displacement, indebtedness, food insecurity)
16. * What are people in the region saying about climate change?
17. What innovations has the project brought to your daily work? In your opinion, which actions stand out?
18. Implemented actions and their benefits: What have been the main project results so far? Please comment on environmental impacts, community life, income generation, local culture, and decision-making processes.
19. What has worked well and what has not? Could you give examples?
20. Do you believe any of these successful actions could be applied elsewhere?
21. How is this project helping to address both existing and new problems?
22. Do you believe the project can help participants/the community adapt to the impacts of climate change? How?
23. Can you describe any practice or idea that emerged from the community itself to deal with climate- or environment-related problems? How did it arise? Has it been working well?
24. In your opinion, are the implemented solutions sustainable in the long term and capable of continuing without external support? What were the main challenges faced during project implementation?
    a) Were they overcome? If yes, how?
    b) If not, why?
25. Are there unresolved gaps or new needs that have arisen due to climate change?
26. What recommendations would you give to improve the effectiveness of the initiatives?

Future perspectives and final questions

27. Is the community preparing in any way for the climate changes that are already occurring or expected to occur? How?
28. Beyond the current project, are there other local organizations or initiatives working to reduce climate impacts?
29. What could be done to further strengthen the community's resilience?
30. If you could give advice to another community starting a similar project, what would it be?
31. Are you aware of any government initiatives addressing these changes? Which ones, and how do you think they could help?
32. What do you think public authorities could do?
33. What do you think companies could do?
34. How do you see the role of cooperation among communities, government, and companies in addressing these challenges?
35. What marked you the most in participating in this project? Did anything make you change your way of thinking or acting?
36. If you could summarize in one sentence the importance of this project for the community, what would you say?
37. When you think about the future, are you pessimistic or optimistic? Why?
38. Is there any topic that was not discussed that you would like to address? Would you like to add anything?

ANNEX II. SUMMARY TABLE OF PRACTICES IDENTIFIED IN THE TERRITORIES AND THEIR RELATION TO THE STUDY'S KEY CONCEPTS

IDENTIFIED PRACTICE	MITIGATION	ADAPTATION	RESILIENCE
Reforestation of degraded areas	X		
Implementation of agroforestry systems and agroecological agriculture	X	X	X
Soil fertilization and crop rotation	X		X
Meliponiculture (native stingless beekeeping)	X		X
Community-based tourism			X
Selection of more climate-adapted species		X	X
Poultry and fish farming		X	X
Infrastructure for water capture, storage, and treatment		X	X
Diversification of economic activities		X	X
Diversificação de produtos artesanais		X	X
Environmental and climate education	X	X	X
Courses and workshops on best practices	X	X	X
Women's engagement and empowerment	X	X	X
Communication initiatives	X	X	X
Development and strengthening of local organizations		X	X
Development and strengthening of local organizations		X	X
Knowledge exchange among communities	X	X	X
Access to subsidies and public policies		X	X
Management of pirarucu and freshwater turtle populations		X	X
Management of threatened plant species (e.g., copaíba)	X	X	X
Financial education and technological training			X
Irrigation projects		X	X
Seedling production in nurseries	X		
Continuous search for partnerships to expand positive-impact initiatives	X	X	X
Restoration of springs and other Permanent Preservation Areas	X	X	X
Conservation of breeding lakes			X
Collective monitoring of impacts and illegal activities in the territory	X	X	X
Development of agroindustry and production infrastructure			X
Mapping of Brazil nut groves			X
Research and studies in partnership with technical assistance institutions		X	X
Collective work through community ("mutirões")		X	X
Actions to combat deforestation and fires	X		
Youth engagement and leadership training			X
Diversification of local diets through locally produced crops		X	X
Acquisition of productive equipment for shared use		X	X

ANNEX III. LIST OF INTERVIEWEES AND RELATED INFORMATION

TERRITORY	INTERVIEWEE	ROLE IN THE INITIATIVE
Território Tupi Guaporé	Uraan Anderson Surui	Besides being a Chief, he was COOPSUR's president at the time of the project
Território Tupi Guaporé	Lana Surui	Beneficiary
Território Tupi Guaporé	Suellen Fernanda Mangueira	Field Coordinator and Technician at Forest Trends
Southeast Pará	Darci Batista	President of the Rural Producers Association of Colônia Progresso (ASPROP)
Southeast Pará	Zélia Sousa	Coordinator at COOAGRO
Southeast Pará	Polyana Souto Lima	Vice President at Associação Marajoara
Maués	Ítalo Mamud	Technical Consultant at Instituto Terroá
Maués	Paula Renata	President of the Artisans' Association
Maués	Ismael Pinheiro	Master of Culture
Acre–Rondônia–Amazonas Border	Aldênia dos Santos Gama	RECA cooperative member
Acre–Rondônia–Amazonas Border	Sérgio Lopes	RECA cooperative member
Acre–Rondônia–Amazonas Border	Gicarlos Souza de Lima	Member, Commercial Manager, and current RECA Coordinator
South of Amazonas	Matheus Wallisson	President of the Youth Collective "Puxirum pelo Clima" and of the Rio Manicoré Communicators' Council (CORIM) JOCSAM communicator and deputy coordinator of the Youth Collective
South of Amazonas	Márcia Pinheiro	Finance Secretary at the Association of Agroextractivist Workers (ATRAMP) Articulator and mobilizer in the rubber value chain at WWF
South of Amazonas	Dario Nascimento	Rubber tapper
Médio Juruá	Estephanie Loureiro	Responsible at Memorial Chico Mendes for monitoring initiatives related to açaí, rubber, and oilseed value chains in Juruá
Médio Juruá	Francisco Solivan Pires	President of AMARU (Association of Agroextractivist Residents of the Uacari Sustainable Development Reserve)
Médio Juruá	Fernanda de Araújo Moraes	President of AMAB (Association of Agroextractivist Residents of the Lower and Middle Juruá)
Marajó	Bruna Oliveira	Regional Ecosystem Articulator at Conexsus.
Marajó	Gracione Silva	President of Cooperativa Manejaí Manager of the PEAEX "Coletivo Deus é Fiel" settlement
Marajó	Daniella Miranda	Regional Ecosystem Articulator at Conexsus.
Juruti	Eudes Gomes da Silva	Beneficiary
Juruti	Yves Andrade	Field Technician at IJUS
Juruti	Tatiana de Souza	Beneficiary from the Curumucuri Gleba Representante do Sindicato dos Trabalhadores
Alto Solimões	Taciana Coutinho	Professora da Universidade Federal do Amazonas (UFAM) Coordenadora do Parque Científico e Tecnológico do Alto Solimões (PACTAS)

THANK YOU FOR READING!

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