THE PATHS TO A SUSTAINABLE AMAZON

Joseph Young & Juliana Sampaio

Brazil is the guardian of the Amazon rainforest

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Conception
Joseph Young

Project coordination
Guilherme Young

Revision
Thaísa Barbosa Nogueira

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circulacao@m3editorial.com.br

Text
Juliana Sampaio de Souza
Aline de Almeida Reskalla

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Dedication

To Marshal Cândido Mariano da Silva Rondon, we dedicate this book written by many hands. The protagonists who inhabit the Amazon Forest and keep it standing reveal feelings akin to his, when he started to explore this vast, unknown portion of Brazil. We need to take care of nature, because we depend on it .

Our admiration for that pioneering work in serving the country, extending telegraphic lines to interconnect frontiers distant from urban and political centers, and establishing peaceful contacts with indigenous peoples.

An example seldom followed until our present days.

SPONSORSHIP

Brazil is the guardian of the Amazon rainforest

Mariscal Candido Mariano da Silva Rondon would certainly agree with this proposition. He was one of the greatest explorers on earth to date and he was not fairly recognized at that time. That injustice was repaired, in a certain way, by the authors who dedicated to him several posthumous biographies, the most recent the one of American journalist Larry Rohter, who lived in Brazil as a correspondent of American newspapers and visited the Amazon many times.

He was the first authentic pioneer to enter the Amazon rainforest through the state of Mato Grosso to set up telegraph lines at request of the then Empire. He made the first peaceful contacts with indigenous peoples and recognized their wisdom about the forest by keeping an intimate relation of interdependence with nature and the flora and fauna species. From that experience, Rondon coined the motto "die if need be, never kill", aiming at guiding his men in the relation with the indigenous peoples.

He created the service of protection of indigenous peoples, which he led for years in the administration – when he was disappointed to see that politicians at his time basically wanted to do the least possible for the indigenous people, opposite to their pompous rhetoric, as reports Larry Rohter. The journalist did a long and patient survey to write "Rondon, a biography". His book points out that the then coronel Rondon led some 20 expeditions in the northern region, set up 2 thousand km of telegraph lines, walked 40 thousand km in the virgin territory, mapped unknown rivers and landforms, ultimately, he designed the frontiers of the Amazon rainforest.

Recognized by only a few for clearing new limits of the Brazilian territory, Rondon became a celebrity when he led the expedition of the former American president Theodore Roosevelt and his son to course the river called ***Rio da Dúvida*** in 1914, in Mato Grosso, as far as Manaus. Wounded in the leg in an accident during the expedition, Roosevelt was literally carried by the men of the expedition during part of the way, mainly when crossing some waterfalls was necessary. As luck would have it and supporting the colonialist vision of some of the world organizations at that time, initially the credit for the findings of the expedition was given to the American politician, as if Rondon, then 48 years old, and other 15 Brazilians were mere supporting actors.

This book seeks to record the sustainable undertakings showing sound results in the Amazon rainforest, without ignoring the serious problems in the region which have persisted for many years, involving issues such as violence, invasions of law-protected indigenous lands, illegal activities such as gold digging,

for instance, in addition to deforestation and public land grabbing. Ultimately, the absence of the State and its agents to enforce the law.

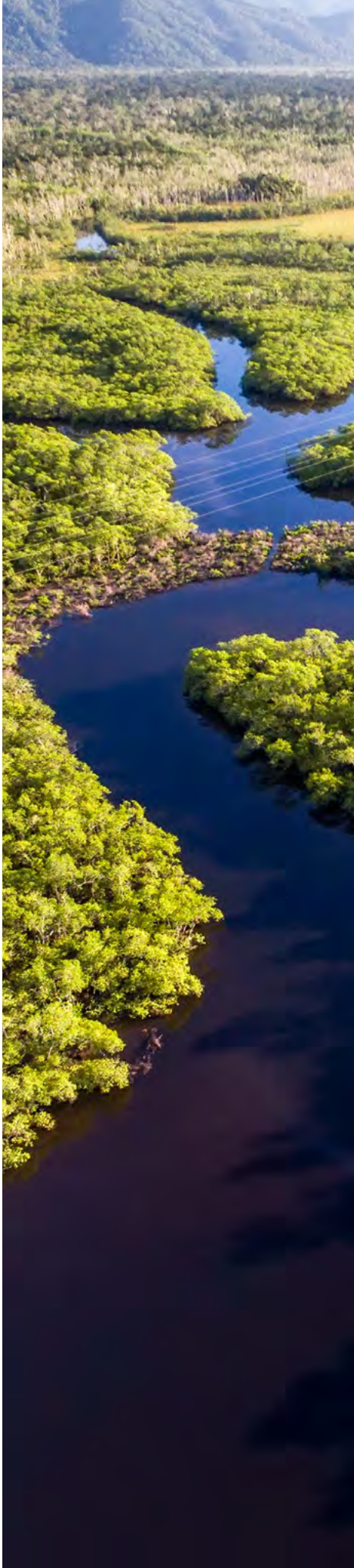
We have chosen the path of pointing out the positive effects of undertakings that bring income to indigenous and native peoples, respect their traditional culture, such as extractive techniques, and recognize that they keep the forest standing. It is obvious that those successful programs supported by private companies disclose, at the same time, how much there is still to be done considering the difficulties, such as the large physical expanses, poor means of transport, and scarce availability of mobile phone signal.

We also present the crucial role performed by the NGOs (non-governmental organizations) which started pioneering programs at the Amazon rainforest, for the purposes of meeting natives' needs and have been able to conquer an increasing number of partner companies along the way. The most known examples are: decrease of deforestation in Paragominas, Pará; direct supply of Brazil nuts by extractivists to the bakery industry in the southeast, eliminating intermediaries; successful handling pirarucu fishery, which was an endangered species; and the Chico Mendes extractivists reserve. There are also other successful programs, like the "coconut breakers" and sustainable management of native trees of the forest.

Not to mention the several peculiarities of the Amazon Region, such as: strong presence of buffalos as means of transport and even as a pet in the Island of Marajó (Pará); pink dolphins which appear when the Negro River (AM) floods; natural methods of alternative medicine that heals the people by means of faith and plants, including from malaria to Covid-19; and, obviously, the unequalled wealth of the local culture, presented by indigenous artists who use their talent to tell the story of this "Amazon universe" in the country and abroad.

We are convinced – whereas the inspiring examples presented in this book – that the civil society, including actors of the economic activity, who are entrepreneurs and companies of different sizes, can take a stance and initiatives to defend the Amazon rainforest, in addition to putting pressure on the government to have it enforce the law. Within this last context, we have to stress the importance of the demarcation of indigenous lands, targeting on materializing a broad and decisive movement both to preserve the Amazon biome and to use its potential in the global green bioeconomy that rises in the horizon. Brazil is the guardian of the Amazon rainforest.

Joseph Young



Contents

Indigenous peoples in the Amazon's past, present and future

Who discovered Brazil was not Pedro Álvares Cabral in 1500, but possibly a large group of immigrants who walked and arrived in South America from as far as eastern Asia at least 12 thousand years ago, crossing a strap of land known as Bering Strait, between the current United States and Russia. In their way they faced colossal glaciers, a fauna of gigantic animals and the Amazon Forest maze.

They persevered so strongly in their colonization of the territory that thousands of years later, when the Portuguese moored their ships in the coast, the navigators found a population of about three million people, according to some of the latest estimates. Portugal population, on the other side of the Atlantic, was barely one million at that time.

The Portuguese did not land at a virgin Brazil, without history, but in a land already known by different names by hundreds of indigenous peoples spread around the territory, mainly in the Amazon Region. For the Tupi-Guarani people, the first people Europeans had contact in the coast, the territory was called ***Pindorama***, the "land of the palm trees", and this is also the name by which certain scholars refer today to an "indigenous Brazil".

The country maintains its indigenous roots, with 305 ethnicities distributed on all five regions, particularly in the north, where about 37% of that population is concentrated, according to projections published by ***Fundação Nacional do Índio*** (FUNAI). The indigenous community estimated in the country totals almost 900 thousand people, most living in rural zones, according to the last census of ***Instituto Brasileiro de Geografia e Estatística***

Photos: Marcelo Camargo / Agência Brasil

(IBGE). It has become three times smaller between the arrival of the Portuguese and the XXI Century. Nevertheless, it keeps a vast cultural richness and preserves more than two hundred languages, for instance. Today, over 500 years after being "discovered" by the white man, the indigenous peoples stand for less than 0.5% of inhabitants in Brazil, according to the census, and they fight for representativity and survival in the territory.

Land demarcation is in the core of the debate on the indigenous peoples' right. The right to maintain their lands and culture has been disposed in the 1988 Constitution, however, it was only given its current definition in a decreed published in 1996, during Fernando Henrique Cardoso administration. In the past, the whole Brazil belonged only to the indigenous peoples – now, the area exclusively dedicated to them has decreased, but it remains larger than France and England, for instance. It corresponds to 680 territories officially determined or under analysis in all regions of the country, particularly in the so-called Legal Amazon, according to FUNAI.

Land demarcation is a complex process, which starts with a FUNAI's anthropological study, targeted on identifying the land. During the months the process lasts, institutions can, including, present reasons opposing to the demarcation action, which also passes by the Department of Justice before being approved. The very President of the Republic needs to sign the decree to homologate the demarcation of the indigenous peoples' land.

"Controversies do exist, but the pieces of land demarcated before the 1988 Constitution occurred based on a colonialist vision. They were determined based on an idea that a settlement would be set around the indigenous houses and the area destined to gardening or collection would not be set for no other activity. Those Indians would be there until they could be integrated in a "national communion". The extensions were minuscule, as still they are today, of the lands occupied by the Guarani-Kaiowá people, for instance, in Mato Grosso do Sul. The indigenous lands demarcated after the 1988 Constitution occurred according to a different understanding, that they should be for those people's physical and cultural survival, not only around the houses. Demarcation in the Amazon, for instance, is "bigger", informs anthropologist and demographer Marta Azevedo, FUNAI president from 2012 to 2013.

The right to the indigenous lands protects not only those who live in those communities, but also the very nature – and Brazil's future as a sustainable nation. A study of MapBiomas (Annual Mapping of Use and Coverage of Land in Brazil), a project that monitors the national territory, has pointed out that the country has lost 69 million hectares (ha) in the last 30 years, and only 1.1 million ha, 1.6% out of those, are within indigenous lands.

Integration and isolation in Brazil

Indigenous individuals with a notebook, in a car, in the National Congress and living isolated from the rest of the population: all those can be found currently found in Brazil. The 1988 Constitution guarantees indigenous peoples the right to maintain their own culture. It has been the first document officializing that guaranty, which expressly states as follows "Indigenous individuals shall have recognized their social organization, mores, languages, beliefs and traditions, and their original rights over the land they traditionally occupy, the Federal Government being in charge of having their land demarcated, and their assets protected and respected".

However, for a long time the Brazilian legislation has treated indigenous individuals as "relatively incapable" persons. This is the expression with which the "forest people"", as they were called, are mentioned

in the 1916 Civil Code, for instance, which determined the need of tutelage by the State until they would be adapted to the "civilization of the country". Still today, after decades that understanding was legally changed, there are those who question indigenous individuals' independence to choose the lifestyle they want to lead.

Marta Azevedo, former FUNAI president, stresses that the prejudice still stands in the way of indigenous populations' rights. "The controversy exists because there is prejudice, racism, a lot of people against indigenous peoples because they do not like them. Therefore, of course there is a controversy. There is the thought that you will demarcate land for a community they think savage, barbarian, entitled to nothing. This is questioned all the time", she points out.

She also highlights education's strength to contain prejudice. "As to understanding what is to be an indigenous individual in Brazil, little have we advanced, a lot is still wanting. The indigenous subject is not studied at school, indigenous persons are aliens. Campaigns have to be created to inform who are the people in those communities, how they live, how are their cultures. Brazil is one of the countries with the biggest native socio-diversity in the world, only losing to Indonesia, home to 800 autochthonous people, i.e., different original peoples. Prejudice is quite related to ignorance", says she.

In an interview to Uol, activist and digital influencer Alice Pataxó advocates multiple ways of being an indigenous individual. "I grew up hearing my mother say that my ancestors used a ***borduna*** (an indigenous weapon) to be heard and to show they were fighting. Time passed and now we use a pen. Today, we are decolonizing computer's screens and talking to the whole world in a mobile phone. We show that we have adapted and have not forgotten who we are, it does not matter whether we use a mobile phone, a computer or if we live in the city, all that does not make us less indigenous". She is one out of dozens of proudly indigenous young women who use the social media to record their daily life and, in parallel, to denounce violations of rights and the environment.

On the other hand, FUNAI records 115 indigenous peoples isolated in Brazil – almost all of them in the Legal Amazon. A community is deemed isolated when it does not hold permanent relations with the national societies, or which has low frequency of interaction with non-indigenous groups or other indigenous peoples. FUNAI explains that the people's decision to stay isolated is historically associated to negative experiences or fear to have contacts with the external community, factors that may trigger new diseases and violence, for instance. Isolation is also caused by social and economic self-sufficiency, when that community is able to meet their own necessities by themselves.

It is exemplary the case of the so-called "the hole guy", or "Tanuru". Monitored by FUNAI since the 1990s, he was the last member of an indigenous community to live isolated in Rondonia and was decimated in the 1980s and 1990s. That agency tried to set direct contact with that man a few times, but in 2005 it gave it up after he had expressed many times his lack of interest. The remaining individual was accompanied from far away by researchers, who nicknamed him "the hole guy" due to his habit of digging holes in his hut. Sometimes the researchers would leave seed and tools in his way, until 2022, when he passed away apparently without any violent cause, just lying in his hammock,

For many indigenous individuals, any relationship with external communities is balanced between distance and proximity, with an opening for demands of access to the State's basic services. In 197 indigenous areas, for instance, internet routers have been set up to increase digital inclusion as part of the Wi-Fi Brazil federal program, developed by the Ministry of Communication.

FUNAI: the background

Indigenous peoples are mentioned 11 times in the 1988 Constitution, which lists a series of responsibilities of the State toward them, such as guaranty to the land, culture and education, including by using native languages at their regional schools. The whole State is in charge of respecting those prerogatives, but in 1967 the Brazilian government created an agency which, up to this date, leads the promotion and protection to the indigenous peoples' rights, FUNAI.

It was founded in the first years of the military dictatorship to replace the ***Serviço de Proteção aos índios*** (SPI). The former department had already been criticized by anthropologists because it performed in a "tutelage paradox", because at the same time they looked for protecting the indigenous culture and lands, but also tried to transfer the communities far away from "progress", so that they would not stand in the way of the colonization.

FUNAI was conceived by intellectuals of the ***Comissão Nacional de Política Indigenista*** (today replaced by ***Conselho Nacional de Políticas Indigenistas***), for the purposes of overcoming the SPI paradox, assess the NGO ***Instituto Socioambiental*** (ISA), defender of the indigenous rights. However, under the perspective of that organization, at the beginning FUNAI reproduced the mistakes of the past by subordinating indigenous policies to the national defense and to the advancement of the infrastructure in the Amazon Region.

That is part of what the group calls "assimilationism", an attempt to integrate different groups to the society without worrying, often enough, about the particularities of the indigenous culture. Currently, the movement of indigenous leaderships advocates the opposite: to enforce the Constitution and simultaneously guarantee the right to preserve culture, territories and, like any other group, health, education and communication. The demand now is of co-responsibility of the indigenous peoples, with their active participation in the decisions of the State, very far away from the idea of tutelage disposed in former Civil Code, as already mentioned in this chapter.

In practice, in addition to performing in the demarcation of indigenous lands and in the protection of isolated peoples, FUNAI renders support to other demands, such as strengthening local economy in the villages. That is what it calls "ethno-development", economic growth with traces of the local traditions.

One of the examples most celebrated by the very FUNAI is their support to coffee production by the Paiter-Surui people in Rondonia. For over three decades white coffee-growers planted the seed in the indigenous lands Sete de Setembro and Rio Branco, respectively, in the cities of Cacoal and Alta Floresta D'Oeste, in Roraima. However, after the demarcation, the properties were returned to the local peoples, and they, by themselves, started to work the plantations. Since 2018 the company Três Corações has started to support the ***Projeto Tribos,*** and it purchases the coffee for its line of special coffees of Amazon.

"Certainly, this is a story that was born inside the Paiter-Surui people in a search for a sustainable project, which values the forest, culture, growth and quality of social issues of the stakeholders. It is possible to develop a sustainable project without hurting the environment and indigenous peoples' rights, among other interests", stressed Almir Surui, with one of the four coffee production cooperatives in the region, in a presentation of the company Três Corações.

Photo: Marcelo Camargo / Agência Brasil

Terra Livre camping site.

Photo: Marcelo Camargo / Agência Brasil

Photo: Pedro Guerreiro

Photos: Arquivo Reca

The RECA project united migrants and rubber tappers and recovered the forest

In search of a piece of land, a group of migrants which started with around 100 families became a cooperative with over a thousand small farmers – people who started off struggling to provide for their children and are now entrepreneurs supporting the preservation of the Amazon Forest. This is the RECA Project, whose name is the Portuguese acronym for commercial intercropped reforestation. It produces over two million kilos of fruits per year, diversified in produce like cupuaçu, açaí, peach palm, Brazil nut, palm hearth, andiroba, and a variety of fruit pulps.

This novel project, born of the union of migrants and local farmers, generates income and reforestation through environmentally conscious planting in Nova Califórnia, a district of the municipality of Porto Velho, in the state of Rondônia. A place once forgotten and hopeless, before the arrival of a group who believed in those lands in in their own strength.

In 1984, when Nova Califórnia (RO) had no roads and still suffered with malaria outbreaks, peasant families from several parts of Brazil went to the Amazon in search of materializing their dream of owning some land. Without any governmental assistance, the challenge was not only to secure space, but also find income sources to subsist in the forest. According to the project, the newcomers soon learned that those lands were by no means similar to those in Brazil's South and Southeast Regions: the open woods meant constant sun, and the soil would often dry out. Given the difficulties, the migrants realized that they had to unite in order to transform the reality of the place and of the families who settled in the area.

"At the time, we came to Rondônia after seeing an advertisement of the Land Reform Institute (Incra), designed by the federal government as a campaign for the settling of lands in the Amazon. And because land was hard to acquire in the state of Paraná, we joined the program and came on July 11, 1984. It was just for men, to work, see what the land was like, and then bring their families. Three buses then came with migrants. However, when we got here, there was nothing. There were no roads, not even plot demarcation. That's when we became closer to the rubber tappers and the families who already lived in the area, to learn about the lands and find solutions together", explains Sérgio Roberto Lopes, 62 years old, a small farmer of Nova Califórnia and one of the founders of the RECA Project.

According to Lopes, the beginning was marked by difficulties, since besides the adaptation to the climate and land conditions, it was malaria season in the Amazon: "We all felt hopeless. Disease was spreading, many gave up, others died from malaria. There was also the problem with the roads, so impassable with mud that they were often closed. Therefore, we came together with the locals and began to discuss solutions to generate income and stay in the lands. At the time, there was much talk about the nut trees in the Chico Mendes reserve, in the state of Acre; then we began to study ways of planting them. Initially, still in the 1980s, we were helped by the diocese of Rio Branco, thanks to bishop Moacir Grecchi, who believed in our plans and arranged the funding so we could start the project", Lopes recalls.

With the union of the migrants with the local inhabitants, rubber tappers and peasants, the group planned alternatives that respected the local climate and the way of life of those who already lived in those lands. They combined the knowledge of organization and cooperation brought by the families from other states with the local wisdom about the forest. Thus, they began to develop a project to implement agroforestry systems (SAFs) using native plants typical to the region, which bear good fruits. From this alliance, in 1989 the social organization called RECA was officially created.

A thousand families from all regions

The production aligned with the forest led RECA to multiply, becoming a cooperative that serves directly or indirectly over 1,000 families, not only through the marketing of products, but also through courses, training, learning exchange, internships and partnerships with universities, the creation of jobs and income, among other benefits. Of the families that compose the project, 40% are native to the area, and 60% are from other parts of Brazil, resulting in a blend of them all.

Over the years, the growth was such that the project divided its activities into ten groups of cooperative members to facilitate services and the participation of all. "The division into groups was made according to their distance from RECA's headquarters. We have a monthly board meeting and another monthly one in each group. That makes things easier, everything that's done at the board is passed down to each one of the groups, which in turn discuss their agendas and send information back to the board", explains RECA's current CEO, Hamilton Oliveira, who was born in Paraty, Rio de Janeiro, but has been living in the Nova Califórnia district since the project started.

According to Hamilton Oliveira, RECA has a technical team that assists the farmers through the guidance it provides. Most of this team is formed by members who were trained in livestock and crop farming by family agriculture schools (EFAS), whose work is based on alternation pedagogy, an activity that requires

more collaborators. "Technical teams' work is still not enough to meet all demands, since each technician deals with a particular activity within RECA, for instance, one technician for organic certification, one for carbon offsets, another for composting, etc.", the CEO explains.

Family agriculture becomes knowledge passed through generations

Most of the technicians who provide guidance to the RECA cooperative families were trained at the State Rural School Jean Pierre Minga, a local institution named after a former priest who also helped to create the project. The learning unit began to be discussed by the residents in 1992, but it wasn't until 2011 that it started to operate. Today it has 60 students, all of which are children of local farmers who study in a boarding-like system, known as the Paulo Freire alternation pedagogy, based on the division of time between theory and practice.

In this conception implemented by RECA collaborators, the students live at the school for 15 days, learning agriculture activities, and after this period they return to their homes with assignments to be developed in the land of their family and community. The students leave the school with a vocational program certificate, i.e., a high school certificate that includes qualification as an agriculture technician. Most teachers at the school are also former students trained in this learning system.

Besides the school, the project partnered with the local parish and implemented an alternative pharmacy that produces natural medicines at symbolic price for the people of the region.

Most of the families rely 100% on RECA, since they generate their income from the selling of fruits. However, several farmers in Nova Califórnia are already deriving income from other activities without RECA's direct participation, though with support from the project. According to Sérgio Lopes, one of the project's founders, at the beginning, families were making less than half the minimum wage value. After the project developed, the average income of local farmers now reaches four times the minimum wage.

"Today, RECA sells to large companies, such as Natura and large wholesalers. We sell 10-kg sacks and 30-t truckloads of fruits, as well as oils that we sell in buckets, and all of it is sold in several parts of Brazil, such as São Paulo, Acre, Rondônia and Paraná. Palm heart, on the other hand, we sell through retail, including label, packaging and the RECA logo", Sergio Roberto Lopes details.

Daniel Berkembrock, 58, a man of German descent born in Blumenau, in the state of Santa Catarina, started to work in the Nova Califórnia district in 1986, and moved with the family to the area in 1990. His new life began in a small shed in the lot he acquired and, after the sales of the fruits he plants, which are marketed by RECA, he was able to buy more lands in the region.

"We began to plant manioc, then cupuaçu, Brazil nut, peach palm for seed, palm heart, andiroba, and açaí. I deliver a certain amount to RECA, and then they pay us. In this way, I've bought more land, remodeled my house, bought myself a car and agriculture machinery for work. My daughters and wife help me with the planting. We saw that the project helped us escape poverty and evolve a lot", tells the Southerner, who says he is currently making four times the minimum wage in sales to RECA, besides his independent production.

Today, according to data from RECA, the cooperative produces on average per year: 1,235,626 kg of cupuaçu; 41,856 kg of cupuaçu butter; 16,298 kg of nut oil; 163.752,00 kg of peach palm stems; 117,254 kg of açaí fruits; and 39,674,10 kg of palm heart, among a variety of other pulps and fruits.

Benefits to the forest

the story of the union of migrants, local farmers and professionals from all fields to guarantee land and ensure income also had another purpose: to protect Brazil's largest biome. The Amazon Forest also benefited from the implementation of RECA. From the beginning, the project adopted as production parameters the agroforestry systems (SAFs), which consist in having a variety of crops and income sources in the same area. RECA alone has spread over more than 1,000 hectares of environmentally conscious planting, the equivalent to more than 1,100 soccer fields. In addition to respect for the forest, RECA yields year-round harvests.

In RECA's SAFs, over 40 fruit and wood species, including medicinal ones, are intercropped. The practices adopted on a daily basis constitute the principles of agroecology – each family has its own composter, and the forest management in the areas is carried out by communal actions that include members of the group of the coordinated area.

According to Dielison Fortunato de Souza, 25, trained as an agriculture technician at the project's school and now advising the cooperative families, RECA currently has 264 farmers divided into nine groups. These teams are characterized by branches, which correspond to the crop locations: "In these groups, we provide guidance on correct sowing so project can lower the deforestation rate in the properties compared to the average rate in the region. Hence the purpose of our carbon neutrality project", Souza adds.

Moreover, RECA conducts organic certification throughout the cooperative production chain, which consists of a seal that indicates the integrity and traceability of the produce so as to endorse the production. This measure also leads families to comply with the Brazilian Forest Code.

The Carbon and Organic Certification Projects

Of the one thousand RECA cooperation families, 30 work in their properties with international preservation certification. The organic certification project implemented by RECA provides a seal, which is granted by the Instituto Biodinâmico (IBD) to farmers who follow biological agriculture guidelines, thereby complying with the legislation and respecting the Forest Code. Taysa Faltz Macedo, 27, a crop and livestock technician at RECA, describes how the procedure works.

"In this group of 30 farmers of the organic certification project, there is an internal control system formed by professionals who audit activities once a year to check if there are cases of noncompliance with work standards. And twice a year, IBD, the organic product certifier that inspects us, runs an external audit about the internal control system", Macedo explains.

She also adds: "We have three IBD certifications: organic crops, extractive operations, which comes from the forest, and processing, thus covering the whole production chain", says Taysa, emphasizing that RECA's organic certification is international, since it is valid for Brazil, the United States and Europe.

Besides the organic certification that monitors farmers, RECA has a carbon neutrality project under technical supervision of Dielison de Souza. He explained that the project was conceived in 2013, when they followed the initiative of Natura, one of the companies the cooperative sells to, which launched its carbon neutrality project to encourage the reduction of deforestation and, consequently, the emission of greenhouse gases.

"As suppliers to the cosmetics company, we thought it necessary to also contribute for the same

goal. In other words, the deforestation rate in RECA properties should be lower than the regional average. To that end, the farmers who adopted the idea were also given bonuses. And that's what we began to achieve. Now, the areas that are not part of RECA had a deforestation rate of 5.4%, while in properties linked to the project it was only 0.8%", supervisor Dielison points out, along with other details he gives on the functioning of RECA's payment for ecosystem services program (PSA), in small properties and communities of the Amazon.

Still according to Dielison de Souza, RECA's agroforestry systems employ continuous reforestation, and their durability spans from 1 to 20 years, depending on the crop class (fruit type) of each cooperative farm. The technician mentioned as an example the property of the cooperative co-founder Sérgio Lopes, which has been using the system for 34 years, since the project started, still with high productivity.

According to a RECA survey, the cupuaçu crop count, for example, since 1982, totals 139,500 trees planted. The figures are also significant for other crops like peach palm, palm heart, copaiba, andiroba, açaí, Brazil nut, soursop, and other species that have SAFs disseminated over Nova Califórnia since 1982.

When asked about the size of RECA's environmental offsets in the Amazon, Dielison de Souza compares: "I wish there was a project of this kind in each municipality. It's an organization built by the farmers according to their own reality. Besides income, environmental preservation comes as a merit. RECA shows that it is possible to make money while benefiting the environment", he concludes.

RECA plans to expand abroad

Given the cooperative's success, RECA has gained significant news coverage in the country, becoming a reference for other agriculture projects. In July 2022, the cooperative participated in Biofach, the world's largest organic fair, held in Nuremberg, Germany. For this event, RECA was advised by GIZ, an agency that promotes technical cooperation between the German and Brazilian governments, as well as logistic and graphic consultancy to several communities in the Amazon. The project had already been in the 2020 edition, which had approximately 3,000 exhibitors from over 100 countries.

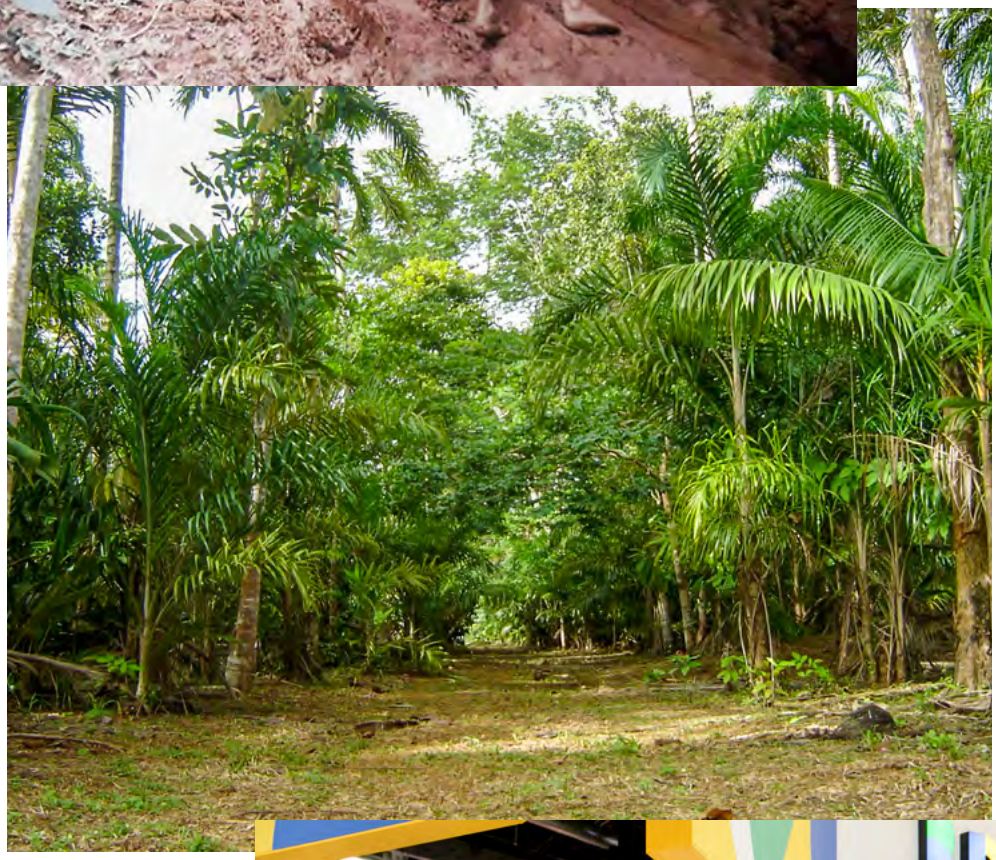
According to RECA's commercial director, Gicarlos Souza de Lima, the cooperative's participation in the exhibition is aimed at conquering the international market. "We brought to Biofach our products which have international organic certification, especially the Brazil nut and andiroba oils and the cupuaçu butter. As novelties, in our effort to integrate RECA into the global market, we present two products we've been studying for quite some time in Brazil and Europe, which are lyophilized cupuaçu and açaí. In the past, RECA's goods were basically frozen pulps", the director comments.

Still according to Gicarlos de Lima, the fair gives RECA greater visibility in the world market, a motivation factor for the cooperative members.

— Our goal is to expand and promote the products even further, since the more they are valued, the better we can remunerate our farmers. That is necessary as we are now in a devaluation scenario in the country due to the growth of livestock and crops in the Amazon. We want to expand the sales of organic goods in Brazil and abroad as a way of recognizing and encouraging farmers. In this way, we consolidate the SAFs not only as a form income generation, but also as a way of preserving ecosystems – he concludes.

With impassable roads, RECA farmers were mired in Nova Califórnia in the 1908s.

Photos: Arquivo Reca



Production of diversified fruits by the RECA cooperative, including cupuaçu, açaí, peach palm, Brazil nut, palm heart, andiroba and various fruit pulps.

RECA farmers at the Biofach exhibition, in July 2022, in Germany

From "Capital city of the Fat Ox" to "Green County": the union of Paragominas against deforestation

From 72 square meters of deforestation per year to 19. From the blacklist of the Brazilian institute of the environment and resources (IBAMA) to the title of first Green County. The story of Paragominas' transformation and awareness in Pará is impressive. A city that came up with the construction of roads to colonize the Amazon and then was transformed into the capital city of cattle raising and logging. Around 2007 entrepreneurs and the city hall understood that the source was drying and that it could be the end of the local nature and economy. It was the beginning of the process of awareness and union for survival of the urban center and the forest.

The story of Paragominas, at the border of the states of Pará, Goias and Minas Gerais, starts as far back as in the 1960s, when there were other cities only on the banks of the Tapajós, Caetés and Acre rivers, with a small population surrounding them. There were only seven million inhabitants and point five percent deforestation. The only means of transportation was the rivers.

It was then that president Juscelino Kubitschek and his team decided to build the first road in that region through the forest, which would interconnect the Amazon to the new Federal District, still to be inaugurated. That federal road, called Belém-Brasilia, was created for the purposes of promoting the occupation of the Amazon.

As from then, the federal government started a series of actions targeted on stimulating the colonization of the Amazon. In that period, Celio Miranda, from Minas Gerais, who was already keeping an eye in the state of Pará's potential, was granted a

Area in Paragominas being regenerated with plantation of Eucalyptus

concession of land by the government and founded Paragominas county in 1961. The city, right in the middle of the Amazon and on the border of three states, started to develop economically wildly.

"There were several financings and programs of Juscelino's administration to colonize our region with cattle raising. Other roads came up, such as Porto Velho-Cuiabá and Santarém-Cuiabá, and with them, many companies. Men then started to enter the forest. That point five percent of deforestation increased to 21% within half a century. From the seven million inhabitants in the Amazon before the roads, the population jumped to 30 million", remembers the former mayor of Paragominas, Adnan Demaski, 57.

"After about 30 or 40 years, with the climate change and global discussions, in addition to the market which started to prefer sustainable products, requirements came up for the forest to remain standing. In 2008, the then minister of the Environment, Marina Silva, edited a list of the counties that were deforesting the most in the Amazon, and our county led that ranking", completes Adnan Demaski, who administered the county from 2005 to 2012, the period when the dramatic change took place.

At that time, according to the former mayor, Paragominas had already deforested almost 400 km2 of the county territory in 2007. It was then that the environment started to be a subject of concern.

"With that news, we had two options: either we questioned the list and challenged the federal government, or we recognized that things were then different from the JK administration, we were in another moment where the world demanded sustainable development", stresses he.

"It was then that, as the mayor, I started to talk with all civil associations and entities of Paragominas, such as: Rotary and Lyons Club, the industry union, association of charcoal burners, rural union, workers union, commercial and dwellers associations, and churches, among others, totaling 51. My argument was as follows: to be in an environmental blacklist is as if a company were listed in the credit protection services, which was not something positive for our economy. Therefore, it was high time we stopped deforesting because we already had area enough to produce. We already had half the forest territory and the other half of open woods, so, we should remain like that, but working sustainably, without any need to deforest more", tells Adnan.

According to the former mayor, when those entities were called, most of them agreed, because Paragominas' image was not the same due to nicknames the city had been given in the newspapers because of the conflicts caused by disputes over land and the cattle raising activity in a disorganized way.

"The city was called Paragobala (*Paragobullet*) and "Capital city of the Fat Ox", in addition to several negative images. We needed to have a new paradigm and to take away that image of forest destructors, we had to exchange it for one of sustainability. Thus, we proposed a pact with all entities: nobody would deforest any more, and we would register all the open areas. Whoever had enough legal reservation could work in that open area, provided that they helped recovering the riverbanks, the springs, etc. However, if the owner had an open area opened larger than the size legally allowed, they would have to recover it to work there", details Adnan, saying that as from then he started to seek the collaboration of environmental non-governmental organization for the purposes of finding solutions to recover Paragominas.

"Thus started the performance of the TNC (*The Nature Conservancy*), with the creation of the first rural environmental registries (CARs) and the monitoring action conducted by the institute of the environment of the Amazon rainforest (Imazon), for us to be able to inspect those who tried to disobey the zero-deforestation pact agreed between the entities and the county", adds Adnan.

The then mayor of Paragominas contacted Imazon and scheduled a meeting. At that time, Adnan even

asked clearly: how can we be removed from that list? That was the one- million-dollar question at the time, because nobody had asked that question when the list had been published, which triggered the interest of that institute and ours to face the challenge. Up to then Imazon had been conducting technical studies remotely. After the mayor asked that question, we saw that we needed to investigate and find answers for deforestation, provided that the country actually showed interest in that action. Then we started to build up a plan together for the purposes of finding solutions to remove Paragominas from the list as being the city that deforested the most", comments Paulo Amaral, Imazon researcher, who participated in the action in the county at that time.

Confronting destruction

Before the action to try to mitigate the environmental impact caused in Paragominas, Imazon already led the local surveys in the 1990s, and the scenario was of a sad series of illegal activities. The consequence of an accelerated occupation by producers of three states simultaneously.

"We saw that in that region we had producers from Goias, Minas and Pará using the same type of grass to produce pastures, i.e., monoculture. Cultivating the same species represented imminent risk of decadence. At the same time, Paragominas had other characteristic: very high forest density with species of trees with high commercial value which was not explored. So, to open pastures, they had to fell those trees, in a dynamic of occupation that degraded the biome in an accelerated way", describes Amaral.

"Therefore, those who worked with cattle raising would follow the loggers thar felled the trees and cleared the area. Then, in the 1990s, the logging activity boom started in Paragominas, when 240 companies performing in that area were set up in that region. It was an activity that strongly degraded the forest in a very large county the size of the state of Sergipe, and which drew the attention to the size of the devastation", remembers Paulo Amaral. At that time there was not the Ministry of the Environment yet, and producers did not know about IBAMA.

"They were only afraid of the Ministry of Labor, they were not afraid of environmental agencies. Then, in the 2000s, the Ministry of the Environment already created, a list of the 37 critical counties that deforested the most in the Amazon was elaborated, Paragominas ranking first. As from then, two governmental operations started: the "Fire Arc", actions taken jointly by the Federal Police, IBAMA and the National Forces, and the Green Arc, supported by public and political entities, to help the counties to face the deforesting problems", reports Amaral.

According to that researcher, at that time to have Paragominas leave the blacklist, there were two main criteria: the first one was to reduce deforestation for three consecutive years to less than 40 km2 per year; the second, to have 80% of the county's area registered in the CAR, to be elaborated by the TNC.

"People there did not know what the CAR was, they were afraid to register the properties. The other challenge was to decrease deforestation, our objective being at least to reduce by half those 72 km2 per year. Then, we started to conduct a collaborative monitoring. We would produce reports and send them to the city hall, pointing out the places that needed to be visited. On the other hand, the Executive would do its mobilizations with the producers and start to create public policies for the environment", tells Amaral.

Soon afterwards, Paragominas city hall created the Department of the Environment, the first in the Amazon that would start to issue notices of environmental violation and fines to those committing environmental infractions.

"Imazon would pass on the coordinates and satellite images to me, and I would send the newly created team of the Municipal Department of the Environment to the area informed. It would take a Fiat Uno – it was my car at that time – and arriving in the place, would verify the deforestation and conduct the inspection, issue a notice of environmental violation and fine those deforesting", explains former mayor Adnan Demaski, who remembers being challenged many times. "I did not pass any decree, it was a pact, an agreement, the operation would only be conducted jointly". He states.

During a series of monitoring actions conducted by Imazon, researcher Paulo Amaral reports that they even discovered a third hidden illegal activity, but which deforested even more than cattle raising and logging in Paragominas.

"When we started to map in the field and understand the deforestation dynamic, we found out a hidden figure: production of charcoal in the city. A fully illegal, degrading activity. And thus, we produced a document recording it and handed it to the city hall, which took a radical action and effectively forbade the production of charcoal in the county", stresses Amaral.

According to that researcher, with the discovery and pressure on the charcoal producers, the origin of the material they used started to be questioned, because they alleged that it was residues of the logging activity, but it actually came from the native forest.

"If they were able to prove the origin of the raw material we would clear, but it was not residue of the loggers. We found out the actual origin of the material. It came from areas of the native forest that were felled to make charcoal. Thus, we hit the target where the problem was. However, we were not able to talk to them, there was an investigation, they threatened to arrest me and, so, I had to report the case to the police. And the mayor agreed with us, because he said that it was an activity that was not interesting, it was bad for the health, did not pay taxes and was extremely degrading", tells Paulo Amaral, with Imazon.

After the charcoal burners were blocked, former mayor Adnan tell us that Imazon reports led the county to another problem: to identify the territories where to issue a notice of environmental violation.

"With the complaints, the team would hit the road, arrived there and verified that the area had no identification. With the accusations of illegality, we realized the saying that bad son has no father. In those monitoring action where we found charcoal ovens and several illegal activities we realized the importance of the CAR, because with the help of the registrations, we could find immediately who were the owners. That is the importance of registration in the county, which contributes to identify the properties and monitor all areas", explains Adnan.

The CAR registration

In parallel to monitoring and to the actions to fight deforestation, other action with rural producers was the taskforce of the rural environmental registry of Paragominas.

The CAR started to gain visibility after the interventions in the county, where joint efforts to register producers were made by ***The Nature Conservancy.*** The objective was to reach 80% of the county registered and to remove it from the list of those who deforested.

Fabio Niedermeier, 52, who was the local coordinator of the TNC actions with the CAR in Paragominas, had moved from Curitiba (PR) to the county in Pará to work in the project.

"I came to Paragominas when the city was included in the list and TNC hired me just for that action.

Up to then, no council had ever succeeded in being removed from that list, and our biggest difficulty was to convince cattle raisers and loggers to reach the 80% set for the registration. To come closer to those producers, our office worked inside the Rural Union and, so, we were able to make headway in the registering and reach the goal set. Paragominas is a very large county, so, those 80% stood for over 1 million hectares within an extremely short time", he highlights.

According to reports of the former coordinator of the integrated actions, in addition to having the team's registration office working inside the very union facilities, to convince rural producers other actions were implemented, easing the adhesion to the registration to control the areas of the county.

"The CAR came with the objective to regularize things, not to punish. At the beginning, it was expensive. In 2010, for instance, registering would cost R$ 1.5 thousand for a producer. To motivate people to register their properties in Paragominas, we were able to reduce that price to R$ 250.00".

"The process was fully simplified, which favored producers' adhesion. We also promoted awareness by informing that the properties would not be given notices of environmental violation, just registered. We also removed the blockage of the county", clarifies Fabio Niedermeier, by reminding us that the CAR started to be initially discussed in Mato Grosso, and later it arrived in Pará, being created by the state governments in 2008.

Still according to Niedermeier, the register was replicated and countersigned after the county in Pará was removed from the list of deforestation in 2010. Paragominas became an example to be followed and showed the CAR's efficiency.

Officially, the rural environmental registry was created with Law no. 12651/2012 by means of the national system of information on the environment (Sinima), being regulated by MMA Normative Instruction no. 2, of May 5th, 2014. Once it is a public electronic register, the CAR is inserted in the national ambit, being mandatory for all rural properties, with the main objective of presenting environmental information inherent to the properties registered, and also the rural possession referring to areas of permanent preservation (APP). Thus, it is possible to have the areas monitored, with environmental and economic planning, focused on fighting deforestation.

Being the CAR validated, it is the first step to have the property environmentally legal and to grant owners many benefits, such as: owners' data, rural owner or direct responsible for a rural property; information on documents proving ownership and/or possession of the property; and georeferential data of the property's perimeter, of the areas with social interest and areas of public utility, being observed the localization of the remnants of the native vegetation of the areas of permanent preservation (APPs), of the areas of restricted use (AURs), of the areas consolidated in an APP, and areas of legal reserve (ARLs).

Paragominas becomes a green county model

After the actions together with the NGOs and one year after this fight, Paragominas was able to reduce the 72-km2 deforestation on average to 19. Out of that figure, according to Imazon, 70% were of legal deforestation, i.e., activities authorized by the county.

To achieve that recovery, researcher Fabio Niedermeier informs that in addition to the confrontation actions and the pact with the entities, some pioneering fast-growing species were planted in the most deteriorated soils. At the other front, it happened based on a natural recovery, a unique characteristic of the Amazon Forest, due to its biodiversity, in the areas that had been abandoned by former producers.

According to researcher Paulo Amaral, with Imazon, Paragominas has yet 60% of forest coverage and other 40% of areas occupied, with legal deforestation in properties registered following the CAR restrictions.

According to former mayor Adnan, in addition to CAR's monitoring and registration activities, the city hall adopted environmental education as a subject in municipal schools.

"I went to São Paulo, searched for partnership with the ***CEDAC, and educational community,*** and together with qualification of teachers in Paragominas, we were successful in implementing environmental education in the learning units. All that because we faced many difficulties in convincing dwellers. I would think: If I am not able to teach and warn adults, then let the process occur through their children, for them to help us bring awareness to their parents. For 12 years Paragominas schools have offered environmental education", stresses Adnan, adding that students have included learned waste destination, thus multiplying the idea in the city: "Currently, by virtue of this environmental education, Paragominas is one of the cleanest cities in the Amazon", he celebrates.

After two administrations, Adnan went back to being a lawyer. However, he did not put aside the subject of environment. He opened an agency of sustainable businesses with environmental services in Paragominas, mainly by approaching matters of carbon credits and actions to maintain the forest standing.

About his administration, Adnan reinforces that he is proud of the positive impacts after fighting deforestation, which is working up to this date.

"I left the office, but the activities and awareness go on, because people have understood the importance of preserving the forest. So, out of my administration – the infrastructure construction work, such as schools, we made a lake, a stadium, we built up Sanepar, Paragominas' municipal sanitation agency, to ensure treated water, among many other things -, the one that most marked me was not a physical conquest, but the contribution to break paradigm in the Amazon: that we can conciliate development with environmental protection. To do that, suffice it to have political willingness and to involve the society, making it realize that this is the way", stresses Adnan, complementing about his legacy: "We have to understand that a standing tree is worth much more than one down", he completes.

The green legacy goes on

Secretary of the Department of the Environment in Joao Lucidio Lobato Paes administration since 2021, manager Roberto Carlos Gambim, 54, speaks about the challenges to continue the work done against deforestation in order to keep the title of Green County.

"Paragominas is over 19 thousand km2 large, a quite big area. We still have 53% of legal reserve and the rest of tolerable use area, we are even a little over the index. Our difficulty is due to the size of this territory to conduct in-loco inspections, what helps us is the satellite monitoring. Additionally, Paragominas has a border with Maranhão, where there are some cities inside the neighboring territory, and also in Pará, with intensively active logging activities".

"Our great challenge to keep the pact is to curb illegal wood extraction done by some people that come from other states, not by the registered owners. That is why we must have a very efficient monitoring", explains the secretary.

Roberto Gambim adds that the municipal administration is buying more sophisticated equipment, such as drones, to strengthen this accompaniment and inspection of the areas.

According to Roberto, the monthly average of legal deforestation has been registered between 17 and 18 km2, lower that the one set at the time of the pact, corresponding to 40 km2. Other good piece of news is that environmental awareness has strengthened among those rural producers, who have transformed the deforested areas into areas for agriculture.

"In small properties and settlement areas with less than 1 hectare deforested, families plant manioc, beans and some subsistence produce", tells the secretary, pointing out that those areas of cultivation of subsistence produce are not detected by the satellite, only by means of in-loco visits, which is deemed another challenge for the monitoring activities.

Education and agribusinesses

With the transformation of the former "Capital city of the Fat Ox" into "Green County", in addition to monitoring activities and rural registrations, producers saw the opportunity of using deforested areas for agriculture. Once the federal rural university ***of the Amazon*** (UFRA) was set up in the county, several students started to do internships in farms, which were adapted and become companies in the agricultural segment by planting grains.

"Now, the city breathes agribusiness and, in all college courses, experimental classes and internships are ministered in farms, depending on the qualification involved. For instance, if it is a zootechnics course, classes are given in registered cattle raising areas, if it is of Agribusiness, at the grain companies. Currently, from 800 to 900 students attend UFRA, 50% out of those as interns in rural companies or properties. So, chances are they hire those students later", emphasizes Cesar Tenoriio, a professor of UFRA Forest Engineering.

To Cesar Tenorio, Paragominas has become a university pool, mainly due to its history of quick recovery of degraded areas. "We know that specific fast-growing species were used, such as eucalyptus, paricá and mahogany, which grow within 5 to 10 years. That emergency action made part of the county be reforested. On the other hand, it enabled reusing those deforested open areas which could not be reforested, but transformed into places for planting grains, a way out found by the agribusiness", says the professor. According to Tenorio, in addition to the transformation in the environment and in the county's economy, the environmental actions were of the essence for the society as a whole: "Nowadays, Paragominas' dwellers respect pedestrian crossings, respect one another, obey the laws".

Certain entities, such as the forest monitor PlenaMata, the MapBiomas platform, the French Organization CIRAD ***(the center of international cooperation in agriculture research for development),*** among others, have corroborated with mapping data on that decrease in deforestation in Paragominas along the years and the recovery of the forest.

Lago Verde, in Paragominas, created after the sustainable actions and became the Green County

Foto: Site Programa Cidades Sustentáveis

Paragominas producers had to adapt to the Rural Environmental Register

Photo: Sindicato dos Produtores Rurais

Foto: Vitória Leona – Imazon

Area being recovered with Eucalyptus

Sustainable management recovers the forest and changes the lives of quilombolas

Contrary to society's culture, a logging company decided to work only with forest management, without harming the forest, and still generating income for over 2,200 families. That is the story of Benevides Madeiras, in the state of Pará. Besides countering deforestation and training locals to help keep the forest up, Benevides strengthened the economy and the quality of life of families who never expected an initiative such as this.

Surprising expectations, by means of sustainable management, Benevides Madeiras created the Aflora Project in the municipality of Gurupá (PA). Since 2010, the project has been providing training to enable income generation for local families and to support sustainability. Headquartered in the state of Pará, the Aflora Project is the fruit of a partnership between the company and the surrounding communities.

The project is supported by the Brazilian Agricultural Research Corporation (Embrapa), the Federal Rural University of the Amazon (UFRA) and the Forest and Biodiversity Development Institute of Pará (Idelflor-Bio), as well as the state's environment and sustainability department (Semas), which defines along with the community the areas to be managed.

From the area selected for the management plan, the project sets impact mitigation techniques such as the maximum number of trees to be exploited and the use of more suitable processes for log removal and transport. The goal is to lead the forest to recover quickly, as well as contribute for the growth of new species.

The Aflora Project operates as a partner of the Hadex group, the association of quilombola communities of in the municipality of Gurupá (ARQMG) and the board of quilombola associations in the state of Pará (Malungu). The initiative also foments an economic partnership which allocates part of its revenue to the community, and another portion to the company. Benevides also directs 5% to economic development and infrastructure projects of direct interest of the local community. The city of Gurupá received several improvements, such as piped water, an artesian well, electricity, schools, primary healthcare, an ambulance fitted with a stretcher and oxygen, and a 300 km road enabling access to the city, which was only possible through the river.

All this development in small Gurupá, in the Amazon region, was only possible after the community mobilized in the search for progress combined with the conservation of the forest. It was the beginning of a long awareness raising process initiated by Benevides' owner family, which eventually convinced the locals and everyone who came to know about the project.

From logging company to exemplary forest producer

Benevides story began with the work of grandfather Arnaldo Betzel, who was already in the logging business in the state of Espírito Santo in the early 1970s. At that time, however, he still worked rustically, using an axe and loading the truck manually. Arnaldo Betzel started his first sawmill in southern Bahia.

However, a few friends of Arnaldo's who had settled in Paragominas, Pará, convinced him to move into that municipality given its better economic prospects. Thus, he disassembled his sawmill and followed with his family on a truck to Paragominas. Arriving in Pará, in the 1980s, he started a new sawmill, originating the family's first large business.

In 1999, Arnaldo moved to Belém, where he founded Benevides Madeiras in partnership with his brother José Betzel. Initially, the family would buy only ready wood, i.e., they would purchase logs and turned them into lumber. In 2010, already under his brother's lead, besides the sawmill, the family decided to go into forest management, investing on machinery and starting talks with the quilombola communities in Gurupá.

"The logging industry has always been maligned. So, our first route change from sawmill to forest producer using sustainable management emerged with the sector's increasing demand, which is the supplying of legal and constant raw material. We needed to get resources correctly, to keep the company working in a lawful manner. It was this sense of not only getting raw material, but doing so in a correct, legal way, that we needed to expand securely and become not only a purchaser, but a forest producer", justifies Gustavo Betzel, CEO of Benevides and its founder's grandson, who took over the company in August 2014.

According to Gustavo, besides the difficulty obtaining raw material legally, another restriction to keeping the firm operating correctly was land regularization, a requisite the quilombola community met, though it did not know the potential of its lands.

"Our bottleneck as a sawmill was to own an area legally for forest production. So, based on local indications, we learned that the association of quilombola communities of Gurupá owned a land titled issued by the state government saying that the land was their property. We then sought these quilombolas who owned the land regularly and used it for their subsistence. We explained that it was possible to turn that land into income for themselves, but in a sustainable manner. We thus started the forest management project, Aflora", Gustavo tells.

He stresses that the whole project was documented in the community's name, including details on how much they would receive for work in the place. "We did not make anything in the company's name. We signed a partnership agreement whereby the community had knowledge of the values they were to be paid, authorizing use of the land and providing paid labor. As for ourselves, we came in with the technical part, providing training for sustainable management, engineering, and machinery. In a word, they had what we were after, which was the land, and we took on the task of doing the forest management in the area, hiring them to work", Gustavo explained.

Initially, according to Gustavo Betzel, the main difficulty for the Aflora Project was to raise locals' awareness, as they had no idea about the importance of preserving the forest. "At the time, they only thought about the money, some didn't show any interest in working with the management. As they suffered hardship, they only cared about how much they would make. They didn't try to understand how it would be to keep the forest, and they were really averse, so it took more than 2 years to convince the community to accept it, from 2009 to the Summer of 2011", he says.

With that experience, he stresses that it is necessary to conduct socioeconomic work in all parts of the Amazon in order achieve the goal everyone wants: to protect the forest. "This economic and environmental situation is a structural problem in the region. Therefore, until we solve the financial issue of the people who live the Amazon, it's no use talking or holding campaigns to protect the forest. Without means of subsistence, they will either destroy what's in the forest in order to survive, or they'll starve. And that's what happens in reality", Gustavo points out, underscoring that forest management was a survival alternative for local communities, not only as a form of income generation, but also of preserving the Amazon biome.

Currently, of the 500 employees of Benevides, 180 are working with forest management, including only direct jobs, without adding contract workers. In all, there are now 21 communities, that is, 21 local associations, totaling over 2,200 families engaged in forest management, which has become an example for other regions.

"This partnership between Benevides and the ARQMG became a success case in the region, and other communities wanted to participate. This happened because we understood the difference between creating jobs in the city and creating opportunities in a far-off region. We were able to generate resources in an isolated area, while also preserving the forest. That is so very important for them and for us. Because from this work with the communities, besides income generation, you have 360,000 hectares managed and protected in the correct manner, respecting the forest's cycle ", Gustavo stresses.

Since 2009, when the Aflora Project began, until now, the company has invested R$ 90 million between income and improvements in the communities, directly destined for the locals. Regarding the income generated for each family through forest management, the partnership records an average R$ 2,000 per hectare. "Without cutting down the forest, we managed to generate for them more income than leasing for soybean crops would. Therefore, we may not be the solution everyone expects, but we're part of this solution we live in, which consists in solving the socioeconomic problem of those families living in the Amazon, helping to keep the forest up", Gustavo emphasizes.

"If even my family took a long time to believe that it was possible to extract wood without destroying the forest and even protect it with this work, imagine, then, other people who follow the culture of an entire

society. They can only believe it seeing for themselves, and they'll see it's true". These words come from forest engineer Ana Lúcia Vilhena Muniz, who has been working since 2008 for Benevides with the forest management process that originated the Aflora Project.

The forest engineer describes a feeling that is found in most people about a particular work they don't know, but which is "like caviar, they have only heard about it". To convince communities in Pará, as well her family, and you who are reading this story, Ana Lúcia Muniz details how sustainable management is done in the Amazon Forest, a project that became a model to other regions based on the Benevides initiative.

"There's a big difference between suppression and deforestation. Suppression is the legally authorized cutting down of trees, according to each area. In contrast, deforestation is the extraction without telling anyone, with no control. In the former, each property has its rate, and in the Amazon region, you can only extract and convert 20% of that area, and you must leave 80% for management, in addition to keeping the forest up. Once this 80% area, called a forest management unit (UMF), is defined, it can be divided into smaller areas called environmental production units (UPAs), forming 25 to 30-year cycles.

According to the logging intensity, we can use this cycle to enable the regeneration process. In other words, we will only return that area 25 or 30 years later so that the forest can recompose itself", Ana Lúcia explains.

However, before deciding on the logging time, according to the forest engineer, a data collection procedure denominated forest inventory is done on the area defined as UMF. This inventory is a document that comprises all the information about the species found in that area. This allows identifying which trees can be cut down in the 25 to 30-year interval, and those that will remain intact.

"According to the legislation, after the inventory with all individual trees, we separate the trees with 60 cm of diameter, which are the only ones allowed for logging. We also extract the species that will actually be sold, depending on the market demand at the time. In addition, we can extract only 29 m^3 per hectare, and of those, only the species that are not vulnerable and that actually have commercial value", Ana Lúcia points out.

According to the engineer, the species that are most commercialized are angelims, ypês, parajubas, and maçarandubas, with authorization by the local quilombola association. "Of these species that will be extracted, we must still preserve 10% intact in that area, to secure the next cycle. As for the vulnerable ones, that is, the ones in the endangered list, such as ypês, we must leave 15% there. But it's all proportional to the area, respecting the characteristics of each species. It is the inventory that will determine whether you'll have to leave 10-200 species intact in each management area. Noting, again, that after we extract only the allowed percentage, we will only return to the place 25 years later".

The forest engineer stresses that the recomposition of the area takes place between the cycles with help from the ecosystem and, to your amazement, from the sunlight that comes precisely with the logging. The forest has its own dynamics. The forest ground is full of seeds all the time due to the biosystem. However, when logging is carried out in a forest management area, the luminosity from solar energy contributes to the sprouting of these dormant seeds.

In other words, the management ends up helping the regeneration of many species in the forest's natural cycle. After 1 year, if you return to the same area, you won't be able to walk into it, due to the so

many new species, as in this interval the area has already recovered due to the rapid growth of these plants", she explains, underscoring that the area cannot be managed again for at least another 25 years.

As for the challenges to understanding forest management both in the Amazon and in society at large, Ana Lúcia sends a message:

— It is a cultural habit to think that management represents deforestation. Forest management is about planning, and it is sustainable. We must show them that it works, we must point out an area fully regenerated five years later, but it all requires a lot of technique and guidance.

Numerous times we found people from the community logging, that is, deforesting. And after the advice and training provided to the quilombolas, they are helping us to monitor the areas and protect them from deforestation. We might say that in a region where you have management activities, the risk of invasion is lower, since this protection comes from the quilombolas themselves, who understood the benefits of the mechanism and the importance of the forest in their lives", says the forest engineer.

The managers who became brothers

Before Benevides implemented the forest management project in the municipality of Gurupá and surrounding communities, the region already had its legal owners and local culture: the quilombolas, mostly of African and indigenous descent.

The first talks between the company and the quilombolas took place from 2008 to 2009, in a village in Gurupá, in the Maria Ribeira community, where some 70 families lived at the time. The first visit was made to this location, which is coordinated by the association of quilombola communities of Gurupá, headed by Mr. Francisco Ramos Muniz, 61, better known as Mr. Chico.

"When we first met Mauro and Arnaldo from Benevides, we began to discuss the forest project. We passed the idea to the ARQMG council members and, at the time, of 11 communities, only three agreed to participate in the project. These were the communities Jocojó, São Francisco do Alto Cuxuna and Pavilhão da Bênção do Alto Cururiú. Most of the others thought they wouldn't pay us, that they wanted to steal. However, after they saw things working for these three communities, then each year, at least two others joined the forest project", says Mr. Chico.

Mauro Roberto do Vale Martins, mentioned by Mr. Chico, is the community project manager at Benevides. He established the first contacts with the quilombola communities. According to him, convincing them that the projects aimed to offer jobs without harming the forest was challenging.

"The beginning was very hard, we spent two years talking and trying to show them that we were not going to destroy but collaborate. We helped them in many ways, from food baskets to lending them a tractor, and the machine would lie there unused. We offered them a whole paid labor structure with forest management, and yet many still kept the traditional thinking and wouldn't believe in the project. Then we went on to offer free courses, too, for anyone who wanted to work, and by and by, we integrated the community and the firm. The technicians taught the quilombolas how to log through management and make a forest inventory. Overtime, we changed their mindset and made room for the new, which was quality of life through legal, acknowledged work, with environmental awareness", Mauro Martins expounds.

The coordinator also recalls that Benevides established a partnership with the Federal Rural Univer-

sity of the Amazon Region, in Paragominas, bringing students to conduct field work in areas owned by the company. In this way, the students helped the quilombolas in matters of environmental preservation.

This training gradually changed the quilombola communities' view.

For the pedagogist Nivaldo dos Santos Nascimento, 51, a quilombola from the Santo Antônio do Cambutá do Rio Pixuna community, also in Gurupá, the management project was always executed according with the legislation and with plenty investment on the company's part, in addition to the technical training in partnership with the communities, all of which motivated the local families.

"The company has invested in various areas, such as health, education, not only the environment. At the time, there were even denouncements by some agencies because the firm was a sawmill, but since there is no irregularity, the project has continued all these years, up and running.

Nivaldo Nascimento is a board member at ARQMG, the president of the residents' association in Vila Cantagalo, and a member of the Rio Pixuna community. He works as a teacher, union leader and advocate for the quilombola communities. Always defending the communities, he was also a city councilor in Gurupá for 20 years.

The teacher also explains that besides the change in families' finances, there was the recovery of the first forest production units, pioneered by the management project: "Today, the first UPAs where we started the project are unrecognizable, you can't hardly notice that it's been logged. They are fully reestablished. So, we saw in practice that the forest recovers again after management", he stresses.

Mr. Chico, who attended the first talks with Benevides and had to convince the quilombola council members about the project's effectiveness, also recognizes the evolution of families, including his own. "This project really helped my family and those of neighboring communities. Residents here were able to buy houses in the city, some have a car or a motorbike, but before that they didn't have anything. And what really had an impact was the training for these people. My children, for example, completed their education, one of them even works with GPS devices. The help provided covered from education to healthcare, Mr. Chico summarizes.

He also mentions the new talks between ARQMG and Benevides. "As a preview, we're now working on a carbon project within the 83,000 hectares, a negotiation between our board and Benevides. Now, the view is not focused on the adults, but on the future of our children. This partnership has become a life project, and Mr. Mauro and Mr. Arnaldo from Benevides have become our brothers. In our culture, a brother is one who won't let you down when you're in need, so they are our quilombo brothers", he concludes.

Açaí collection through the rivers of Pará

Arnaldo, mentioned by the quilombola Chico Muniz, from Gurupá, bears the surnames Andrade and Betzel. He is the brother of Gustavo Betzel, from the Benevides group, and currently leads the business of the Goola Açaí brand. A new attitude related with the peoples of the Amazon.

After the results of forest management in the communities of Gurupá and surroundings, the family of forest producers also saw the potential of açaí in the riverside regions of Pará. The industrial project of Goola Açaí started between 2015 and 2016 with the planting of açaí in Acará, a municipality in the rural microregion of Tomé-Açu, and the setting of the factory that turns açaí into deriving products, in Benevides, also in the state of Pará.

In Acará, the company not only plants açaí trees, but 95% of the açaí is bought from the hands of local riverside farmers and from over five communities in that area, in addition to other regions, such as Marajó, Amapá, Alto do Tocantins, Ponta das Pedras, Marajoí, and Cachoeira do Araí. Today, there are more than 450,000 açaí trees planted by Goola Açaí. Besides, the purchases of the fruit have created a new income source for over 47 families in the area.

"Nowadays you can find açaí all over the world, the demand grows more than the offer. And that offer does not increase year on year. Therefore, we began to buy from the communities, and we continue to do so. Now we're also investing in planting to make sure that we will have the fruit, providing workshops on planting techniques for the communities. We currently have more than 150 hectares planted, but we buy 95% of our açaí from the riverside communities. This is because we depend on nature, since the climate and weather affect the harvests. The fruit only comes 3 to 4 years after sowing", says Arnaldo Betzel, founder of Goola Açaí.

According to him, the industry in Benevides supplies açaí to 21 countries. A demand which, according to the company, has been growing beyond the offer, so it is necessary to buy around 20 tons a day from the riverside population.

"We hired a boat that goes from community to community through the river, buying cans of açaí. Each can we buy has an average 14 kg of the fruit, sold to us at R$ 40 to R$50 on average. The company spends R$ 50,000 to R$ 100,000 each day just in purchases of the fruit from the communities. Because we've been operating since 2016, the total we invest in buying the cans is much greater", the businessman stresses.

According to Arnaldo, Goola Açaí's purchases generate an average R$ 53,000 in sales per harvest for the local collector families. The industry currently buys açaí from the following communities, besides Acará: Vila Santa Maria I and II; Goiabal; Vila Vinagre; and Vila Jacarequara. In addition to buying açaí, the factory hires local labor, and has now ten employees from the locality linked to activities with açaí. Another 52 local residents were hired in other activities of the company, such as livestock, beekeeping, etc.

"Besides buying the fruit from the communities, we hire some of these people for the company's activities. We also carry out several social actions in these locations, such as workshops on planting, dental treatment; Christmas events and other celebrations, among others. That's important for motivation, not only in economic terms, but also to promote quality of life for the riverside population", he adds.

From Pará to the world

Today, Goola Açaí is a global brand with a factory certified in Brazil and abroad, thus confirming the quality of its product. Some of the seals are: British Retail Consortium (BRC), which is a certification related to the Global Standard for Food Safety; and Organic Product. In addition to fruit pulp, the company also makes sorbet (a water-based, milk-free ice cream).

According to Gustavo Betzel, approximately 70%-80% of products are made for export.

"In 2020, we set up our franchising system. We are now in the states of São Paulo and Minas Gerais, to resell the products across the country. Outside Brazil, we have eight shops in Portugal, in the cities of Lisbon, Porto, Cascais and Aveiro. We have an expansion program, and we have signed a deal to open more than 150 açaí product shops", he celebrates.

About Benevides Madeiras, Gustavo Betzel says that 60% of its production is sold in the domestic market, and 40% are directed for export. According to him, the lumber is exported to Belgium, France, Holland, United States, Portugal, the Caribbean, and China.

Forest management becomes an example in other regions

The forest management story – that it developed the economy and the quality of life of communities in the small Gurupá – is being repeated in other municipalities of Pará. In 2016, Benevides signed an agreement with the federal government, taking over the concession for the Floresta Nacional de Caxiuanã, an area situated between the municipalities of Portel and Melgaço, in Pará. The company also opened a branch in the municipality of Portel, in the Marajó area.

The new branch has also been mobilizing communities with job and income creation, as well as guidance for families in the municipality who, according to Gustavo Betzel, live in poverty, which affects specially the children.

"We are assisting associations in the city in several fronts, with special attention for children. In forest management, we have implemented a project in the Acangatá community – which is not formed by quilombolas, but by riverside people -, where we're building the same story as in Gurupá. We set up a primary healthcare unit and donated to the local association. The unit is now run by the municipality. It also implemented electricity and piped water, in a word, the whole basic and necessary structure, as with the quilombola communities", he adds.

According to Gustavo Betzel, Benevides built a basic care unit in Porto de Mós, in Pará, which encompasses RESEX Verde Para Sempre, an extractive reserve with an area of 1,289,362.78 hectares. "In this reserve, there are some communities, one of which is called Arurubar, where we built a basic care unit, bought an ambulance and drilled an artesian well. We've also donated tractors so that they could work in agriculture. The goal is to enable this community, like others we work with, to also develop, and that these families might have a good quality of life", he concludes.

Forest Management – Art, Luxury and History

"My life story is to rekindle forest art and combine it with contemporary are, without deforesting". This is a statement from Etel Carmona, a self-taught designer and entrepreneur in furniture manufacturing whose firm is certified by the Forest Stewardship Council® – FSC®, a reputable entity that monitors sustainable forest management. She was a pioneer in encouraging the purchase of wood from management areas and the first furniture maker certified by the seal in 2002.

The luxury furniture designer, who has traveled on mule back in the region, led rubber tappers to engage in training on forest management both for income and biome conservation.

Before becoming a symbol of design with certified wood, Etel began her professional path in the 1990s, restoring antiques in her small farm in the state of São Paulo

In 1985, she founded ETEL, a company specializing in furniture created by renowned designers and artists. The company now accounts for most of the re-editions of certified furniture created by Brazilian modernism masters.

In 1998, Etel began to engage in sustainable projects involving wood from forest management in the Amazon region and, consequently, with professional training for the forest peoples. According to Etel Carmona, the invitation to encourage forest management came from the Government of the State of Acre. At the time, the state was looking for support to convince rubber tappers that forest management was a more intelligent and profitable practice than deforestation.

"When I started to produce, I wanted to rekindle forest art and put it into contemporary art. I began a relationship with the forest and with social issues in Xapuri, Acre. The governor had a project there, in partnership with the FSC® (Forest Stewardship Council®), which sought to convince rubber tapers to use forest management, they needed to stop deforesting. My commitment to the project was to train them as carpenters and buy their wood in order to encourage forest management", Etel explains.

In the challenge of convincing Xapuri rubber tappers not to deforest, Etel engaged hands-on in the project to motivate the community. Together with forest engineers, the designer followed management workshops on mule back through the Amazon Forest.

"I went to Xapuri with the forest engineers and rubber tappers, about 25 men, and I was the only woman. I went after them riding a mule, while they walked on. I even skipped a stream on that mule in one of the tracks, and they'd joke that I was the forest goddess", she recalls, telling that those tracks were coursed during the practical forest management workshops, assisted by technicians from the Acre state departments, in 1998.

According to Etel Carmona, at the time, 30 to 40 families of rubber tappers began to work with forest management in Xapuri.

Sustainable furniture with art from nature

Still buying forest management wood, Etel Carmona says she has diversified her material with other organizations besides the FSC®, but all her wood is tracked and certified from legalized sources. Today, ETEL buys wood mainly from Orsa Florestal, which manages 545,000 hectares in the Amazon where it applies low-impact techniques – the company is considered a world-class model of sustainable management.

Indeed, Orsa Florestal was mentioned as an exemplary case by the Food and Agriculture Organization of the United Nations (FAO). It produces 100% FSC® lumber from over 20 native commercial species.

With 180 artisans trained, Etel Carmona explains that besides buying only tracked and certified wood, the company also makes pieces by reusing leftover material.

"In my factory, nothing is wasted or lost, except for the sander's noise. We use even the sawdust, and what's left we send to a cooperative that turns it into fertilizer", she stresses.

Today, the ETEL factory has resellers of craft furniture made from certified wood in Italy, Germany, Turkey, South Korea, Japan and the United States.

"Our work is not only to make a beautiful piece, but to know where it comes from, the social story of that material and its goal with sustainability", Carmona emphasizes, underscoring the importance of preserving the environment:

"Nature does not repeat itself, the wood itself is art, with its unique beauty. What we really need is to put into practice actions to always preserve. My motto is that I'm driven by the love of art, nature and man".

Photo: Arquivo Benevides Madeiras

A quilombola community that works with sustainable management in Gurupá, Pará.

Photo: Arquivo Benevides Madeiras

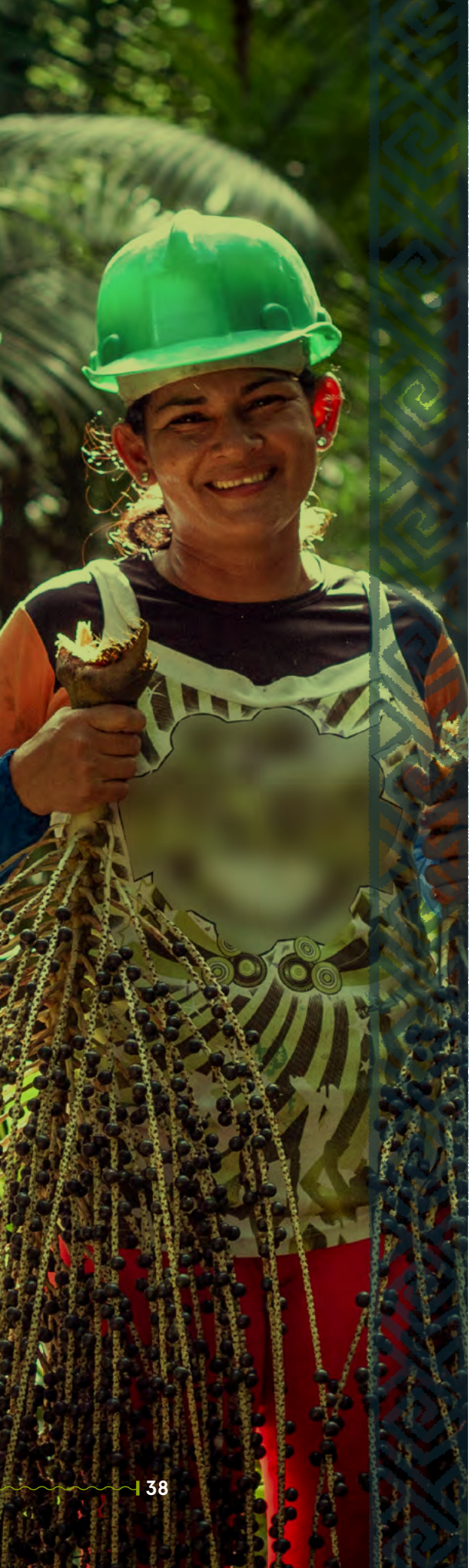
Forest management requires training and an interval of at least 25 years.

Photo: Arquivo Goola Açaí

Riverside producers of açaí who supply the fruit to the Goola Açaí industry

Photo: Arquivo Etel Carmona

Designer Etel Carmona in Xapuri, Acre, where she encouraged the beginning of sustainable management.



Açaí conquers the world and creates income for the forest people

Legend has it that an ancient tribe of the Amazon rainforest, located where today is the city of Belém do Pará, started to sacrifice babies to contain the growth of its population, because there was not food enough for so many people. The drastic action had been ordered by chief Itaki.

Not even the chief's family escaped from such a cruel order. One day, his daughter Iaçã gave birth a child that had to be sacrificed because of its very grandfather. The girl was inconsolable. After days crying, without sleeping, eating or leaving the hut, she raised her thoughts to Tupã, an indigenous god, begging for a solution that made that never again a child had its life taken.

Legend has it that Tupã was touched by the girl's pain.

One day, Iaçã hear a child crying and left the hut. To her surprise, she saw her baby girl next to a palm tree. However, the child soon disappeared. Iaçã was torn apart again. She cried until she lost her strength and died.

On the following day Iaçã's body was found hugging the palm tree. Chief Itaki's daughter seemed to be serene and even smiling. Open, her eyes seemed to be looking at the top of the tree.

Itaki saw a small dark fruit accumulated in bunches at the top of the palm tree at where his dead daughter was looking. It was the açaí. The chief ordered it was harvested and with it they made a thick, reddish juice, and the tribe started to be fed with that juice, thus ending the food shortage.

As an homage to his daughter, Itaki called the fruit açaí, which is Iaçã backwards. With a nice flavor and potent nutritional properties, the food ended the tribe's hunger.

From a legend to a consumption craze

From being a basic food of riverside populations in the north of Brazil, açaí has become fashionable. It has gained new ways of preparation, entered for good in the menu of diners and ice cream parlors all over the country thanks to its flavor and its nutritional properties. For those who have already tried it or heard of it, but do not know the food well, it is a Brazilian fruit cultivated mainly in the Amazon region. With a dark color, from purple to black and roundish, açaí is born in bunches and most of the times at more humid or flooded areas. The exotic delicacy has gained even more importance for the Amazon culture because, since it has become popular, its trade moves about R$ 40 million yearly.

And from one of the most isolated regions of Amapá comes the only açaí in the world with environmental certification. The result of the work of AmazonBai, a cooperative of small producers in the Bailique archipelago, located about 160 km far from the capital city Macapá, composed of eight islands where about 10 thousand people live.

"AmazonBai came up as a community protocol implemented inside the whole Bailique archipelago in 2013/2014. A community protocol is a consultation document made inside communities to dialog and compose a process of participative development process in the territory. It was discussed in the 51 communities. Based on the community protocol, demands came up to work with the production chains of açaí, fish, oils and medicinal plants", tells us Amiraldo Picanço, current president of the cooperative.

He remembers that in 2014 stewardship's good practices started to be promoted inside the territory. Over 200 families were qualified focused on generating minimum impact from harvesting and handling açaí. The families organized themselves during 2014 and 12015, when an opportunity of trading açaí in large scale came up. And at the end of 2016 the ***Associação das Comunidades Tradicionais do Bailique*** (ACTB), the manager of the protocol, was granted the FSC® certification, already mentioned in this book, an acronym standing for the Forest Stewardship Council, the only association in the world granted such recognition for handling açaí with verification of positive impact on ecosystem services of carbon and biodiversity.

The FSC® is an NGO present in over 74 countries which distributes one of the most recognized green seals worldwide. To obtain this certification, organizations have to follow strict rules: nobody works without a helmet, workers wear boots, protection goggles, machete in its sheath when climbing the açaí trees to harvest the fruit, and gloves to thresh the bunch.

"The association decided to create a cooperative targeting on performing in the açaí trade. AmazonBai was founded on February 14th, 2017. With that objective, it came up and started to grow inside the territory by buying açaí from the cooperative members. They were 37 at the beginning. As time went by, others adhered", remembers Amiraldo Picanço.

Since 2016, when it was granted the FSC® certification for forest stewardship, Bailique products have gained strength in the national market and abroad. In addition to removing middlemen from negotiations and exporting for the first time in 2017, the cooperative was able to put together a warehouse, The House of Açaí, which enabled selling the fruit in natura and the pulp certified.

Currently, AmazonBai has 132 members, more than 4 thousand hectares, and a certified area of community forest stewardship: açaí producers have felled less productive trees to adjust the intervals among the plants, thus easing sunlight to come in. Over one thousand trees have been felled, which will enable doubling the harvest.

The trees felled stay on the ground and serve as fertilizer. In December 2021 producers took another important step toward valuing the fruit, by inaugurating an agribusiness where açaí is already being processed into pulps.

Out of each can of açaí sold, 5% are reserved for an educational fund. In the future this money will be used both to build and to maintain a primary and high school for students of the region. Last year 8 thousand cans of açaí were sold, which yielded R$ 204 thousand, out of which R$ 10 thousand were sent directly to the fund.

The stewardship of the açaí plantations ensures the maintenance of the forest coverage and, consequently, of the conservation of carbon stocks and preservation of the diversity of species. Thus, valuing Bailique's açaí performs a fundamental role in the generation of important ecosystem services, while the FSC® certification contributes to increase these benefits and maintain them for good.

Açaí's properties

Açaí exploration is extremely important for the whole northern region of Brazil, particularly for the states of Amazon, Pará, Rodonia, Amapá and Acre. The activities encompassing the trade of the fruit have had a significant increase since 1992, the summit of its exports. The growth happened mainly due to the increase in the international pressure for the preservation of the Amazon rainforest.

Additionally, there was incentive to prioritize the stewardship of the native açaí trees, thus making it the main activity and contributing to decrease deforestation and fires. It also occurred to have workers change their focus from illegal wood extraction to açaí harvesting.

Açaí pulp is full of nutrients: iron, calcium, phosphorus and vitamins. With a distinctive flavor and nutritional properties, it pleases other regions of Brazil, and even the international market.

The fruit's importance for the Amazon culture goes well beyond feeding people: it is also used in the cosmetics and aesthetics areas due its high antioxidant power – which prevents precocious ageing and protects the skin.

Açaí stimulates the local economy, but production is insufficient

According to a report of the national company of supply (Conab), published in March 2022, the dynamic of the açaí market has been characterized by an increasing demand higher than the offer, which has been pressuring prices, mainly with an increase in exports.

Let us check what the report says: "The açaí market in Pará, the biggest Brazilian producer, has been undergoing structural changes in the last years, both as to consumption and elaboration of new industrialized products, and in the production system. Brazil is the biggest açaí producer and the biggest exporter of frozen pulp, but there is still a long way to go when the subject is diversity of açaí-based products. The verticalization of the açaí chain is one of the main aspects that needs to be worked in that fruit's production chain, for the purposes of increasing the fruit producers' income and helping to consolidate it in the international market. In the case of açaí, verticalization assumes the production of the highest number possible of varieties of açaí-based products. More control over the production chain and inventory by using proper technology is something necessary that can ease the domain over the production".

The açaí crop in Pará arrived at the end of December, starting the year in the off-season crop. The

prices in the state had a variation typical of that period, a 29.5% increase from December 2021 to January 2022. However, in the annual comparison, the off-season crop in the state started with a 17.56% drop in the fruit's prices in the state of Pará on average.

According to information rendered by representatives of the producers, in the region of Baixo Tocantins in Pará, one of the biggest açaí producing regions in that state and, consequently, in Brazil, there was a large production of the fruit in the last crop, and expectations are that there may be an increase in the volume produced related to 2020.

In 2020 açaí production was 1,698,657 tons, 4.79% higher than that in the previous year, however, still lower than that in 2018, when production was 1,731,668 tons (the biggest in the whole historical series assessed). Ass to the value of the production, in 2020 the index was the highest in the whole historical series, recording a 79% increase related to 2019 in the total production value. With that the price of one kilo of açaí grew from R$ 1.85 in 2019 to R$ 3.21 in 2020. That behavior probably results from an increase in demand over the offer of the fruit. We can observe that the increase in açaí production in the Brazilian market has been occurring in consecutive years.

For the last years, except for an inflection point from 2018 to 2019, when there was a 6.2% decrease in the total volume produced, we can say that the exponential growth in production mirrors the increase in the fruit market.

Other indicator related to the increase in production is the area cultivated. Except from 2017 to 2018, the increase in the açaí production area, from 2015 to 2020, occurred in consecutive years, totaling a 61% increase in the period. However, it did not necessarily mean a proportional increase in production.

Photos: Divulgação Amazon Bai

Local açaí producers

Açaí production increased from 2015 to 2020 consecutively

AmazonBai's meeting of cooperative members

Pirarucu: the fish that sustains the riverside families

For good reason the pirarucu is the second largest freshwater fish in the world. The first is the beluga sturgeon, but the ***Arapaima gigas***, the scientific name of pirarucu, has become larger, not for its size, but for its importance to the Amazon. Today, the pirarucu sustains the riverside families and helps to keep the forest standing. That's right! A freshwater fish can contribute to preserving the forest, its lakes and other species through sustainable fishing management.

This story can be verified in the sustainable development reserve (RSD) of Mamirauá, a protected area situated in the state of Amazonas, in the mid-Solimões region. This is the largest forest reserve in Brazil solely dedicated to protecting the Amazonian floodplain, where pirarucu management has become the main economic, social and environmental activity in the region.

The giant, which almost disappeared from the Amazon in the 1990s, has escaped extinction risk to become a major income source and a reason to preserve the forest. In order to rescue the species, one of the first bodies to foment pirarucu fishing management was the Mamirauá Sustainable Development Institute, which created in 1998 a fishing management project for the species.

The Mamirauá Institute is a social organization (OS) fomented and supervised by the Ministry of Science, Technology and Innovation which conducts research, natural resources management and social development programs, particularly in the mid-Solimões region, in the state of Amazonas. The program was created to promote the conservation of fishing resources through participatory management.

Photo: Ricardo Oliveira – Inst. Mamirauá

Since then, other fisherman groups have become fishing managers, and other institutions have joined programs for the conservation of the species and subsistence of the Mamirauá peoples. One of them is the Foundation for Amazon Sustainability (FAS), which holds workshops and monitors fishermen, teaching them all the management steps: from watching over the lakes to counting the species that are repopulating Mamirauá, bringing awareness, sustenance and hope back to the riverside families.

Fishermen become guardians of the lakes and the forest

With its motto of caring for people and the forest, the Foundation for Amazon Sustainability was founded in 2008, headquartered in Manaus (AM). This is a non-profit organization that runs projects in education, entrepreneurship, sustainable tourism, innovation, health and other priority areas. Through the valuing of the forest and its sociobiodiversity, the FAS develops work that promotes the improvement of the quality of life of riverside, indigenous and underserved communities in the Amazon.

To that end, according to Edvaldo Corrêa, manager of a FAS preservation program and coordinator of managed pirarucu markets, the organization began to support production chains in conservation units (UCs) in the Amazon in 2010. At the time, with resources from the Amazon Fund, the FAS began to work in a territory with 16 units under a cooperation agreement with the Government of the State of Amazonas and the State Environment Department (Sema). They soon began to promote incentive programs to improve the quality of life of local populations in these 16 units.

Before creating the pirarucu management program, Edvaldo Corrêa explains that a transfer payment program was created, which consists in payment for environmental services (PSA) by means of direct transfers to these families. Until 2020, the payment, which was R$ 50 to each family, benefited 9,000 enrolled families. Today, the program pays R$ 100 as compensation to those who participate in FAS projects, contributing to conservation.

"We realized we had to strengthen extractive associations, empower them and help with community infrastructure in terms of health and education, in addition to income generation.

It was necessary to improve the productive chains that already existed in the units, from family agriculture with açaí, Brazil nuts and other fruits to rubber tapping, lumber management and pirarucu fishing. We then decided to invest in those production items and discovered that of the 16 units we worked on, five were already fishing pirarucu, but they needed to develop so that managers could add value to their product and have a better quality of life", Corrêa explains.

A resident of the municipality of Fonte Boa, situated in the territory of the Mamirauá reserve, the fisherman Edson Carlos Gonçalves de Souza, 40, currently a supervisor of the FAS pirarucu management project, remembers the period when the fish was at risk of extinction, while he and other fishermen felt desperate, not knowing what to do. "I grew up seeing boats of rich landowners, who even would lease their lakes and catch all the fish, that is, all the production we needed. Slowly, the fish disappeared, and managing became a necessity" he explains.

Besides the Mamirauá reserve, another four UCs were identified by the FAS where pirarucu fishing was already an activity. These were the sustainable development reserves Cujubim, Acari, Piagaçu-Purus and Amanã. In these reserves, according to Edvaldo Martins, the FAS identified the need for structure and techniques to manage the fishing of the giant fish.

"Given the situation, we decided to raise funds to support those families. The Brazilian Development Bank (BNDES), for example, was our partner for 7 years in this project. Then other partnerships came. At the time, we identified a deficiency of basic pirarucu fishing equipment such as canoes to carry the species, which weighs around 50 kg; the gillnets used for it, quite expensive ones; and the 'floats', a type of boat used in the protection and vigilance of lakes and the fish", Edvaldo Corrêa describes, noting that there are various rules and stages to this management, including the right fishing period.

The pirarucu is protected by Normative Instruction 34, of June 18, 2004, from the Ibama, which sets general rules for the fishing of the Arapaima gigas in the Amazon River basin. According to the rule, annually, the catch, sale and transportation of pirarucu is forbidden according to the schedule in these states: Amazonas, Pará, Acre and Amapá, from December 1st to May 31; Rondônia, from November 1st to April 30th; and Roraima, from March 1st to August 31st.

"After the species became endangered in the 1990s, there was a guidance campaign for the communities. People then started to understand that if they didn't take the protection steps, they and the next generations would no longer have the pirarucu for food, let alone for sale", Edvaldo Corrêa stresses.

In turn, Edson de Souza, a fisherman and the project's current supervisor, recalls that, in the beginning of the process, things were difficult, since they couldn't fish pirarucu for two years in a row due to the closure of lakes.

— We embraced the case and took the risk. We stopped all fishing activities in 45 lakes for two years in a row, waiting for the areas to recover. That's when the management united all fishermen, since we lived on fishing. We began to fish other species in rivers, just for subsistence. If somebody was struggling, one family would help the next. We shared even our sugar, but it was worth it because we saw, within a year, the lakes beginning to recover.

In the first year there were over 100 pirarucus already. We realized that management wasn't just about repopulating, it was about planning that worked – explained the supervisor, recalling that he and the other fishermen attended FAS meetings and training courses where they learned the techniques of fishing management.

According to Edvaldo Corrêa, the management of pirarucu requires planning divided step by step between the managers: "The defense and the watch on lakes are essential steps, which can be organized by community or sector. Each sector is formed by four to six communities due to the distance from one another in the Amazon. In this first stage, they organize in turns. In lake flood periods, using a float donated by either the FAS or other partners, the fishermen take turns watching the lakes to prevent invaders from to fishing in their areas", he details.

According to Edvaldo Corrêa, each unit has a creation decree, which restricts fishing by residents from other municipalities. "They have an agreement between the community and the managers for the management plan, whereby only fishermen residing in that unit, trained in management, can fish in the area. Another management step is the count, which gives the number the Ibama will use to determine quotas for the amount of pirarucu that fishermen are allowed to catch" he explains.

Still according to the coordinator of managed pirarucu markets, the Ibama determines the quota according to the count of species, and the Amazonas State Environment Department, which is responsible for the territory, issues a validation report for these parcels.

"Each group formed to fish pirarucu has an X amount determined for the activity, which varies ac-

cording to the place. This is done after the process of count of pirarucus. First, the fishermen zone the lake, dividing it into: nursery, which is off limits for fish exploitation as it is considered for reproduction ends, where the smaller fish are; the maintenance area, where fishing activity is allowed year-round for subsistence; and the lakes, destined for commercialization", Corrêa exemplifies.

The watch and the giants' ids

Another important rule pointed out by the FAS manager Edvaldo Corrêa, according to Ibama regulation, is that pirarucu has a minimum size to be fished. Legally, fishing is allowed only for fish larger than 1.5 meter, and forbidden for smaller sizes. In this restriction category are the so-called ***budecos***, the nickname given to the smaller fish by the fishermen.

And you must be wondering, how can they measure and count pirarucu under water, right? In an almost unbelievable way, which requires a lot of patience and dedication. According to Corrêa, pirarucu count is carried out using a technique created by the residents themselves, which in fact was scientifically verified through research conducted by the Mamirauá Institute.

"They count pirarucu when the fish is floating on the water surface, because this species comes up to breath each 20 minutes. At that moment of the so-called ***boiada*** (`floating'), the fishermen count each fish. They stand around the lake, 20 meters apart from each other in order to watch. Within that range, they can see how many pirarucus come up to float each 20 minutes. They write the number down. In this way, observing how high the fish rise to breath, the fishermen calculate and distinguish whether the pirarucu are big or small", Edvaldo Corrêa details.

After this "fish watch", the managers gather to compile a list with the numbers and respective identifications. The finished reports are sent to Ibama, which is responsible for defining the amount permitted for fishing. According to Corrêa, the agency authorizes 30% on the count of large fish classified as adults for each group of fishermen.

"After the authorization, the next step is the harvest, a procedure that removes the fish from the cultivation unit based on the commercial size desired. Everything is carefully planned, since the fish can weigh 50, 60, 120, sometimes 200 kg, it varies a lot. You have to organize what each person will do at fishing. However, the general average is 50 to 60 kg", the FAS manager explains.

For the harvest, the group of managers splits into several tasks: one team for fishing; and another to carry the fish on their back and transport them on canoes to the first float, where the treatment is carried out. There, a third team will remove the innards, which is the evisceration process to clean the fish. Then, the pirarucu will be measured and weighed and have its sex determined. Finally, the fish is sealed with an identification number.

"Each pirarucu has a seal with a sequence number, like an ID, with the name of place, in this case, the UC where it was caught, along with other data. After sealed, it is put on cooled boats, which serve as provisory storage before it is commercialized. It's a joint effort", Edvaldo Corrêa adds.

And whoever thinks these management teams include just men is truly mistaken. The female public is also engaging in this fishing activity. The fisherwomen are still a minority in this milieu: five women to 33 men just in the group from the municipality of Fonte Boa, in the Mamirauá Reserve. Among these five women is Maria do Rosário Seabra de Freitas, 47, who comes from a fishermen family and has been involved in

her parents' work since she was 10, to guarantee her own food. In the management work, Maria do Rosário Freitas won't carry pirarucu on her back, but she is responsible for the harvest stage, and the cleaning of the species of 50 kg and larger than 1.5 m.

"Before this, I was doing odd jobs, side gigs. Today we're living on pirarucu fishing. A while ago, the fish was only for food, now we make ourselves an income from it. With the management and sales, we were able to build a house, buy appliances like a refrigerator, and we've also learned to preserve and care. That's preservation, taking care of the future to come. That's what matter to us", Maria do Rosario stresses.

Edvaldo Corrêa says that the managers, men and women, are trained, and each year they attend refresher workshops covering an evaluation of the management steps, particularly regarding the count of pirarucu.

"After the management, we started a training course on beneficiation with them. Recently, the FAS focused on a group of around 200 residents of the Mamirauá Reserve, situated in the municipality of Juruá (672 km from Manaus). There are over a thousand managers there who should watch and monitor these activities. Our aim is to always analyze how each group produces and markets, in order to help them develop their product's value", Corrêa explains.

Corrêa points out the ramifications of this experience with 200 people. "In that initiative we learned that they were fishing, taking out the entrails and selling on the middleman boat the entire fish, in their own way, at any price. The price was low because the fishermen were unable to even store the fish, so they were devaluing their own work. So, whatever they caught, they had to sell it quickly. Given this scenario, we set up a partnership with MBA students from the Notre Dame University, in the US, who came to the Amazon to find a solution both for the FAS fisherman support and the pricing of pirarucu in the community in question. Then we began to structure commercialization by the managers", he comments.

The guardians of Arapaima gigas become entrepreneurs

Considering from the production chain to the market end, and thinking about the population and development, Edvaldo Corrêa, the manager of the FAS forest preservation project, said that the foundation began to structure the way in which pirarucu was sold. To that end, boats and storage means were acquired in order to improve logistics and support the managers in Mamirauá. A new strategy to divide the ways of commercializing was also implemented.

"We divided the pirarucu in order to raise its price. We began to sell the fish in parts: fillets, bulk pieces, carcass, and even the skin. That way, we set up a cold storage structure to store and sell sliced pirarucu. From then on, pirarucu ceased to sell at R$2.50 to R$ 3.00 a kilo. We managed to add value for the managers, in addition to approaching large companies and fish processing plants. Now, the managers sell the fish at R$ 9.00 a kilo", shows Corrêa.

Today, according to the FAS manager, the fishing managers are able to make even more than the minimum wage value from pirarucu fishing. According to him, depending on the group fishermen and the amount of fish they catch, the activity can yield up to R$ 5,000 for each manager.

"We began to see people's houses improving. The fishermen began to send their children to school. I myself took a fishing technician course, which helped me become the head of a sector. Fishing management has opened many doors, but most of all, we learned to legalize and value our own work. Before, as

I said in the beginning, we'd see the bigger sellers taking our fish away. Now that the FAS has taught us to value our work, we keep ahead of these sellers. They'll buy the fish from our hand", recalls Edson de Souza, who continues to work as a fishing manager.

Pirarucu gets the stalls up and spins the economy in the forest

To boost pirarucu sales even further and improve income generation for managers, the FAS began to organize pirarucu street markets in Manaus, the Amazonas state capital. According to Edvaldo Corrêa's account, the markets started to be held in 2021. At the time, six markets were organized, with sales totaling 30 tons of pirarucu at higher values than those they charged from fish processing firms. In this way, they developed the managers further as fishing entrepreneurs, besides generating profit for the families.

"All revenues from pirarucu sales go to the families, who participate in the management actions. That benefits the fisherman and the communities", comments the FAS preservation program manager and market coordinator Edvaldo Corrêa.

Pirarucu sales through the FAS are supported by the Ibama, the Amazonas State Environment Department, the Institute for Sustainable Development of Fonte Boa (IDSFB) and the State Rural Production Department (Sepror-AM). The initiative is the fruit of a partnership between the FAS, the association of Mamirauá residents (Amurman), and Bradesco.

The most recent pirarucu market was held in early October 2022. That time, the sale prices per kilo were R$ 19 for chunks, R$ 28 for fillets, R$ 14 for ventreche, and R$ 7 for carcass. The event was held at the FAS building in Manaus as the entity is responsible for organizing the markets. Five tons of fish were sold, and the money went to the 36 families from the Nova Esperança and Costa da Ilha communities who participate in the activities guided by the institution.

"After the management started, they began to have expectations of better quality of life through legal fishing. They've come to value work that they had been doing, but now they are empowered fishermen. Not to mention the improvements that management brought to the area as other species also began to repopulate. Therefore, each year, the fishermen have been looking beyond the limits of fishing, positioning themselves better in relation to the firms and defending the whole ecosystem, which involves the pirarucu environment", says Edvaldo, who emphasizes: "That's the FAS mission, to teach the fishermen to not just sell pirarucu carelessly, but to actually engage in sales. The new reality enables well-being for themselves, valuing their own work and helping to keep the forest standing"

Pirarucu management gets international recognition

João Campos Silva, a biologist from São Paulo, received a prize from Rolex, the Swiss luxury watch maker, in 2019, for the implementation of pirarucu management in the Juruá River area, in the state of Amazonas. João Campos Silva demonstrated that pirarucu can be saved through an action in the Juruá River, in western Amazon, which was the closing of small lakes connected to rivers, combined with fish stock management by the local population. The measures resulted in species recovery, multiplying by 30 the number of pirarucu.

That recovery improved fishing significantly. Now, each lake generates an average R$ 45,000 in annual extra income for local communities. Moreover, the result of the project contributes for the creation of

schools, medical service, and jobs. The perceived change in the lives of those people has led communities to engage more and more.

"Local communities have been contributing for the recovery of the largest scaly fish in the planet", says the biologist, considering that "saving the Arapaima from extinction is also an antidote to poverty".

João Campos Silva began to study the ecological, population and migration dynamics of the giant fish across the region, implanting microchips and monitoring 30 individuals by radio waves. Besides pirarucu, by closing lakes to hunting and fishing, the project brought back other species that were endangered in the region, like the manatee, the giant otter, the amazon turtle, and the black caiman. "I believe that community pirarucu management is the most powerful instrument we have to ensure a sustainable future for Amazonian floodplains".

How the recovery of the pirarucu began

Today, according to the Mamirauá Institute, over 200 organizations work with pirarucu management in the state of Amazonas, providing advisory and helping manager groups in different sectors, whether in the Mamirauá Reserve or other locations in the forest. Specialists and fishermen are thus coming together for one purpose: to protect the species and their own family, since they live on pirarucu.

Before this initiative spread, the organization that pioneered the implementation of pirarucu management on fishing activities in the Amazon was the Mamirauá Institute, which began with a pilot project in the São Raimundo community, in the Jaruá sector of the Mamirauá Reserve, in 1998, a time when the Arapaima gigas was disappearing from the waters.

"Commercially, pirarucu fishing was already forbidden since 1996, due to two pieces of legislation from Ibama setting the possible periods in the country's North Region, but the state of Amazonas was the only one with year-round restriction. So, in the period from 1996 to 1999, when fishing had been banned, the Mamirauá Institute launched a series of studies and research to design a sustainable use solution to resume commercial exploitation by that people.

So, a pilot project was created in 1998 to be executed the next year, following the basic premises, which are: respecting the size and management adjustment measures, such as setting a 30% quota, monitoring, among other actions", explains Ana Cláudia Torres, the coordinator of the institute's fishing management program.

The program coordinator adds that, at first, the project was rejected by Ibama, but it was reformulated and approved, with the first managed fishing occurring in 1999.

Ana Cláudia Torres remembers the first challenges to the implementation of management in São Raimundo, starting with awareness raising for the local population.

"The first key measure was to establish a pact with the community about the need to suspend pirarucu fishing. We had to obtain a commitment from the community, which had to suspend fishing, because even with the Ibama prohibition in 1996, the activity continued in São Raimundo, as well as in other areas.

So, our argument to convince them was that fish stocks were already scarce, as proven by monitoring data from the Mamirauá Institute, and we would support them in catching other species, to solve immediate needs, while we waited for pirarucu to recover. At the time, the institute even created financial incentives to support them in selling other species and carrying that production up to Manaus, were it could get a better price", the coordinator details.

According to Ana Cláudia Torres, the fishermen in São Raimundo stayed from September 1998 to the first semester of 1999, almost a year, without fishing pirarucu, waiting for the repopulation of the species. In that period, training was provided not only for the population of the Jaruá sector, but so that other communities might also learn the management.

"We always held training about the management model proposed, covering courses on best fishing manipulation practices. We also provided training to kickstart production monitoring, in order to secure licensed fishing permits from Ibama, issued annually, and to have sustainable fishing quotas granted. These authorizations were only possible after a survey of the number of species, through constant monitoring by a collective of fishermen", Ana Cláudia Torres underscores.

The coordinator stresses that there is no such thing as individual fishing in pirarucu management." The authorizations are issued to the name of a community association or group, because pirarucu fishing is done collectively and divided into tasks, each team being assigned an activity", the coordinator recalls, referring to the monitoring, fishing, transportation, cleaning, and even sale stages.

According to Ana Cláudia, the organization provides advisory to 12 fishing management groups, five of which in the Mamirauá Reserve, four in Amanã, and three fishing agreements. Other management institutions also support fisher groups, but most have received training from the Mamirauá Institute during the implementation of the activity.

In 2022, according to the coordinator, just for those 12 projects advised by the institute, the management production totaled over 3,500 fish, an estimated 700 tons of pirarucu. About the population of this species, after management-based recovery, according to the latest count by these 12 groups, more than 155,000 pirarucu, between the young and adult stages, live in the rivers of the state of Amazonas.

Still according to the organization, since 1999, the implementation of collective management helped to increase by approximately 427% the natural stock of the species, besides becoming the main income source of fishermen in the region. That is the result of mutual, constant cooperation between man and nature, proving that unity is strength.

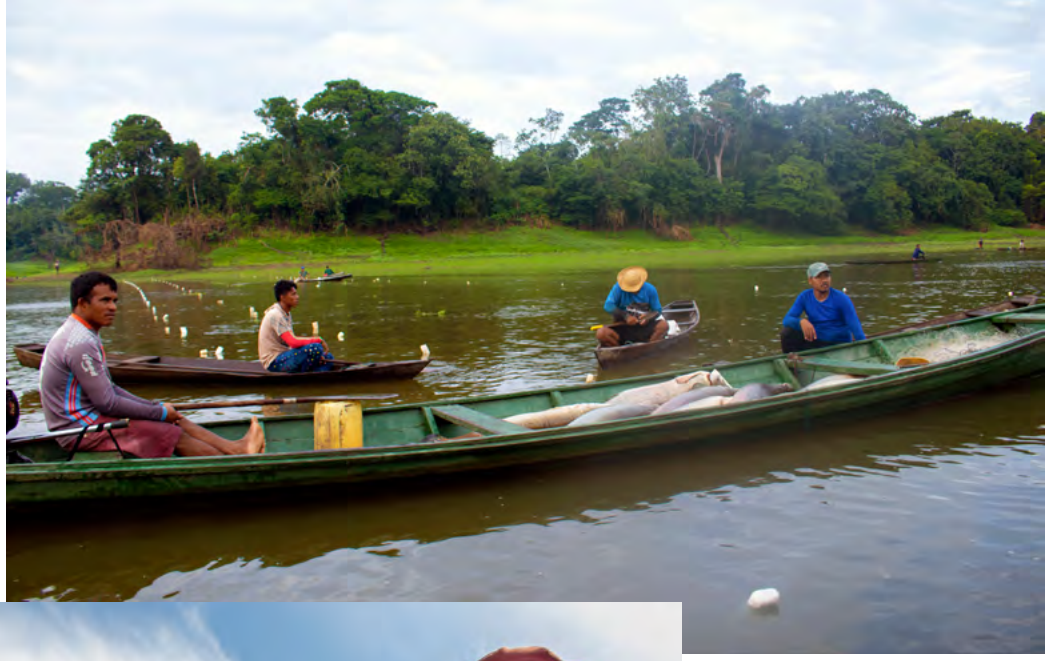


Photo: Arquivo FAS

To measure the size of pirarucu, the fishermen keep watch in lakes

Photo: Bernardo Oliveira – Inst. Mamirauá

The Arapaima gigas (pirarucu) can reach 2 m in length and weigh over 50 kg

Photo: Arquivo FAS

Pirarucu market in Manaus, Amazonas, in October 2022

Photo: Pedro Guerreiro

The Marajó Island or the Buffalo Island

Can you imagine your garbage being collected by buffalos? Buffalo-mounted police officers in "buffalo patrols"? Well, on the Marajó Island, in Pará, the buffalos do the job. The animal that seems exotic in other regions and known only for being the origin of cheese and dairy products, on the Marajó Island they are as common as humans. According to the 2020 IBGE data, in the state of Pará there are 605,110 buffalos in the effective herd, and just on the Marajó Island, 422,348 heads. In Soure, a tourism village in the archipelago, the number of buffaloes is higher than that of inhabitants: there are 25,752 people, according to the 2020 IBGE census, and over 95 thousand buffalos currently, according to the Pará association of buffalo breeders (APCB).

It is a curious story about how those animals originally from India ended up in an island in the Amazon. Since then, buffaloes have been the main means of the archipelago's socioeconomic development, in addition to their being pets for the whole population.

In Brazil, four breeds are recognized by the Brazilian association of buffalo breeders,(ABCB): Mediterranean, Murrah, Jafarabadi (the river buffalo) and Carabao (the swamp buffalo). Each one of these breeds has their own characteristics, but all of them are quite charming for their gentleness.

According to the food technologist and technical responsible for the Mironga Farm in Soure (PA), Gabriela Gouvea Moura, in addition to gentle, those animals have other important characteristics: they have few diseases, they are expert

swimmers, and they are quite fertile. And it was with those peculiarities that the buffalos arrived in the Marajó Island: by swimming!

According to historical reports, in the XIX century the buffalos were on a ship going to French Guiana, but it sank near the Marajó Island, which made them swim as far as the nearest dry land. When the usefulness of the animals was realized, the local farmers decided to import more buffalos.

In the version of the Brazilian association of buffalo breeders, the first introduction of the animals in Brazil happened in 1890, by Dr. Vicente Chermont de Miranda, who bought buffalos of the Carabano breed for the Marajó Island, which belonged to fugitives of the French Guiana whose ship had sunk on the coast of the archipelago – a fact that agrees with the story told by the region dwellers.

Still according to the ABCB, in 1895 Ms. Leopoldina Lobato de Miranda, and her children imported Italian buffalos for Marajó. Both introductions originated the black buffalo of Marajó.

According to data of the national association, currently Brazil has the biggest herd in the West: 3 million heads. Out of those, a significant number of animals are in Marajó, in the extreme north of the country.

Soure, the "Capital City of the Buffalos"

This is how the county of Soure, on the Marajó Island, is known. The nickname comes from the expressive number of animals, higher than those of inhabitants. According to the ABCB, today there are over 95 thousand buffalos in the city, while the population is a little over 25 thousand. There are 320 breeders of the animal associated to that entity. And the reason of this large population of bubaline is beyond the reason mostly accepted: production of cheese with their milk, the origin the famous and noble buffalo mozzarella. Additionally, the animal, which is loved by everyone, has become the main means of transport and of the economic and social development of the county.

In Soure, buffalos are used to collect the city garbage in carts, and when they come back, they bring sand and stones for construction work in the city. There are over 100 waggoners. The Military Police also has a buffalo patrol enabled by donations of breeders and associates. Ultimately, buffalos stand for the life in the county, based on the supply of high-quality protein both with their meat and milk and other dairy products and with their image, its being the Marajó's identity. Not to mention that it is an extremely friendly animal deemed by the Food and Agriculture Organization (FAO) of the United Nations as the most docile domestic animal in the world", stresses Joao Paulo Mota Melo da Rocha, the ABCB president.

According to reports of Joao Rocha, buffalos have been donated to the Brazilian Army at its military bases at the borders, and to the Soure Police, among 12 to 14 animals donated by associate breeders. About the production of dairy products, a liter of bubaline milk costs R$ 3.00 to R$ 3.50 on average. It is deemed one of the main sources of income in the city. The Mironga Farm is one of the most famous for its buffalo dairy products in Soure.

According to the farm's technical responsible, there are about over 200 families which depend on buffalo breeding, in addition to cowboys, those in charge of stewardship, and tourism professionals.

"Currently, just at Mironga Farm there are 100 animals, and we rely on 12 employees to work with buffalo breeding, dairy products, handling poultry, and tourism. Breeding those animals involves free feeding, abundant water, and conditions able to favor thermal comfort for them. Monthly we produce 250 kg of Marajó cheese, 50 kg of buffalo milk butter, and 80 kg of sweet of buffalo milk", details Gabriela Mora, add-

ing that breeding those animals does not demand any restrictions: "Their main characteristics are rusticity, few cases of diseases, excellent swimming skills, and fertility", she stressed.

Technology expected to increase reproduction

The Amazon foundation of support to studies and research (Fapespa) of the Government of the State of Pará published the birth of the first heifer by means of an in-vitro production technique, i.e., via artificial insemination, in December 2021. The news comes from the central project of biotechnology of bubaline production in the Marajó Island, whose objective, according to the Fapespa, is to promote genetic improvement of the bubaline herd.

The process is developed in the counties on the island located in the mesoregion of Marajó. The birth of the first buffalo heifer, which was generated based on the in-vitro embryo production technique (IVP) took place on the Marajó Island, at Paraíso Farm, in Cachoeira do Arari.

Djair Barreto and the Marajó's essence

From personal pictures to the rustic characteristic of the buffalos of Marajó. Born in the county of São Sebastião da Boa Vista, Marajó archipelago, Djair Barreto, just 27 years old, is known for his images posted in the social networks and jobs done in the county of Soure, on the Marajó Island. In 2017 he graduated in Natural Sciences with major in Biology from Pará state university (UEPA), but it was in photography that he found his talent.

He started by using a mobile phone and created the "Mobile Photography" website with hints and tutorials on how to make better pictures with mobile devices. In 2017, still with his mobile, he had his first magazine cover in the July special issue of the Pará+ Magazine.

Currently, he works as a photographer and with events in general. In addition to his passion for traveling, working as a photographer has led Djair to create the "Essence" project in 2019, which approaches peculiar pictures of stories of the Marajó people.

One of those stories told with a photography album is that of the young Romulo and his buffalo Pepe, who from a tourist transport animal became the family pet.

A family buffalo

Based on the watchful look of the peculiarities that the Marajó people have of the nature and of the animals, Djair Barreto registered a unique story through the "Essence" project. Romulo de Carvalho Alves, 28, was raised with a buffalo tenderly named Pepe. The bond between them is so unique that it makes us forget that a buffalo is a wild animal weighing over 1 ton.

Romulo is a guide of tourist tours with buffalos, the main activity of his family and of the county of Salvaterra. His first contact with buffalo Pepe was when his father bought it to use it as transport in tourist tours, which is common in Soure and Salvaterra. However, when Pepe arrived, he was wounded and could not transport anything, and its condition touched Romulo.

"Its hoof had holes, it was wounded, it could not work in tours. Then my father wanted to sell it, but I could not agree with that. I ended up by buying the animal from my own father so that I could take care of it", tell us the tourist guide, remembering that Pepe arrived when it was 3 years old at his home, and today it is 10.

According to Romulo, buffalos are common animals in Marajó, which attracts the tourists. He comments that tours on the back of the animal is a frequent activity in the region. However, not always the animals are properly cared by their owner.

"When I took care of Pepe, I used the knowledge I had acquired at the time when I worked with a veterinarian. There are many important instructions. Despite large and rustic, the animal needs care during the tours, such as related to the fact that they float on the rivers. The guides do not know to guide them, they put tourists on the animal's back while it is supposed to swim, but it floats. Then, if you love the animal, you will not mistreat it. You will take care of it and have it be more than a riding carriage", warns Romulo.

Pepe is not the first family buffalo of tourist guides. According to Romulo Alves, before Pepe he had Jaco, which lived 42 years. Romulo's family has worked with tourist tours with buffalos for 20 years. According to him, he takes care of the buffalos as if they were pets.

According to that guide, buffalo tours, traditional in all counties of the Marajó Island, cost from R$ 100 to R$ 250, depending on the county. Tourist tours go from the woods, mangroves and lakes to the archipelago's beaches.

To photographer Djair Barreto, Marajó is an inspiring and paradise place, with colors, shapes and textures, from the field to the mangroves, to the beaches, in addition to the humble and warm people who interact with the nature.

Photo: Djair Barreto

Photo: Pedro Guerreiro

Despite their size, buffalos are gentle animals

Photo: Djair Barreto

Buffalo cheese producer of the Mironga Farm, Marajó, Pará.

Photo: Site Oikos

The Marajó Island has paradise beaches with fresh and salt water.

Rubber builds the history of the Amazon with trees that bleed

The economic history of the North Region of Brazil confounds itself with that of natural rubber. A product obtained through extractivism, it constitutes a permanent and essential activity for thousands of communities in the Amazon Forest.

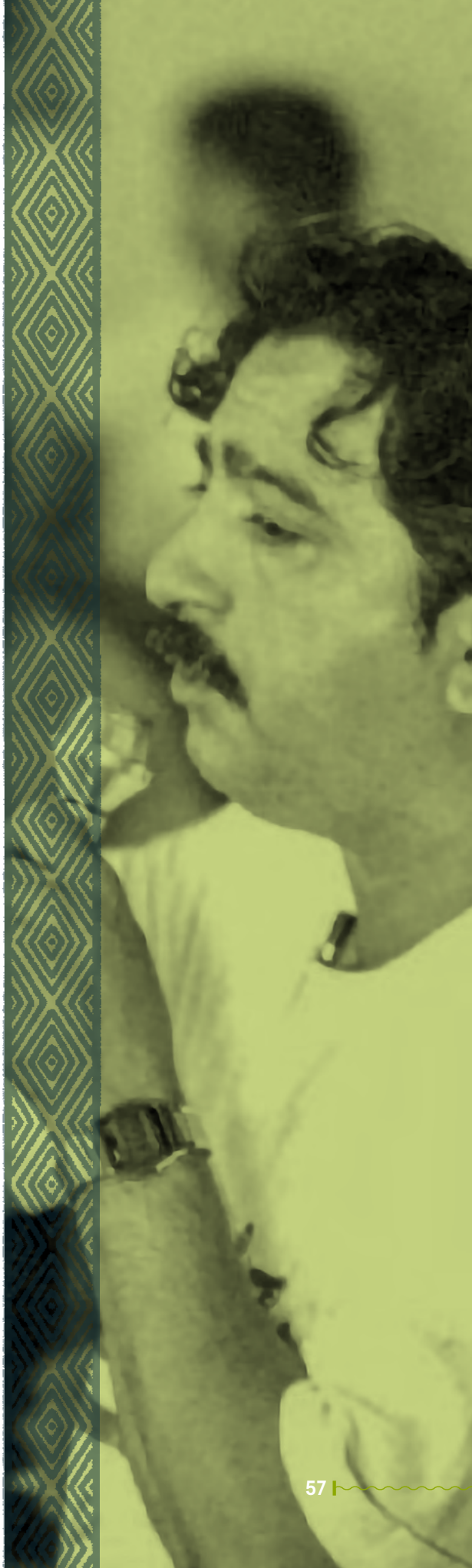
Natural rubber comes from latex, a thick white liquid extracted from the rubber tree, a plant native to the Amazon Region. Along with steel and oil, latex is a strategic and sustainable raw material, forming the basis of many industrial processes. It is a milky sap produced in the bark of the rubber tree, the raw material of natural rubber and fundamental for the manufacturing of more than 40,000 products used in our day-to-day: tires, toys, accessories, shoes, auto parts, in the manufacturing of surgical gloves, syringes, catheters and capsules.

The tire industry is the largest consumer of this raw material. In Brazil, 80% of the rubber obtained in the rubber estates are destined for tire manufacturing.

The country was, until the 19th century, the world's main supplier. Today, it has only 1.5% of this market, according to data from Abapor, a major Brazilian tire manufacturer association.

Presently, the Brazilian states that are home to the Amazon Forest account for a tiny share of the national rubber production, less than 1%. According to IBGE data, the state of Pará produced 1.412 tons in 2021, followed by Acre, with 169 tons, and Amazonas, with 22 tons.

The tapping of the rubber tree is the symbol of extractivism in the Amazon, especially in Acre, and it originated large mi-



gration movements which occupied the region, called "rubber cycles". The most significant of these took place in the late 19th and early 20th centuries, when migrants from the country's northeast fled poverty and droughts and headed to the Amazonian rubber estates in search of a better life.

The rubber tapper who works in a native forest normally 'bleeds' 140 to 160 trees a day, collecting 15 to 20 liters of latex. One tree yields on average 4.5 liters of latex per year. Rubber tappers work two months per year, with two pauses: when they engage in the collection of Brazil nut fruits; and when rubber trees lose their leaves. Because the rubber tree lives have a long lifespan, its milky sap can be extracted for several decades.

Natural rubber manufacturing in Brazil started still in the 19th century and gathered momentum in the historical period known as the "Rubber Cycle", which corresponds to the period when latex extraction and commercialization were fundamental economic activities. It took place in the central region of the Amazon Forest, between 1879 and 1912, in addition to the short period from 1942 to 1945.

In the so-called "Amazonian Belle Époque", cities like Manaus, Porto Velho and Belém became the most developed among Brazilian state capitals. They had electricity, piped water systems, sewage, museums and movie theaters. One of the main postcards of the capital of Amazonas, the Municipal Theater, was built during that period. All of it was built under European influence. However, the two cycles ended abruptly, mainly due to the lack of public development policies for the region.

The demand that came with the Industrial Revolution made natural rubber a highly valuable product. It was being used in tires of automobiles, motorbikes and bicycles, in the manufacturing of straps, hoses, shoe soles, etc. During this period, around 40% of all Brazilian exports were coming from the Amazon. Many riverbank villages and settlements emerged. The existing cities thrived. Besides the socioeconomic development, hundreds of thousands of workers, mostly from the country's northeast, migrated to the region.

However, since the end of this cycle, in the early 20th century, Brazil has lost significance in the world's natural rubber scenario. According to the Brazilian Agriculture and Livestock Confederation (CNA), the country was the world's largest producer until the mid-1950s, but suffered a steep production decline due to the growth of the activity in other continents, particularly in Asia. Thus, productivity loss ensued. Today, it accounts for a little more than 1% of the world production. It has become dependent on the external market.

The legacy of Chico Mendes

During the 1970s and 1980s, the Brazilian government provided massive support for livestock ranchers to implement farms in the Amazon region. The forest's inhabitants were forced out so the forest could be turned into pasture. In Acre, rubber tappers, led by Chico Mendes, discovered a way of fighting for land, giving local rubber tappers autonomy.

As an alternative form of land occupation, a new model was created, the so-called Extractive Reserves (Resex), in which lands are owned by the Union, but the right of use is granted to those inhabiting and working on them. According to the State of Amazonas Environment Department's definition, these reserves are protected territories whose purpose is to protect the livelihood and culture of traditional populations and ensure the sustainable use of natural resources in the area. The sustenance of these populations is based on extractivism and, complementarily, subsistence agriculture and small livestock breeding.

They were introduced by Law 9,985/00, which created the National System of Conservation Units (SNUC). They are created by a law and managed by the corresponding environmental body: if it is a federal law, then the Chico Mendes Institute (ICMBio) is responsible; for state municipal laws, it is the respective environmental body's responsibility.

Reserve areas belong to the government, and the right of use is granted to the traditional extractive populations. Private areas included within their limits are to be expropriated in accordance with the legislation. Public visiting is allowed where compatible with the local interests and the management plan for the unit. As for scientific research, it is allowed and encouraged, so long as it is authorized by the environmental body responsible for the area.

In the Amazon, extractive reserves cover an area that represents around 4.8% of Legal Amazon, 19% of the Amazon Conservation Units, and 8% of forests in the region, benefiting approximately 1.5 million people. These projects add value to the natural products of the forest and usually foment the development of areas, such as basic education and healthcare facilities. However, these services do not reach all families in the communities.

Chico Mendes, the rubber tapper leader assassinated over 30 years ago, gives his name to one of the most important reserves in the Amazon region. It was one of the earliest in Brazil, created in 1990, two years after the leader's death, symbolizing the struggle of the forest peoples for the right to preserve their own way of life sustainably, amid the expansion of agribusiness.

Situated on the border with Bolivia and Peru, in Acre's southeastern part, it covers an area of approximately 970,570 hectares. Within its limits are 7 municipalities and around 3,000 families, who live on latex extraction and Brazil nut collection.

Resex Chico Mendes is the fruit of a long struggle of rubber tappers who opposed the development models defined by the Brazilian government for the Amazon region in the 1970s. The process started in Xapuri, in Acre, where Chico Mendes came to lead the demands for allocation of territory to ensuring sustainable use of natural resources and protecting the livelihood and culture of traditional forest populations.

Originally, the economic activities that moved this reserve were only rubber extraction and Brazil nut collection. However, in recent years, another activity has been intensifying both inside and out of the unit: livestock. Cattle breeding is not allowed in extractive reserves, except for small-scale, subsistence livestock breeding.

However, Resex Chico Mendes has lately been threatened by deforestation, illegal hunting, land grabbing and invasions due to the interest of some in replacing rubber and nut extraction – practiced for decades – by livestock breeding. Land grabbers have been pressuring and threatening extractive workers into selling or giving up forest areas to be deforested and turned into pasture for cattle. Such livestock breeding is done both for supplying Acre's internal market and for export to Peru and Bolivia through the Transoceanic Highway, connecting Acre to ports on the Pacific coast.

It is estimated that, today, 3,500 families live in Resex Chico Mendes. With support from environmentalists and the unions of rural workers from the six Acre municipalities comprising the Resex – Assis Brasil, Brasiléia, Xapuri, Capixaba, Rio Branco, and Sena Madureira – the rubber tappers and nut collectors are denouncing to the sector's control bodies the increasing pressure and threats they are suffering from land grabbers.

Shoes and accessories

According to IBGE, the rubber production in Acre has been varying positively since 2016, driven by the increasing value of the price paid to extractive workers, which is owing to the addition of value through the cooperative of extractive workers, the introduction of the product in different markets, and federal and state subsidy policies.

Acre is only second to Amazonas in rubber production. IBGE data also shows that the value of vegetal extraction in Acre is the highest in 10 years. In 2021, that value totaled R$ 100.7 million, representing an 87% growth compared to 2020.

Some locals are reinventing themselves with the wealth offered by latex. Rubber tapper José Rodrigues, for example, turns the raw material into shoes, slippers, necklaces and bags. Known as "Doctor Rubber", he combines traditional knowledge passed down by his father, also a rubber tapper, with a technique he learned during a course in Acre, developed by the chemistry lab of the University of Brasilia (UnB), called ***folha semiartefato*** (FSA).

José Rodrigues, that is, Doctor Rubber, was born in Assis Brasil and used to work in the rubber estates. Today he participates in fairs throughout the country, but still keeps his simple lifestyle, waking up early every day to extract latex, which, mixed with a chemical called pyroligneous acid, thickens the milky liquid, forming a screen that rests at the bottom of a tray. The screen is passed several times through a manual cylinder until it gets very thin. Then it will dry out. With the dry sheets, José starts to make the shoes.

"Five o'clock in the morning is the time the rubber tapper goes out to the wood. I'll spend two to three hours on average tapping the trees, and another hour and a half collecting the latex. Then I return home", says Doctor Rubber, for whom the greatest joy is to see the excitement of other people and storekeepers in seeing the products he makes.

"When I started this work, I had no idea about the mine of wealth, not of values, but knowledge from the forest that I would be bringing to the world', he celebrates.

French sneakers

One of the extractive reserves that present positive results linked to the rubber value chain is the Alto Juruá reserve. There, families have organized around rubber collection after they participated in workshops on management and best production practices with investments from the French company Vert Shoes. Recognized in the market for the socioenvironmental element in its product lines, the brand incorporates production concepts like the use of sustainable raw material.

One of the materials it uses is natural rubber from the Amazon – the only place in the world where rubber trees grow in the wild – used in its sneakers' soles. Developed in the University of Brasilia, the liquid smoked sheet (FDL) process allows producers to turn latex into rubber sheets without any intermediate industrial stage.

The raw material meets the demand of Vert, which uses natural rubber in the manufacturing of sneakers in some 40% of the composition of soles. Since 2007, Vert Shoes has been supporting the structuring of natural latex production chains in Acre, in partnership with extractive associations. According to data released by the company, today, over 1,200 rubber tapper families are directly involved in the latex supply chain.

They discuss and define with the farmers' representatives how to reach the correct value for both producers and cooperatives, according to fair trade principles. Presently, the area of forest preserved by the rubber tappers in partnership with Vert covers 9,000 hectares.

Photo: Felipe Santos da Rosa – Embrapa

Latex is a milky sap produced in the bark of the rubber tree, the raw material of natural rubber.

Photo: Divulgação Dr. Da Borracha

Rubber tapper José Rodrigues, known as "Doctor Rubber", turns latex into shoes, slippers, necklaces and bags.

Brazil nuts boost the socio-biodiversity economy and change the life of indigenous and riverside families

Over 865 tons of forest nuts have already been bought from those who work there. These are Wickbold's data by 2021 of a partnership that worked out not only for the bakery brand, but mainly for the indigenous peoples, riverside peoples and traditional populations in the territories of Xingu, Calha Norte and Rio Negro, in the Amazon. With the creation of the famous bread ***Grão Sabor Castanha-do-Pará & Quinoa***, over one thousand families have started to be fed not with the very nuts, but with the income they started to create.

"In 2021 we created the bread ***Grão Sabor Castanha-do-Pará & Quinoa,*** which has become a differentiated bread in the market. Six years after its launch, we were contacted by the Imaflora (the institute of stewardship and forest and agriculture certification), which was looking for a large buyer of nuts to join the Origens Brasil® network, whose mission was to ensure traceability to forest products and participation to local entrepreneurs. Immediately we agreed to join in.

That was when we started to actually buy from those who extracted the nuts, which was very gratifying, because it was an opportunity to pay fair compensation for their work. It enables them to keep the lifestyle locally perpetuated for generations. This permanence in the forest, on its turn, enables settlements that inhibit the action of loggers and explorers. Ultimately, they are the true environmental agents", said Pedro Wickbold, Wickbold general manager.

According to the company, by the end of 2021 over one thousand families supplied produce from the Amazon to that

brand, and R$ 4 million was the total commercialized in the period between Wickbold and the forest peoples through the Origens Brasil® network. The results are part of that partnership, whose objective is to value the work of indigenous and riverside peoples, and the Amazon rainforest traditional peoples.

Brazil nuts are harvested from December to May, and it requires commuting long distances by river and land. Thus, the traditional populations and indigenous peoples have to monitor the areas they travel constantly to inhibit the practice of illegal and predatory activities. In addition to being a relevant activity to generate sustainable income, extracting them enables Brazil nuts to be part of the menu of the local population and to value the cultural practices of the indigenous peoples.

Wickbold buys Brazil nuts extracted by the local population available to be bought for its bread production. The commercial relation through the Origens Brasil® network offers guaranty of origin of the production, transparency and ethical trade between the company and the forest populations, resulting in long-term commercial relations, payment of fair price, decrease in middlemen, and direct negotiation with those who produce.

Additionally, all consumers in the market recognize the origin and the history of the products they consume. The packages of bread *Grão Sabor Castanha-do-Pará & Quinoa*, available in square and round shapes, bring the seal Origens Brasil® with a QR code. With a mobile phone consumers can access the information on the producers responsible for harvesting part of the Brazil nuts used in the products.

How the Origens Brasil® network works

With the objective of enabling more transparency in commercial relations between those who produce and those who buy, the network is organized in a management council, territorial committees, committees of companies, and the administrator, which is the Imaflora Institute. The management council is composed of people and institutions that participated in the development of the Origens Brasil® network, and it oversees the territorial committees. Those committees are composed of 22 institutions of associations of dwellers, indigenous individuals, cooperatives, research and socioenvironmental institutes, NGOs and foundations performing inside their own territories. They are divided into the territorial committees of Calha Norte, Xingu and Rio Negro.

On the other hand, the committee of the companies has a consulting nature and gets together annually for the purposes of joining in debates on the subjects and strategies involving Origens Brasil®. The 35 company members of the network compose that committee, among them Wickbold, one of the first to join in the network.

"In the beginning, while a market study was being conducted, we found out that Wickbold, for instance, was one of the companies that most consumed nuts and did not know where they came from, nor the whole process of the ingredient from the forest as far as the company. That was when we invited it to be a part in Origens Brasil® and to come directly closer to the producers and learn the history behind that ingredient. We started with produce coming from the territory of Xingu and it has grown a lot. Today, summing up all the areas, there are 58 million hectares, over 3,000 producers and 35 companies that have become members of the Origens Brasil® network, doing businesses that contribute to keep the forest standing", detailed Patricia Cota Gomes, manager of Origens Brasil® and associate executive secretary with Imaflora.

Finding out valuation

The sales of nuts to Wickbold through the work of Origens Brasil® network have changed the routine of the indigenous families in the territories of Xingu, Calha Norte and Rio Negro. There are over one thousand producers who sell nuts that that company and they are based at the following origin protected areas:

Territory of Xingu: Extractive reserves ***Riozinho do Anfrisio, Rio Iriri, Rio Xingu, Terra Indígena Xipaya, Arara, Apyterewa and Trincheira Bacajá***;

Territory of Calha Norte: ***Territorio Quilombola Alto Trombetas I and II, Territorio Quilombola Área Trombetas, Territorio Quilombola Erepecuru, Projeto de Desenvolvimento Sustentavel Paraiso, Terra Indigena Trombetas Mapuera, Terra Indigena Nhamundá-Mapuera, and Terra Indigena Kaxuyana-Tunayana***;

Territory of Rio Negro: ***Terra Indigena Wai Wai***.

Those producers are members of the network and work in a partnership with Wickbold. Those peoples in the Amazon are organized in the following associations and communities: Xingu (***AMORA, AMOMEX, AMORERI, Associação Pyjahyry, Terra indigena Trincheira/Bacajá, Terra Indigena Apyterewa, AITEX – Xipaya, Associação KOWIT and Ugorogmo – Arara, ABEX and IBKRIN – Xikrin, TATO'A – Parakanã)***; Rio Negro ***(APIWX and Extrativistas da Comunidade Anauá)***; and in Calha Norte ***(ACORQAT, ACORQE, ACRQAT, APARAÍ, APIW, Terra Indigena Nhamundá-Mapuera, Terra Indigena Kaxuyana-Tunayana and Mãe Domingas***).

Those associations carry their produce as far as the storage and distribution site, where there are the so-called "***cantinas***", areas to receive and store produce which, in an organized way, forward the products to the partner companies of Origens Brasil®.

The president of the association of dwellers of the extractive reserve Rio Iriri (AMORERI), Francisco de Assis Porto de Oliveira, 59, who is also an extractor and lives in the community São Francisco in RESEX Rio Iriri, currently is the coordinator of the distribution of the produce coming from the Terra do Meio network, a region that encompasses the communities of Xingu, Tato'a, Ibikrin, Iriri, and Riozinho do Anfrisio. Former rubber tapper and from the northeastern area of Brazil, Assis found work with the fruit of the Amazon rainforest, and he tells us that at the beginning of the extractive activity a crate of nuts was underpriced, costing something between R$5 and R$6 each. Today, with the Origens' model, they are sold to Wickbold for a price that may be 20 times higher, depending on the season.

"When I was 29 and already broke nuts with my parents, we still did not have that organization and appreciation, then we would sell 12 crates to be able to buy some rice, beans, and things for the house. After this partnership started with the Origens network, from R$5 a crate of nuts the price went up to R$40, the first price actually valued. And the price more than doubled today and the money stays right in the producers' hands", tells us Assis.

According to the AMORERI president, before the partnership they already produced copaiba and then they diversified to about ten produce, such as Brazilian nuts, rubber, andiroba and babaçu oil. But they did not have a structure nor companies to buy the products, as it is today.

"When we started to create an income model through those produce, it was organized in a shed. Now, producers bring their materials here where we concentrate the acitvities. Our storage is divided into 30 "cantinas", i.e., 30 areas to place the goods, where then they will be collected by the partner companies. They arrive by boat with the produce, everything with bills of sales and identification, then they go to

the areas of handling, weighing, and classifying the produce and then, to transport them. We receive 20 producers weekly in the "cantinas" on average", reports Assis, informing that currently the headquarter receives merchandise from 300 to 350 extractors of Terra do Meio.

Ultimately, according to the coordinator, through those associations 200 tons of Brazilian nuts on average per crop are sold – depending on the climate in the Amazon – just to Wickbold. According to Origens' data, the following numbers were supplied in tons of Brazilian nuts per year: 2015 – 47.3 t; 2016 – 27.3 t; 2017 – 26 t; 2018 – 363.8 t; 2019 – 75.4 t; 2020 – 244.7 t; and 2021 – 80.9 tons.

This commercial relation which started in 2016 has already yielded R$ 4 million total up to now to indigenous and riverside families, which produce nuts distributed by Origen Brasil® network, in addition to extractivists. A job that results in income and value for the most remote areas in the Amazon rainforest.

"Everything has changed, people in the communities have organized themselves, and those who wanted to move away from here, now want to come back. Now we have income and know that all produce has a meaning, have to have an origin. When would we imagine that the nuts we used to break would be used inside some bread? Now we have transparency, we know to whom we are selling ,and we know the companies' commitments. For us, the nuts are our gold now", says Assis.

To Pedro Wickbold, general manager of the baking company, "the Origens Brasil® network stands for guaranty of valuation of socio-biodiversity, to the terms of traceability of the whole process.

"We, who buy the products, not only contribute to sustainable handling, but also to the preservation and dissemination of the traditional communities' culture, which are the true guardians of the standing forest. While we reach the table of millions of consumers daily, we also take them the opportunity to exercise an increasingly conscious consumption", reminds us the executive.

Good for the pocket, the forest and the health

According to Wickbold, in addition to the economic, social and environmental potential, the forest nuts also have several nutritional properties good for the health. Performing for 85 years, an anniversary to be celebrated in 2023, the company reminds us of the nutritional qualities of that ingredient.

"According to our nutritional consultant, nuts are rich in selenium, an antioxidant that improves humor, helps reducing bad cholesterol, has high content of good fats, fights inflammations, avoid vascular diseases and has several important nutritional contents. Then the bread from Amazon has ended up by being a differentiated product because consumers who buy bread in the southeast are helping directly to preserve the forest standing, helping to maintain those peoples with a dignified pay, and still obtain very relevant nutritional power inside their food. It is a virtuous cycle", states Pedro.

According to Wickbold, the partnership with Origens has contributed to keep 4,040,720.96 hectares of forest standing in the Amazon in 2021. As to creating income and ethical trade, also according to 2021 data, the contribution of the commercial relation benefitted 9 villages and 9 "cantinas".

In addition to Brazil nuts, Wickbold also tries to acquire other forest fruit to expand even more the local production chain. "We are keeping an eye in açaí and studying other produce to continue to stimulate the purchase from indigenous and traditional peoples, and also riverside and extractive peoples of the Amazon. This development of the forest is very important, and it is an idea the company has adopted for its projects", discloses Pedro.

The Amazon' potential for the global climate crisis

A German descent, Wickbold started its business with a bakery in the Brooklin district in São Paulo., called "Allemanha" in 1938. Founded by Pedro's great grandfather, Henrique Wickbold, who came to Brazil running away from a troubled period Germany was experiencing with the war. The bakery was already born with the DNA of the traditional German culture of producing nutritious foods and with grains.

In the 1940s, the place was renamed "Wickbold", and new acquisitions were made, such as the first fleet of vans to deliver bread. In the 1970's, the small business became a factory and ended up by being one of the biggest companies in the area of bakery and foods in the country. In 2015, Wickbold acquired Seven Boys and in 2021 announced the purchase of the old factory Delimyll, located in the municipality of Guarapuava, in Parana. Now called Basteck, the objective of that unit is to promote new business for the manufacturer, in addition to producing sweet bread.

Following the philosophy of nutritious foods, Pedro says that Wickbold is not worried only with its consumers' balanced and nutritious life, but also with the future of natural resources that are the strength of those foods. He stresses the importance of preserving the Amazon rainforest because, as he sees it, it is one of the main assets of development of the country, rich in nature, and, due to that, it can be the solution for the planet's climate problems.

"As a frequent traveler, I have already visited the five continents, and none is comparable to the Amazon rainforest's natural power. As soon as we started the partnership with the Origens network, I spent one week in every region visiting the settlements, such as Terra do Meio, for instance, with is the territory of Xingu, to visit the place and the people who lived there. It took me two days traveling by boat and I saw that the region has a huge potential. Not even the universities are able to offer as significant knowledge as the traditional peoples of the Amazon have", said Pedro, also highlighting the importance of the region for the country and for the world: "We have the solution for the world's main problem, which is the climate crisis. So, the country needs to understand that to become relevant in the geopolitical aspect it has to take care of the Amazon rainforest. We need very significant wisdom because our country can make all the difference for the future of the humanity".

Origens Brasil®: the network that shares the history of those producing in the Amazon

"You can continue the interview as long as you like, lady! I enjoy talking about the forest produce, about my work, about businesses...I love it all here!", answered Francisco Assis, president of the association of dwellers of the Rio Iriri reserve (AMORERI), and coordinator of the distribution center of Origens Brasil® network, where he collects the produce in Terra do Meio.

The network works as a link between those who buy and those who produce, connecting the companies to producers of different regions of the Amazon, sharing the history and enabling visibility to the forest peoples' work – in charge of keeping it standing.

With transparency and valuation of the traditional peoples, Origens Brasil® network was articulated and created by Imaflora and the Socioenvironmental Institute, and today has partnerships with 35 companies around the country through a mechanism of responsible purchase.

The Imaflora institute was founded 27 years ago in Piracicaba, SP, and it performs all over Brazil with actions that contribute to the conservation of the environment and also by improving and maintaining the quality of life of rural and forest workers, traditional populations, indigenous peoples, "quilombolas" (descents of runaway slaves) and family farmers.

After the debates about environmental issues that started in the 1990s, Origens Brasil® started to be designed. "The Amazon rainforest holds the biggest diversity in the planet, which is located mainly within the areas protected where live the indigenous peoples and traditional populations. Said biodiversity is translated into innovation and new products for the food, health care and wellbeing industries. Pressure of illegal and predatory activities threatens the permanence of those people in the territories, which are the biggest guardians of the forest. Creating a system of guaranty which values the peoples and their products, adequate to the reality, is to connect them with the markets that pay fairly for their production and conservation work", explained Patricia Cota Gomes, Manager of Origens Brasil® and associate executive secretary of Imaflora.

According to her, the importance of acting at that moment was of the essence due to the scenario the country was experiencing. "At that moment there was a lot of mining activities. With the Eco 92 the idea was to boycott the illegal tree felling, but that was not the only problem. It had to be a solution for various areas because there was the production of rubber, nuts, copaiba, so we needed a system to keep the forest standing, also compatible with the region's history".

During a survey done by partner companies, Patricia told us that they found out companies that did not know the origin and process of the produce they used as raw material, such as Wickbold. As from then other companies adhered to the idea and currently there are 35 company members of the network, the consulting committee being composed by all of them, which are: Atina, Bossapack, Lush, Mercur, Pão de Açúcar | Caras do Brasil, Wickbold, Tucum, Na Floresta, Beraca, Soul Brasil, Manioca, Feira na Rosenbaum; +55 Design, Bemglô, Osklen, Save the Forest, Jungle Joy Amazônia, Regenera, Amazonika Mundi, Amazon Tastes, Cocar & Co, Havaianas, Natura, Amamos Amazon; AMAZ, Citrobio, Déco Brésil, Dreams and Purpose, Mãe Terra, Moma, Prema, Vert, Urucuna, Warabu, and Amazonian Skinfood.

Thinking of sharing the history of producers with consumers, Origens Brasil® created a seal (which is the very QR Code) inserted in the product packages of the company members of the network. The system works connected to a collaborative platform, where consumers learn the origin of the products of the forest, the history of the peoples and their territories, thus stimulating more ethical trading relations built up based on dialog, transparency and respect to diversity of the ways of traditional life.

The seal has been created in an articulation with Imaflora and the socioenvironmental institute (ISA) along two years in the Xingu territory, with a broad process of consultation and participation involving specialists, leaders of the forest peoples, community organizations and partner companies. Origens Brasil® network has the objective of bringing producers closer to consumers, of promoting more ethical trading relations and of building up the necessary guaranties by means of a network of trust composed by companies, consumers, producers and local organizations. The system was launched in 2016, and started with only three companies, and today they are 35.

"Just here in Terra do Meio, in addition to Brazil nuts for Wickbold, we supply other produce, such as copaíba, to other companies, and also rubber to Mercur and Osklen. We had been collecting nuts and tap-

ping rubber trees for a long time. The community has always existed, and it did all that already. The big difference is that with the support of Origens Brasil® network and the partner companies we learned the value of what we did. We gained content, knowledge, and we learned that every produce has its origin, its history and its value, as do ourselves and the forest", said Assis, in charge of distributing the produce of Terra do Meio.

Extractors become entrepreneurs

An example of that valuation, knowledge and development of the extraction families is the story of Raimundo Nonato Araujo Rodrigues, 32, a descent of the Xypaya people, who has become the manager of a mini plant of improvement of Brazil nuts in Rio Novo, one of the communities part of the extractive reserve Rio Iriri, in the county of Altamira, Pará.

The mini plant, which since 2011 handles nuts and babaçu by transforming them into oils and flours, was set up by Raimunda's family. Before they founded the mini plant, her mother and she already worked with the produce, but everything manually, without any machines.

"There has always been babaçu here, and nuts, but we could not imagine we would set a plant. We started to work with 60 crates of Brazil nuts, which would weigh not even one ton, and we would dehydrate the nuts in a wood oven. At that time, we sold them to local markets, and we would even take them to the Pinheiros district, in São Paulo. But we had no structure to increase the process", remembers Raimunda.

That was then, in 2011, as luck would have it, recognition knocked on the family's door in Rio Novo. Raimunda tells us that they won a Google lottery targeted on implementing a project in some Amazon regions, and the family won an expressive amount of money that was invested in creating the mini plant to improve the nuts.

"That was when we were able to buy the first machines and received support of projects and partnerships, such as those of the socioenvironmental institute, ISA, which introduced us to Origens Brasil® and invited us to make a partnership with it. They conducted studies and even mapped our chestnut groves to guide us how to work correctly, and they proposed a partnership to improve the nuts collected in the "cantinas" of the network. Our mini plant now is the only one in the region that treats the nuts coming from 30 "cantinas" and storehouses", explains Raimunda, saying that the "cantinas" receive the fruit in natura and that her family and her transform them into product, either oil or flour.

The plant has 12 employees, all members of the same family, and her mother and six siblings also work in the production. For her, the mini plant has changed the reality of all of them.

"I have a sister who has six children, and none of them had shoes because she could not give those to them. Today, every family member gets their own wages from the mini plant, and it has improved the quality of life inside our home", tells us the new micro-entrepreneur, who highlights the importance of the forest produce for her and her family. "I ask outside people, when they look at the forest standing, that they also see that there are other people who contribute to that. That they keep on consuming our products, valuing the forest people who work without deforesting", emphasizes Raimunda.

53 million hectares of forest kept standing

According to the annual report of Origens Brasil® network, up to 2022, there already are 46 areas protected in the Amazon, 32 out of those involved in the trade of produce between partner companies

and communities. Performing in five territories, which are Calha Norte, Xingu, Rio Negro, Solimões and Tupi Guaporé, the network calculated that it contributes to the maintenance of 53 million hectares of forest standing. Not to mention the valuation of producers, totaling over 3,000 producers registered from 64 indigenous peoples or traditional populations among indigenous groups, extractors and quilombolas, who are the guardians of the forest.

Recent UN studies show that the indigenous peoples and traditional populations, despite being the minority, are in charge of conserving 80% of the planet's biodiversity, biodiversity that is the source of innovation. Acknowledging the importance of the service rendered by those forest people is of the essence for us to build up a new, more ethical development model able to contribute to maintain the forest standing", stressed Patricia Gomes.

In recognition of that expansion of the project and results beneficial to the population and the environment, Origens Brasil® network has been granted many awards, such as the UN international award for "Innovation for Health Food and Agriculture" (2019); short listed in the Katerva Awards program, among 5,000 businesses worldwide, and was among the 10 best in the category of "Behavior Change" (2019), the winner of the Climate Ventures in the category "The best businesses for the climate" (2018), and the Banco do Brasil Foundation certification in the category "Social Technology" (2019).

Despite the recognition of the brand Origens Brasil® in Brazil and abroad, Patricia highlights that it is necessary that more companies become aware of that relation with the Amazon producers, remembering that there are many cultures and histories hardly known and that it is necessary to value the work of those who live in the forest.

"There are many Amazons inside the same Amazon. Many companies still do not look to that region as they should. Origens Brasil® network wants to value the people who live in the forest and from the forest, because it is not only about recognizing them as goods suppliers, but to build up more responsible supply chains enabling to share value with those peoples and contribute to the conservation of the Amazon rainforest as a whole", she ended.

Photo: Simone Giovine

Extractors leaving to the chestnut grove in Kayapó.

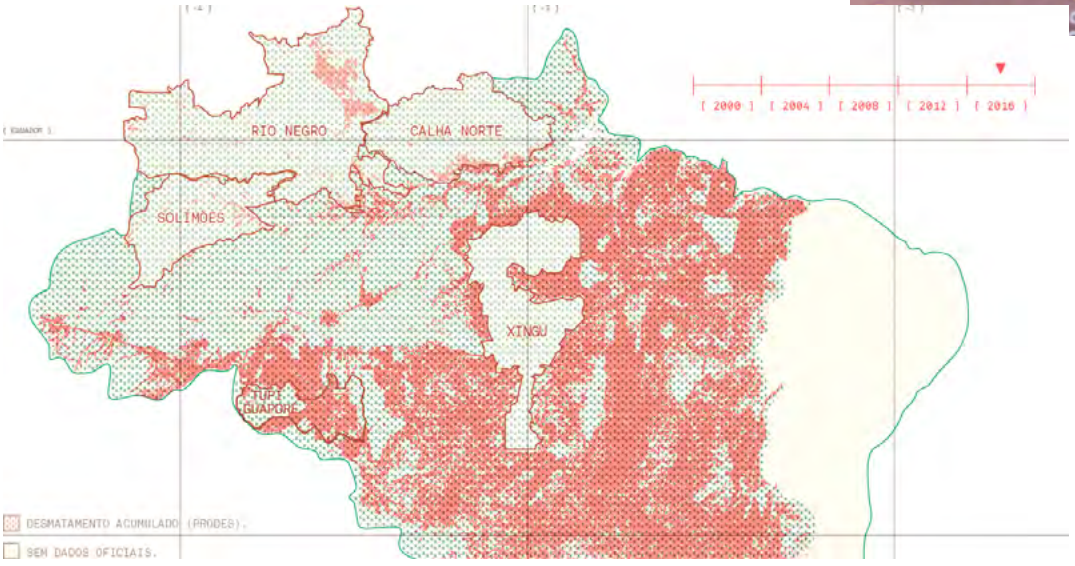
Photo: Aloyana Lemos

Photo: Marcos Fernandes

Pedro Wickbold, general manager of the baking company that acquires nuts from extractors through the Origens network.

Photo: Marcos Fernandes

QR Code of Origens Brasil network, on the right, where consumers can learn the history of those who supply forest produce.



Origens Brasil

Regions where Origens network performs in partnership with local extractors associations.

Raimunda Nonato, 32, an indigenous descent of the Xypaya people, which has become the manager of the mini plant of improvement of nuts in Rio Novo.

Photo: Raimunda Nonato

Photo: Raimunda Nonato

Xypaya indigenous family that work in the Rio Novo mini plant.

Photo: Raimunda Nonato

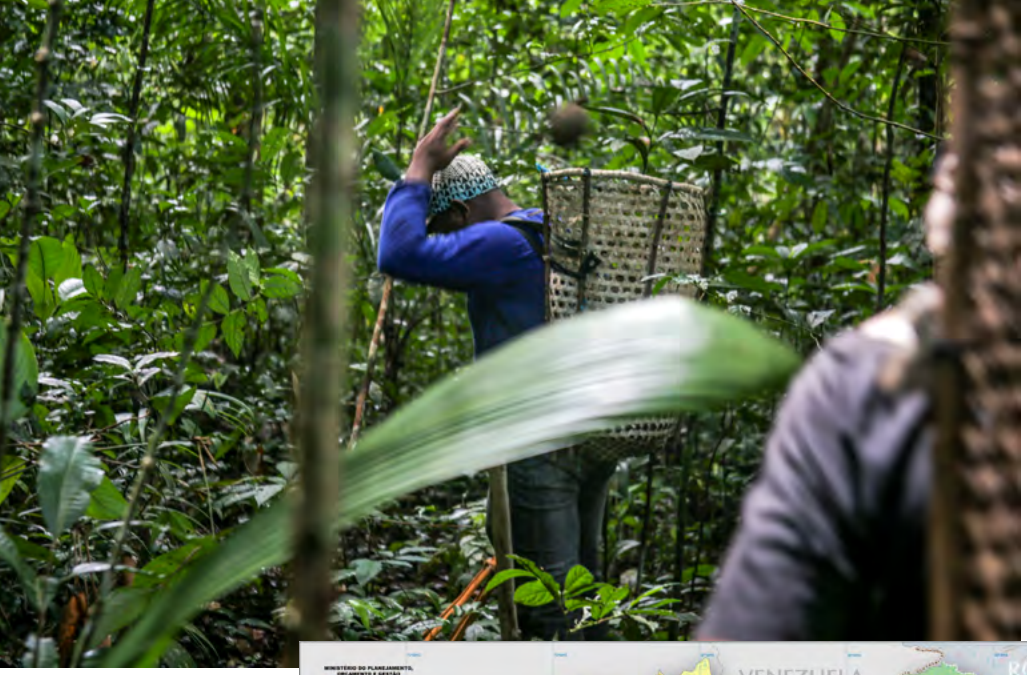
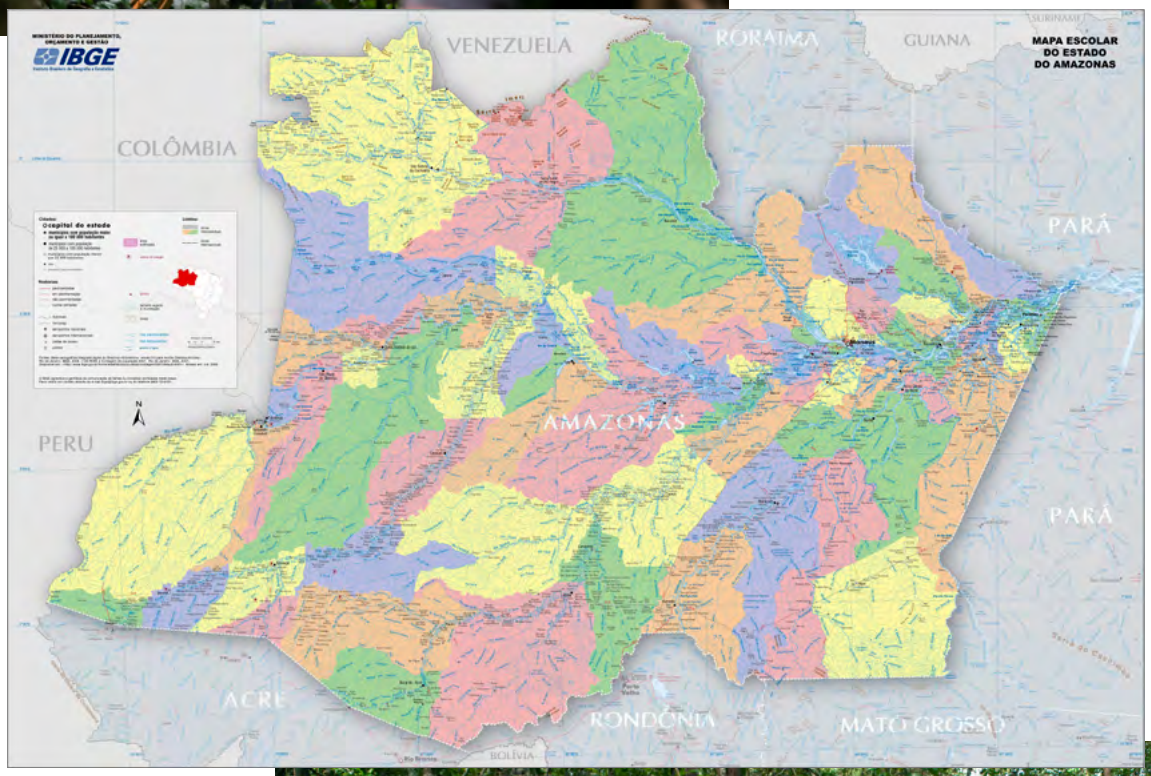


Photo: Aloyana Lemos

There are about 3 thousand extractors associated to Origens network.



IBGE map shows the huge distances that make goods transport and access to basic services difficult for the communities in the remote regions.

Photo: Simone Giovine

Sacks of Brazil nuts and paniers after collection in Kayapó.

From palm oil, the recovery of the forest and a transformation in people's lives

"To see people who had no coffee to offer you, and whose home was nearly falling down on them, but now are farmers, not only with a good home, a car, and a tractor for their work. Their children in college. That shows that palm oil has changed life in the community for the better", says Antônio Jorge Corrêa, known as Jorginho, coordinator of the agricultural sector at Agropalma.

That is the story of transformation that palm oil planting has made in the lives of more than 200 families from communities in the municipalities of Moju, in the state of Pará, besides the protection 64,000 hectares of Amazonian forest. This initiative began when the company Agropalma was invited by the Government of the State of Pará, in early 2000, to participate in a pilot project aimed at fomenting the production of palm oil (***dendê***) by families, in an effort to change the socioeconomic and environmental reality of the region. From then on, a huge challenge emerges for Agropalma: to convince local residents, most of whom were then linked to extractivism, to believe that palm oil planting could be the solution for combatting poverty and deforestation.

In 2000, while across Brazil the Human Development Index (HDI) was 0.612, in the state of Pará it was 0.518, and in Moju, a municipality located 150 km from the state capital Belém, it was only 0.399. That year, the population of the municipality totaled 52,941 inhabitants (7,65 inhab./km²), with 35,315 (or 67%) living in rural areas. The population of Moju was young, with 44% of its inhabitants aged less than 15 and 73% aged 29 or younger. Child

mortality was 34.7 per 1,000, also above the rates for the state (33.1) and Brazil as a whole (30.6) (PNUD, IPEA & FJP, 2015).

In terms of education, 11% of youths aged 15 to 17 had finished only primary education that year. As for those aged 18-20, only 2.7% had completed high school. The monthly per capita income was R$177.58, and 62% of the population had a per capita household income below R$140 per month, in values updated to 2012 (PNUD, IPEA & FJP, 2015).

The locations involved in the palm project were Arauaí and Soledade, riverside communities typical to this region of Pará.

The Arauaí community, situated by the stream that bears its name, is located 101 km from the city of Moju and 31 km from the nearest paved road, PA-150. Vila Soledade is a little more isolated, situated by the Moju River, 130 km from the town and 37 km from the road PA-150. These communities didn't have a better socioeconomic situation than the municipal average, quite the opposite, their scenario was even worse.

According to a study by Homma et al. (2014), before they joined the palm project, less than 55% of families had a gas cooker. Only 19.4% had a TV set. Approximately 10% had a refrigerator at home. Only 13.2% had a motorbike, and none had a tractor.

Agropalma accepted the state government's invitation and participated in the creation of the project in 2001, along with farmer associations, Banco da Amazônia S.A. (Basa), the State Environment and Sustainability Department (Semas-PA), the State Agriculture Department (Sagri), the Institute of Lands of Pará (ITERPA), the Rural Technical Company of the State of Pará (Emater-PA) and the municipal government of Moju. The first stage was implemented in early 2002, benefiting 50 families in the Arauaí community, with approximately 10 hectares of crops each. It is worth noting that each hectare is more or less the equivalent of a soccer field.

According to Edmilson Ferreira, 59, a farmer and head of the community association in Arauaí, with the implementation of this project came the challenges. "We lived in the field and didn't know anything about palm planting. For this reason, it wasn't easy to convince others to trust the project as much as we did. It wasn't easy to learn the process either. The first harvests were a little difficult, but over time and with guidance from Agropalma, we managed to learn by and by. Today we all know how to plant dendê", the farmer explains.

Ferreira stresses that palm oil changed his life: "We didn't have anything. My biggest fear, while working in the fields, was the weekends, because we had to have money to buy some flour. Our income was not even R$200. Now I have a bank account, regular documents and a R$11,000 income from palm planting alone. Besides, my two kids are in the medical school", explains the farmer, who has 10 hectares of palm in his property.

Also a member of the pilot program for family palm agriculture, another example of radical and positive change is the story of Pedro Paulo Furtado Lima, 51, head of the community association in Soledade. He was working in logging before the project. Today he is responsible for reaching out and guiding families who decide to take to palm planting.

"I used to work hard in logging, and the income wasn't good. I decided to believe in the project, and I'd walk 7 km every day to work with palm oil, because I lived on the Moju riverbank. It was far, but I knew it was worth it. Now, besides remodeling my house, I bought a motorbike for my wife and paid for it upfront",

explains Pedro Paulo Lima, who also celebrates the increase in the number of families that have taken to palm planting, as a fosterer of the business: "In Vila de Soledade, when the project began, there was only one family. Now there are 54 farmers just in our village. With our experience, we advise these families on how to plant correctly, and we make contact with future palm farmers directly", he complements.

The production of palm by families in an integrated company-farmer model had its project created, developed and implemented through shared effort, negotiated and agreed to by the participants. The partnership agreement includes a pricing mechanism. Under this document, it was defined that the price of one ton of fresh palm fruit clusters (CFF) is at least 10% the value of one tone of crude palm oil in the international market (Rotterdam spot market, CIF). Thus, transparency and security were ensured in the setting of values for the families who engage in palm planting for oil.

In 2002, the first stage of palm planting was established, in a continuous block of lands divided into 50 lots of approximately 10 hectares each, with 2 extra ha in each lot destined for other crops chosen by the family. Also under the lead of the State of Pará, other two stages were carried out in 2004 and 2005, using the same model, benefiting 50 families, with 50 hectares allocated to each of them.

Iracema da Silva Pinto, 60, is one of the examples of the third stage of the project in the Arauí community. She is passing down palm planting to the other generations. "In 2002, we didn't know what palm was. My husband worked in the fields, but our difficulties were big with our children still small. That's when my husband began to plant palm and saw the results were good. Now we all plant it in our own lot. We have 10 hectares, and 7 are for palm planting. With just these 7 hectares, we've managed to buy a tractor, a motorbike and a house. The best part is that my children are working with me, because my concern was to provide for them. Today they have jobs and even help me and my husband", she celebrates.

Iracema Pinto is already talking about increasing palm planting in her property: "The most important is to expand the crop, since the more palm, the better for us", she says amusingly.

Luís Felipe Bigarelli, the manager of Agropalma's family agriculture and integration program, notes that the company guarantees to buy the entire production from the families involved in the project, but the families must follow all the legal procedures in order to perform the activity and have their fruits purchased by the company: "Their work must not be in areas that are being degraded. If they hire people, they must do so legally, as formal employment. There's a series of demands which they (the farmers) and we (the company) must follow in order to make the production chain a legal process, in accordance with the law", he explains.

After palm, development arrives

Along with the pilot project led by the state government (2002, 2004 and 2005), infrastructure was built in the region (roads, electricity and schools). This new structure was fundamental for the success of the initiative and for decreasing the isolation of communities and improving their quality of life. The success of the first crops encouraged Agropalma to proceed in its commitment to the family farmers in the region.

In 2006, the company established a partnership with 35 families, mediated by Incra, in the land settlement Calmaria II. In 2013, 2019 and 2020, another 10 farmers joined the initiative, totaling 195 families which produce palm in partnership with Agropalma and possess 240 palm planting areas (some families own more than one lot). In all, the dendê planting areas cover 2,002 hectares.

"We work with two groups of producers. The difference between them is in the size of the crop areas. In family agriculture, palm planting must not exceed 10 hectares. Beyond that, and up to 1,220 ha, we have the integrated producers", says the manager Luis Felipe Bigarelli, explaining that the lands of family farmers are concentrated in the municipality of Moju, The integrated producers, on the other hand, are located in the municipalities of Tomé-Açu and Tailândia.

In 2019, the average gross income from sales of CFF by family farmers partnering with Agropalma who started their crops in 2002 was R$72,867. Also in that year, the family farmers produced, in all, 40,929 tons of dendê clusters, corresponding to roughly R$ 12 million. That is an evolution compared to the previous reality, considering that financial income was virtually inexistent.

Access to financial income and to the bank system allowed families to acquire durable goods, such as gas cookers, TV sets, satellite dishes, cell phones, refrigerators, washing machines, motorbikes, DVD players, tractors, and agriculture machinery.

In this period, the number of residences, infrastructures, service diversification and commerce expanded. The Soledade village became a service hub with a grocery, a police station, a school, a basic healthcare unit, among others. The family farmers also report an improvement in education opportunities. Agropalma also maintains a school that serves all of its employees' children, and where youth and adult education (EJA) is offered at night, particularly for literacy and basic mathematics

In addition to the schools already implemented by the state in the communities, the income from palm activities also allowed youths from the communities to study in other locations, so as to complete high school and even go to college.

Palm results reflect on biodiversity

it wasn't just the communities that benefited from palm planting for oil, but also the forest. Agropalma, as the main producer of sustainable palm oil in the Americas, cultivates 39,000 hectares and has another 64,000 in forest reserves protected and monitored. Almost 60% of the company's lands are destined to forest reserves. Since 2002, when the company adopted a strict non-deforestation policy, it has been focusing efforts on initiatives for modernizing crops by using agronomy practices aimed at soil productivity.

Strengthening the programs for certified family farmers and integrated producers in Pará, the company provides refined and in-bulk products, using the Roundtable on Sustainable Palm Oil (RSPO) certification model. RSPO certification aims to decrease the impacts of palm planting on the environment and communities. In 2008, RSPO developed a set of environmental and social credits that companies must fulfill in order to produce certified sustainable palm oil.

The integrated producers and family farmers of the Agropalma project are assessed quarterly, and occurrences like deforestation, slave labor or child labor result in immediate suspension of the supply agreement. In the case of deforestation or slave labor, the agreement will be terminated within 1 month after the suspension. In the case of child labor, if the producer does not correct the situation until the next harvest cycle (10-15 days), the agreement will be canceled within 1 month after that harvest cycle. Failure to comply with or to progress towards meeting the requisites established also entails the suspension and termination of the agreement within up to 2 years, depending on the problem identified.

In 2014, all program farmers went through rigorous audit for certification by RSPO principles and

criteria. Since then, they have been receiving a premium for sales of certified CFF, which has enabled the production palm oil in the segregated certification model. In other words, the family farmers now meet world-class standards.

In addition to following RSPO environmental criteria, the company performs monitoring in partnership with Conservação Internacional (CI), which helps Agropalma monitor and record over 1,000 species, 669 of which are vertebrate (mammals, reptiles, amphibians and fish) and 360 are invertebrate (insects, aquatics, flies, ants, spiders and bees).

The largest concentration of palm producers is situated in the state of Pará, in the region known as Belém Endemism Center (CEB). This area accounts for nearly 90% of the national production of palm oil. The partnership with CI has been working to promote the conservation of biodiversity across the CEB region.

Tulio Dias Brito, Agropalma's sustainability director, emphasized the importance of this work for the protection of the local fauna. According to him, the company even has a round-the-clock forest ranger team operating in the protection areas due to the constant presence of poachers in the territory.

"We have surveillance cameras and trained teams who have encountered poachers in the forest several times, and thanks to this project, it was possible to prevent the disappearance of many species", says Tulio. The territories under Agropalma's responsibility cover 64,000 hectares of forest reserves.

Tulio also stresses that the company's philosophy is not only to produce palm oil in a sustainable way, but also learn about and interact with the local biodiversity. "We should take into account not only the planted area, but respect the forest's history, thus contributing for its conservation. This is not a transitory project, this is continuous monitoring. The work is permanent, in order to protect biodiversity as a whole", he emphasizes.

According to an Agropalma environmental impact report, of the total of species identified, at least 40 are under some form of threat, 11 are endemic to CEB, three are the first record of the species in the region, and three are new species.

The partnership between the company and CI-Brasil is supported also by the Federal University of Pará (UFPA), which monitors biodiversity in the company's properties, in the Belém Endemism Center area. The information collection, which has been done for more than ten years, comprehends the company's permanent protection areas (APPs) and legal reserves (RLs), as well as the dendê crop areas. The continuous monitoring of biodiversity in the forests allows assessing the conditions of the biota and the environment they are situated in, thus ensuring an understanding of the changes resulting from soil usage patterns in the long term, as well as the development of impact mitigation alternatives.

According to the company, the goal between 2022 and 2025 is to expand the monitoring with CI to cover the farms of partner producers so as to include 24 new areas by the end of the period. For 2028, Agropalma intends to conclude the restoration of 500 hectares of riparian woods in palm oil farms.

In addition to preserving its forest reserve, Agropalma established in 2012 a partnership with Biofílica Ambipar, a company specializing in forest conservation and environmental services, to begin its Reduction of Emissions from Deforestation and Forest Degradation (REDD+) project. Biofílica's project portfolio encompasses the largest area under forest carbon credit certification in the Amazon, with 1.5 million hectares of conservation. It also possesses a bank of forests for legal reserve compensation covering over 4,6 million hectares in all of the country's biomes.

"The project designed with Biofílica Ambipar will last 30 years, and it will enable the sale of carbon credits by Agropalma from its second year. The pursuit of zero carbon is one of the main challenges of companies and governments in their effort to meet the targets established by the Paris Agreement. The REDD+ project is a major step in this direction", says Tulio Dias.

The future

Agropalma has six crude oil extraction industries in Tailândia, an export terminal in Belém (PA) and two palm oil refineries in Belém and Limeira (SP). The company operates in the domestic and foreign markets, exports around 15% of its production, and approximately 95% of exports go to Europe, and 5% to the US. In Brazil, around 80% of the production of this oil is destined to the food industry as raw material for large-consumption products, e.g., biscuits, ice cream, milk drinks, and spices. In Tailândia alone, Agropalma generates 6,000 direct jobs and maintains agricultural villages with full infrastructure for its workers.

"In the beginning, most local residents didn't believe in the project and thought it was meant to steal land. Many gave up because they weren't familiar with palm planting. Today, palm is considered valuable, and those who weren't interested now want to join in", explains Antônio Jorge, or Jorginho, the agriculture coordinator at Agropalma, who is proud to see one of his children with a college degree and living in New Zealand, and another with a nursing degree. "I'm grateful not only for myself and the development of my family, but for the evolution of farmers was well. Today, 90% of them live on palm", says Jorginho, who graduated in business management thanks to a scholarship provided by the company, and recently completed a graduate specialization in georeferencing.

Jorginho also coordinates a prospecting project in search of new palm farmers in the Amazon region: "Our goal is to find more farmers who want to take to palm planting, to expand these 2,002 hectares of crops and thus develop economically the lives of more families, though always protecting the environment", he says.

Photos: Agropalma

Iracema Pinto and her children work with palm planting.

Antonio Jorge, or Jorginho, Agropalma's agricuture coordinator.

Tulio Dias Brito, Agropalma's sustainability director.

For 2028, Agropalma intends to complete the restoration of 500 hectares of riparian woods in palm oil farms.

Healing with the Amazon rainforest's energy and plants

A stone, a book and forest herbs, that was how many people have already fought many diseases in the region of Nova California, in Porto Velho, Rondonia. The painful malaria, kidney infection and even Covid-19. These reports are of the group of the RECA project, migrants from the south and rubber tappers of that region, the story told in this book, which has resulted not only in the development of agriculture and reforestation, but also in a solution for that population's health. They found the cure of many diseases with syrups or "garrafadas", as they call them, made with local plants.

In addition to natural remedies, some women in the community have specialized in examining the dwellers by means of a bioenergetic analysis to detect what ails them. That initiative of the alternative medicine, which years later would give birth to the homeopathy pharmacy in the pastoral unit of Nova California, started in the 1980s, when there was not a health care unit or a hospital nearby, but where malaria raged.

"When the RECA project started, we thought it was about land for agriculture, but we had no idea of education and health care around here. We found out that we did not have anything. Those who got ill had to go to Rio Branco to be treated or, sometimes, they would not go there because the road was too bad. It was then that a sister from the Catholic Church of Nova California looked for some courses for us. Because we only knew how to make tea when trying to treat people with malaria. At that time, the cases of that disease would only grow. Then we started to take up the courses through microscopy to learn how to detect

Mrs. Zelinda

malaria in the dwellers. We also took a course of bioenergetic which, by using a pendulum and a notebook, helps us identify each disease", tell us Zelinda Sorde, 75, showing us the pendulum, a stone hanging from a small chain. Born in Santa Catarina, Zelinda Sorde is a RECA founding partner and one of the pioneers in alternative medicine in Nova California (RO).

According to Zelinda, the doctors who ministered the courses were voluntaries, and the Reca project would pay for their transport and expenses so that they could arrive in the community. According to the pioneer of alternative medicine in Nova California, some of them were from Rio Branco, Acre, or from São Paulo. From Acre federal university (UFAC), for instance, went doctors and professors Dr. Gilberto Francisco Dalmolin, Dr. Cleto Batista Barbosa and Paulo Klein, professor of the Center of Health Sciences and Sports, who passed away in August 2022.

Bioenergy to detect diseases

At 75, still seeing patients at her home, Zelinda explains how she would examine dwellers after the qualification they received of bioenergetic analysis. "We use the pendulum in front of the patient placing their hand on the notebook and, through that person's energy, depending on the side the pendulum turns, it will be the symptom of the type of disease the person has. After checking, we recommend the adequate natural remedy", tells us Zelinda.

According to the Ministry of the Health, in the book "***Bioenergetics: Knowledge about integrative and complementary practices in healthcare***" published in 2018: "The World Health Organization (WHO) recognizes and recommends the inclusion of the Traditional, Complementary and Integrative Medicines (TCI), known in Brazil as ***Práticas Integrativas e Complementares in Saúde (PICS***), in the national health care systems of the countries around the world (...)".

"Bioenergetics, also known as bioenergetic analysis, started in the field of body psychotherapies and fits in, within this context, as a relevant therapeutic technique because it is strongly aligned with the integrative health care paradigm. According to Barreto (2011), bioenergetics 10 uses a vitalist vision of the human being and of the world, it takes a wholly look to subjects' health, uses non-invasive therapeutic resources, based on a safe human bond, on careful therapeutic touches, and body and respiratory exercises looking for potentializing people's vitality".

Still according to the Ministry of the Health, in that same book: "(...) All human beings are a field of vibratory forces with intense energetic traffic, and most of the health disorders occur due to some unbalance in the load and unload processes of the most basic energies that circulate in the organism, mirrored in the breathing rhythm and bad functioning of the metabolism, in addition to loss of motility loss and body flaccidity/rigidity. In brief, pain or displeasure experienced by an individual is the product of a pressure created by the energy of an impulse toward pleasure and wellbeing which finds a blockage in the natural flow of energy in the body".

Evidence of the veracity of the bioenergetics methods and of the alternative medicine mentioned by the Ministry of the Health is the dwellers of Nova California which, according to Zelinda, were not only healed from malaria, but were also treated of other diseases.

"Against malaria we cured a lot of people, almost the whole community, I could not count them all. We mainly used teas of ***aquina, carqueja*** and ***boldo*** to detox the liver, because if malaria reaches that organ, the bacteria stay there inactive and the person may be sick again", explains Zelinda, who says also that

she makes syrups for other diseases: "We have syrups for the flu made with mango leaves, ginger and lemon. We have tonics against anemia and many other syrups. I keep on seeing people at my home, because I do not work in the pharmacy any more due to my age. However, other people see patients there and keep on checking patients and making syrups, and homeopathic medicines as well nowadays".

The herbs' power against malaria and Covid

"Garrafada", virtual check-up, personal check-up and medicine bottles. This is the first automatic WhatsApp message of Leodete Camelo, 54, one of the volunteers of the natural pharmacy of the pastoral unit of Nova California. She, as much as Zelinda, came from the south, from São Lourenço do Oeste (SC) to leave in Nova California together with other families of the RECA project.

Leodete Camelo sees patients every Tuesdays and Thursdays at the pastoral unit. The other days of the week she works from home selling medicines she produces and seeing dwellers for bioenergetic check-up with the pendulum, both at popular prices. She has also taken the courses ministered in Nova California and has worked with alternative medicine for 15 years.

"We buy the pendulum ourselves, which is a crystal stone of the region with a chain. Checking is done like this: when the pendulum turns clockwise, the diagnosis is positive for a disease. Then, we identify which it is with the help with the notebooks", discloses the pharmacy volunteer.

According to Leodete, only Mondays and Thursdays at the pastoral unit she and her fried Neusa Maria Ferrari de Oliveira, 51, see from 15 to 20 people per day. And the days Camelo works from home, she sees four dwellers in one day on average.

"We have "garrafada" for ovary cyst and uterus and kidney infections. For these symptoms we use ***cavalinha, pata de vaca, uxi-amarelo, ypê-roxo*** and other herbs. There are herbs even for women who want to get pregnant", stresses Leodete.

On the other hand, her workmate, Neusa, born in Parana, has dedicated herself to syrups and created a special one for immunity to fight the Covid-19 pandemic when it was most raging, a time when the pharmacy was much searched.

"The special syrup to fight the Covid pandemic has 30 herbs, but the powerhouse is ***Jatobá*** mixed with root of ***Açaí, Picão, Cerejeita, Açafrão*** and a little wine to set the mix. It is great for immunity. It was the best seller during the pandemic".

Neusa stresses that those are natural remedies they keep at the pharmacy in Nova California, which works at a house bought with the help of the RECA project. There, they sell natural remedies from 5 to 15 reais, and the proceeds are used just to maintain the pharmacy.

Without being paid any wages, they also sell what they produce at home, when they are not volunteering at the pastoral unit. However, the price is symbolic. "At the pastoral it is cheaper, at home we sell syrups for R$ 15, but if a dweller comes with only five, they take it anyway. We do not deny remedies when someone does not have enough money. People's health is the most important thing", stresses Neusa, adding that they miss new courses because they want to learn more.

The priest of Nova California parish, Valdemar Secretti, in charge of the pastoral unit, points out the importance of Leodete and Neusa's work: "While people want to destroy the forest, they help other people with the very forest, but without destroying it", he completes.

The talent of artists from traditional peoples wins recognition across the country

"We're in São Paulo, and before the flight to Manaus, I'll answer your questions". It was like this, with a packed schedule, that the director of the Manaus Amazônia Galeria de Arte project, Carlysson Sena, tried to send us information about the eight artists from traditional peoples of the Amazon for this book. The artists: Dhiani Pa'saro, Duhigó, Sãnipã, Yupury and Iwiri-ki, of indigenous descent; and Monik Ventilari, Nelson Falcão and Edgard Alecrim, also from Amazonian regions. They are part of the project that has been showcasing the talent of these artists in several exhibitions in Brazil and abroad. Leaving the villages and the Amazon for museums and newspaper pages.

Founded in 2016 by Carlysson Sena, the Manaus Amazônia Galeria de Arte is linked to Instituto Dirson Costa, an NGO developed 20 years ago, which offers artist development programs through an art school. And with the mediation of this gallery, these artists' works go to exhibitions, promoting the valuing and preservation of Amazonian culture.

"The Manaus Amazônia Galeria de Arte operates in the retail of art objects in the primary market, representing the artists and participating in the development and management of their careers. We help with the production and organization of cultural and artistic events that seek to reach a wider audience for visual art. Our work with these artists is multidisciplinary, and it's focused on building a solid career for them", Sena explains.

Photos: Site Daiara Tukano

Daiara Tukano, an indigenous artist and curator of the exhibition about traditional people's languages

By publicizing and selling the artworks, the institution generates income for the artists, curators, assemblers, painters, art teachers, among other actors involved. In 2018, the Manaus Amazônia Galeria de Arte was selected by the Ministry of Culture as the best visual art project, in the category `companies operating in the Brazil for less than two years'. Later, the gallery participated in the event Casa Amazônia 2019, where it was also prized.

"We don't just focus on artists' participation in exhibitions. From March to October 2022, for example, Duhigó and Dhiani Pa'saro took part in important showcases. Duhigó in the national exhibition "Brazilian Histories", at the São Paulo Museum of Art (MASP), with a work titled "Autorretrato de Duhigó", in acrylic on canvas, measuring 2 m by 1.20 m in size. He was also in the collective exhibitions SP-Arte Rotas Brasileiras, at Aura Galeria, and in the exhibition "Opostos Complementares". Dhiani Pa'saro took part as well. And the other artists featured in the collective at The Week, the business fair in Manaus, and in the permanent exhibition at the Manaus Amazônia Galeria de Arte".

According to Carlysson, "Monik Ventilari, for example, will première her first collection of prints on paper, produced by Papel Assinado, a reputed firm in São Paulo, and Duhigó will do the same. All the indigenous artists in our cast were also at the 2ª Mostra de Arte Indígena de Manaus, an exhibition commemorating the city's anniversary. Nelson Falcão is finishing his collection "O Labirinto dos Encantados", which will very soon unfold into other products. Both Monik and Edgard Alecrim are working on new collections".

Duhigó, from the village to the world

in the Tukano indigenous language, Duhigó means "firstborn daughter", but her works mean success. Her talent has earned exhibitions in Brazil and abroad. Based in Manaus since 1995, the artist was born in the Paricachoeira village, in the municipality of São Gabriel da Cachoeira, by the Upper Negro River, in the state of Amazonas. She is the daughter of a Tukano father and a Dessana mother (Amazonian ethnicities). She speaks fluently the Tukano, Dessana and Tuyuka languages.

The artist was the first woman from the Tukano ethnicity to become a professional visual artist, completing the painting course at the Instituto Dirson Costa's art school in 2005. In her paintings, she expresses the ancestral culture of the Amazon in the indigenous cosmovision. She also represents in her works the day-to-day of indigenous nations, Tukano artifacts and mythological elements. She seeks to record the history of the Tukano people, as well as the Amazonian nature she carries in her affective memory.

In 2009, the Government of the State of Amazonas presented FIFA president Joseph Blatter with her painting "Pote Tukano", during the Manaus campaign to host World Cup matches. In the 2014 World Cup, the famous footballer David Beckham bought her painting "Pote de Caxiri".

Represented by the gallery, Duhigó participated in the "Coletiva Internacional de Artistas Amazônicos" and in the collective exhibition "Amazônia Sou Eu" at the UN Headquarters, both in New York, United States, in 2009. In 2018, Duhigó was the first Tukano artist selected with two works for Bienal Naifs do Brasil, the most important event of its kind in Latin America, where she returned in 2020.

In 2021, the painting NepuArquepu became part of the MASP collection, through a donation by Mônica and Fábio Ulhoa Coelho, making her the first indigenous artist from the state of Amazonas with an artwork in the most important museum in Latin America and the South Hemisphere. From

August to October 2022, the indigenous artist was featured again in MASP, at the exhibition "Brazilian Histories", with a painting titled "Autorretrato de Duhigó", acrylic on canvas. She is currently the most renowned indigenous artist from Amazonas both in the Brazilian and the international art market scene.

Talent through generations and for the healing of Yúpury

The son of artist Duhigó and a constant companion of her mother in the visual art environment, Yúpury ended up discovering the same gift, though with his own style. His name means "the firstborn son of the Tukano nation of the third generation", in the Tukano language. He was born in Porto Velho (RO) to a Tukano mother and a father from the state of Bahia. In 2007, he completed the painting course at Instituto Dirson Costa's art school. He found in art a form of therapy to live with diagnosed schizophrenia.

His paintings poetically record the rituals and everyday life of caboclos and indigenous people from the Amazon, as well as mythological elements of the Tukano in dialogue with the contemporary world. What was previously the memory kept in indigenous orality is eternalized by the artist's visual art. In 2020, Yúpury was selected for Bienal Naifs do Brasil, with the painting "Aprendiz de Pajé", acrylic on canvas. The painting received a special mention from the curators of the exhibition, organized by the branch of SESC in Piracicaba (SP).

Dhiani Pa'saro and the art about amazonian habits

Born in the village of Tainá, in the municipality of São Gabriel da Cachoeira, in the region of the Upper Negro River (AM), Dhiani Pa'saro is an artist from the Wanano ethnicity, and his name means "forest duck" in his people's language. He is the son of a Wanano father and a Kobéua mother. He arrived in Manaus at the age of 23. In 2007, he graduated in painting. In 2008, he completed his marquetry training, both at the Instituto Dirson Costa's art school. He is the first indigenous person from the Wanano ethnicity to become a professional visual artist. He speaks fluently the Wanano, Kobéua and Tukano languages.

In his works, Dhiani has the original poetical expression of an artist who sees in art the possibility of safeguarding the ancestral memory of his Wanano people. He also records in his work habits of the Amazonian ethnicities present in his affective memory. Dhiani is an artist with a broad and consistent production.

His marquetry work "Escudo de Dança" was selected in 2020 by the curators at the São Paulo Museum of Art for the national exhibition "Histories of Dance". Due to the COVID-19 pandemic, this exhibition could not take place physically in the museum.

Sãnipã and the culture of peoples

Of the Apurinã ethnicity, Sãnipã means "Caba", a kind of wasp. She was born in the region of Caetitu, in the municipality of Lábrea, on the banks of the Purus River, also in Amazonas. She is the daughter of a Kamadeni mother and an Apurinã father. In 2005, she completed the painting course at the Instituto Dirson Costa's art school, in Manaus. She became the first indigenous woman from the Apurinã ethnicity to become a professional visual artist.

Through her art, she expresses aspects of the culture of both peoples she descends from: Apurinã and Kamadeni. In her pictures and supports derived from the forest (Brazil nut fruit, turtle shell, gourds,

and tururi – the inner bark of a tree), the designs and artifacts bring back the rituals and images that involve her experiences, with personal readings of indigenous aesthetics.

The return of the star Iwiri-ki to the scene

Meaning 'star from the sky' in the Apurinã language, Iwiri-ki resumed her artistic productions after ten years working in other fields. The artist was born in the village of Caetitu, in the municipality of Lábrea, near the Purus River, in the state of Amazonas. She is the daughter of Apurinã parents. She arrived in Manaus at the age of 8. She completed the picture marquetry course at the Instituto Dirson Costa's art school in 2007, becoming the first visual artis from her ethnicity.

The artist is gradually resuming the traces and productions with picture marquetry. Presently, Iwiri-ki is working on a collection of small marquetry pictures depicting fragments of her Apurinã Ancestry. In her comeback exhibition, organized by the Manaus Amazônia Galeria de Arte, Iwiri-ki sold 80% of her works on the first day.

The artis was selected in 2019 for the first time to participate in Bienal Naifs do Brasil 2020, with the installation Totem Apurinã Kamadeni. With the same work, she won the Bienal Naifs 2020 acquisition prize. This allowed her work to be added to the Brazilian art collection of Sesc São Paulo.

Monik Ventilari and her geometric art

A former visual art student from Liceu de Artes e Ofícios Cláudio Santoro, Monik Ventilari is black, Manauara, with a history and social science degree from the Federal University of Amazonas (UFAM). She started her artistic career in 2006, when she participated in her first collective exhibition, in the drama festival organized by the Amazonas State Culture Department.

Monik is an itinerant artist who observes the city: streets, squares, houses, buildings. Through her esthetic and poetic perception, she reorganizes the urban space by creating inner landscapes, abstracting architectural objects in lines, shapes and colors. Monik composes, organizes, selects, combines and balances geometric forms. From monotonous or chaotic landscapes, shapes and especially colors stand out which draw the artist's interest and are captured on photography and then turned into unique artworks.

In 2021, Monik launched, through the same gallery, her collection Paisagem Abstrata Porto-Ventiliar, in honor to main architect of the Amazon, Severiano Mário Porto, with works inspired by the architecture of the Vivaldo Lima stadium (nicknamed Vivaldão) in Manaus, demolished to make space for the FIFA World Cup arena. Monik rebuilt the old stadium through her poetic gaze.

A reflection about the Amazon, by Nelson Falcão

Born in the state of Amazonas, Nelson lives and works in Manaus. He studied visual art at Faculdade Belas Artes de São Paulo, and pursued post-graduate studies in art history. With 18 years of visual art production, research and teaching, his esthetic and poetic approach is concerned with investigating, reflecting on and conserving the immaterial cultural heritage of the Amazon region.

In 2017 he was appointed member of the Academia de Letras, Ciências e Artes do Amazonas (Alcear) for his body of work. Nelson's impressive work arises from his technique combined with the

scientific research underpinning his artworks, making them a source of research on universal myths, mythologies and mysticism which dialogue with the artist's real and oneiric Amazon.

Edgard Alecrim and the amazonian geometry

Born on the banks of the Madeira River, in Humaitá (AM), the caboclo artist studied technical and mechanic design, advertising and social communication at the Federal University of Amazonas, in Manaus. He is a member of the Academia Amazonense de Artes, Ciências e Letras (ACL).

In his art, the veteran Edgard Alecrim draws inspiration from everyday life and the Amazonian worlds, also with an eye for world esthetic expressions. In his latest collection, the artist explores geometric elements found in the Amazonian imagination in fruits, objects, buildings, animals and peoples interacting in the ecosystem of his creation.

The comeback towards the future

According to Carlyson Sena, director of the Manaus Amazônia Galeria de Arte, due to the COVID-19 pandemic, several actions involving the artists were suspended. Now, the objective is to reactivate those activities, which include expanding the gallery's projects, such as an arts education program called "Apaixonados por Arte".

"The project will include debates on issues related to the art system and the encouragement of artwork collecting. We want to expand our exhibition space in Manaus and open slots for new artists to be represented, especially from other states in the Amazon", the director says, adding that the goal for 2023 is to continue to make them known beyond Amazonas, exhibiting their works in other parts of the country.

The human wealth of the amazon

That the Amazon Forest is the largest tropical forest in the world, everyone knows. What not everyone knows is the cultural wealth its inhabitants reveal. Apart from the importance of the biome for climate regulation due to its huge biodiversity, the region is home to major personalities of music, arts, sports and even politics. Each with their own peculiarities and of ethnicities from various regions. Legal Amazon is divided into two parts: Western Amazon, formed by the states of Amazonas, Acre, Rondônia and Roraima; and Eastern Amazon, where the states of Pará, Maranhão, Amapá, Tocantins and Mato Grosso are located.

From Pará, for example, there are various artists known across the country and abroad, such as Maria de Fátima Palha de Figueiredo, better known as Fafá de Belém. Her stage name reveals the hometown of this Brazilian singer, songwriter and actress. With a 47-year career and over 15 million albums sold in Brazil and Portugal, Fafá, born in Belém, Pará, is the only artist in the world who has sung to three different popes, by invitation of the Vatican.

Maria de Fátima Palha de Figueiredo, or Fafá de Belém, won nationwide recognition in 1975, when the song "Filho da Bahia", in her interpretation, was included in the soundtrack of a famous Brazilian soap opera, "Gabriela". She became famous and has recorded 30 albums, between CDs, DVDs and EPs, in

addition to participating in hit collections by other artists. In addition, she has around 50 songs featuring as main themes of soap operas and special TV shows, and has toured extensively across the country and abroad, with concerts in countries like Italy, Spain, Germany, and especially Portugal.

She received, in 2016, the best singer and best album trophies, in the popular music category, of Prêmio da Música. In 2017, she was again nominated in the best DVD category. Fafá de Belém was also awarded international prizes. One of the most important was the "Medalha do Turismo" in 2011, an honor granted by the Portuguese Government.

Fafá also ventured into the screens, featuring in soap operas and musicals. Among these, her part as the character Mere Star, in the soap opera "A Força do Querer", stands out. Fafá played the singer and mother of Marco Pigossi's character in the plot.

In the field of religion, Fafá has been at the lead of Varanda do Círio de Nazaré, the world's largest manifestation of faith, which attracts celebrities, theologians, philosophers and public personalities. The Catholic festival is celebrated every year in Belém do Pará.

Among the major accomplishments in her career is her relevant participation in the movement for the return of democracy in Brazil, which earned her the code name "muse of direct elections" for her presence in demonstrations against the military rule. Fafá was the only artist to participate in all rallies for direct elections, demanding the return of democracy.

The singer is also a UNICEF ambassadress for the Amazon region, for her actions and services to the cause of children and young people and against child exploitation.

Indigenous athletes aim at the Olympics

Not by chance the meaning of the indigenous name "Ywytu" is wind, for Gustavo Paulino dos Santos, 25, or Ywytu, has earned his place as an archery athlete in the 2024 Olympics. The young man qualified for the Archery World Cup to be held in France and Colombia. During the selection stage for the competition in France, Gustavo won the second position in the podium, as well as a place in the Brazilian team. With these results, the athlete has confirmed his participation in the three international stages in 2022.

An indigenous man from the Nova Kuanã community, in the state of Amazonas, Gustavo dos Santos participates in the archery program of the Foundation for Amazon Sustainability (FAS) and in the state's archery federation (Fatarco). In early May 2022, Gustavo had his first participation in a World Cup during the South Corean stage of the competition, held in Kwangju. He was one of the eight athletes in the Brazilian team that went to the competition. In January, the athlete was summoned to train with the team in the city of Maricá, Rio de Janeiro.

"My goal in the sport was to reach the highest level, be one of the two best athletes in Brazil, and have real chances. I'm training a lot to fulfill the purpose of the FAS project to place one of the participants in the Olympics, focusing on Paris 2024", says Gustavo.

The Projeto Arqueria Indígena, developed since 2013, is funded by the company Bemol and supported by the Confederation of Indigenous Peoples of Amazonas (Coipam), the Coordination of Indigenous Organizations of the Brazilian Amazon (Coiab), the State Indigenous Peoples Foundation, and the Ministry of Citizenship, through the Sports Incentive Law.

The initiative is also benefited by the Brazilian cultural incentive law (Lei do Incentivo) and intends

to promote growth opportunities for indigenous athletes in archery, in addition to popularizing the sport and strengthening the image and self-esteem of indigenous populations of the Amazon. The project was launched in September 2021 and benefits five indigenous athletes from three different peoples by providing for their training and preparation.

Other indigenous athletes who stand out in sports, though this time in canoeing competitions, are the siblings from the Pontes family, from the Kambeba people in the state of Amazonas. One of them is Thaís Pontes Yacitua, who won her first gold medal in a national competition in the Copa Brasil de Canoagem de Velocidade, held in the municipality of Capitólio, in the state of Minas Gerais. Yacitua participated in the championship accompanied by her brothers, Antônio Weu and Tailo Xiriri, who are also athletes of the FAS canoeing project.

The youngest son of this family of athletes, who is 14, participated in the 1,000-meter sprint for boys and came third, completing the sprint in 5 minutes, 41.42 secs. He won the bronze medal in his first national competition, like his sister, Thaís Pontes, 16, in the 500-meter sprint for girls, in 2 minutes, 38.07 secs., thus achieving the highest position.

The eldest of the siblings, Tailo Xiriri, 17, competed in the 1,000-meter junior sprint. At the qualifying round for the category, he achieved the first position. At the final, he was very close to making the podium. He came fourth, completing the race in 4 minutes, 25.2 secs., just 11 seconds behind the third position.

The young athletes were summoned for the competition, which took place from April 28 to May 1st, 2022, after the results of the 2o Campeonato de Canoagem Indígena, organized by FAS in partnership with the Brazilian Canoeing Confederation (CBCa) and the Embassy of Ireland.

The Indigenous Canoeing project, created by the same entities, was implemented in 2019, already with 60 indigenous riverside athletes from the Três Unidos and Nova Kuanã São Sebastião communities, situated in the Rio Negro Environmental Protection Area (APA), managed by the Amazonas State Environment Department (Sema).

For the FAS indigenous affairs supervisor, Rosa dos Anjos, the participation of the young has good prospects. "These results are received with great joy as they show us that the project is really working. We knew the potential of these curumins and cunhatãs (indigenous boys and young women), and we believe in them", she celebrates.

Indigenous women in Congress

Contrary to the usual profile of Brazilian politicians, two indigenous women were elected federal deputies in the last elections, in October 2022: Sônia Guajajara and Célia Xakriabá, both for PSOL.

Born into the Guajajara/Tentehar people, from the Araribóia Indigenous Land in the state of Maranhão, Sônia Guajajara ran for the city of São Paulo, and had more than 153,000 votes. Chosen in 2022 as one of the 100 most influential people in the world by Time Magazine, Sônia Guajajara left her home state for the first time at the age of 15, when she was invited to attend high school in Minas Gerais. Then she returned to Maranhão, where she attained a degree in letters and in nursing, and pursued post-graduation studies in special education.

The daughter of parents who had no education, her indigenous and environmental activism began

in her youth, in grassroots movements. She soon achieved national projection, becoming vice-president of Coiab, and then executive coordinator at the Articulation of Indigenous Peoples of Brazil (Apib) for the Amazon. Within a few years, she was featured in news stories abroad for tens of denouncements of indigenous rights violations which she brought to different bodies of the UN, the European Parliament and the Conference of Parties (COP), from 2009 to 2021, traveling to more than 30 countries.

In 2018, Sônia Guajajara was the first indigenous woman to join a presidential ticket. In 2019, she co-organized the 1ª Marcha de Mulheres Indígenas in Brasília, bringing together more than 2,000 women from many peoples. The march culminated in the foundation of the National Articulation of Indigenous Women (ANMIGA), a nationwide organization that mobilizes indigenous women from each biome in Brazil.

Also in 2019, she led the Jornada Sangue Indígena Nenhuma Gota Mais, which brought together another nine indigenous leaders from Apib and traveled to 12 countries in Europe, reporting denouncements about violations, demanding concrete measures and compliance with agreements on environment preservation and the legal rights of indigenous peoples.

Due to the pandemic, and following health guidelines on social distancing, Sônia Guajajara, as the coordinator of Apib, and the organizations that form the National Indigenous Mobilization (MNI) made it possible to hold the Free Land Camp (ATL) remotely through a network model. The federal deputy also presided at online assemblies and over the creation of the emergency plan for indigenous peoples executed by Apib.

Sônia Guajajara has received several prizes and awards, such as the Prêmio Ordem do Mérito Cultural 2015 from the Ministry of Culture. She also received the Medalha 18 de Janeiro from Center for Human Rights Padre Josimo, in 2015, and the Medalha de Honra ao Mérito from the Government of the State of Maranhão, for her work with governmental bodies during the period of forest fires in the Araribóia Indigenous Land.

In 2019, she received from the human rights organization Mhud the Prêmio João Canuto for her defense of human rights and freedom in the Amazon, and the Packard Award, granted by the World Commission on Protected Areas, of the International Union for Conservation of Nature (UICN).

Today, she is a member of the Apib executive board, and serves her second term in Congress, from 2017 to 2022; the first term was for the period 2013-2017. She is still a member of the Council of the Inter-religious Initiative (IRI) for Brazilian tropical forests, an initiative that is part of a UN project.

Federal deputy Célia Xakriabá, from the Xakriabá territory, in northern Minas Gerais, was elected with 101,154 votes, representing that state. She was one of the leaders who represented the indigenous peoples in the UN Conference of Parties (COP-26)

Xakriabá holds a master's degree in sustainable development from the University of Brasília (UnB) and is a doctoral student of anthropology at the Federal University of Minas Gerais (UFMG) – the first indigenous woman to pursue these studies. She is also a member of the Rosalino Gomes Articulation of Traditional Peoples and Communities of Minas Gerais and a co-founder of the ANMIGA.

She has worked for the Minas Gerais State Education Department (SEE), collaborating for the implementation of indigenous and quilombola education units and the resumption of school activities across the state. She also served for 4 years as an advisor to federal deputy Aurélia Carolina, whom she will succeed after winning the October 2022 congressional elections.

The art of villages across Brazil and around the world

Another way of showing the talent of Amazonian artists is through handmade art. That is something the indigenous artist Denilson Baniwa is really good at. Born in Barcelos, in the state of Amazonas, he is an indigenous man from the Baniwa people. Today, he lives and works in Niterói, Rio de Janeiro. As an activist for the rights of the indigenous peoples, he has been giving lectures, workshops and courses since 2015 in Brazil's South and Southeast regions, and in Bahia.

His works were featured in an exhibition at the new Museu das Culturas Indígenas (MCI) in São Paulo. The exhibition is called "Yagapó: Terra Firme".

The exhibition invites the public to journey the Amazon Forest through sensory experiences. It features contemporary, traditional, auditory, and visual productions of indigenous musicians. Yagapó is the metaphor for the indigenous resistance that grows stronger despite constant external threats, through collective action and knowledge sharing, in addition to dance, singing, handmade art, and the connection with forests as pathways for the perpetuation of culture and life.

Denilson Baniwa's works are characterized by the use of performance, painting, laser projection, and digital images, exploring different visual languages. Known as an anthropologist-artist, in 2019 he won the Prêmio PIPA Online, one of main contemporary art events in Brazil. In 2018, he held the exhibition "Terra Brasilis: o agro não é pop!", at the Federal Fluminense University's (UFF) art gallery, in Niterói, as part of the project "Brasil: A Margem", organized by the higher education institution.

In the same year, he participated in the artistic residence program of the fourth edition of Festival Corpus Urbis, held in Oiapoque, in the state of Amapá. He participated in exhibitions at the Centro Cultural Banco do Brasil (CCBB), Pinacoteca de São Paulo, Centro Cultural ***São Paulo (CCSP), Centro de Arte Hélio Oiticica, Museu Afro Brasil, MASP, Museu de Arte do Rio (MAR) and*** the Biennale of Sydney, Australia. Besides visual artis, Denilson Baniwa is an advertiser and a promoter of digital culture and hacking, contributing to building indigenous image repertoires in various media, such as magazines, films and TV series.

In addition to Baniwa's works, the MCI is also holding other exhibitions of indigenous artists from several parts of the country, such as "Invasão Colonial Yvy Opata – A terra vai acabar", by Xadalu Tupã Jekupé, who portrays originary peoples' territories in Porto Alegre, in the state of Rio Grande do Sul.

The MCI was inaugurated in Água Branca, in the city of São Paulo, in late June 2022, and it is an institution of the São Paulo Municipal Culture Department, managed by the cultural organization ACAM Portinari, in partnership with Instituto Maracá, an association dedicated to protecting, disseminating and valuing indigenous cultural heritage.

In addition to the new museum dedicated to his origin, Denilson Baniwa participates in two other exhibitions in São Paulo (2022): at the Instituto Moreira Salles (IMS), with a mural in the exhibition "Xingu: Contato"; and in the exhibition of the indigenous curator Daiara Tukarano, "Nhe'ẽ Porã: Memória e Transformação", at the Museu da Língua Portuguesa.

The languages of the forest

The environment sound are indigenous chants and birds singing. Headphones everywhere, and artworks with different captions. This is the space of the exhibition "Nhe'ẽ Porã: Memória e Transformação", opened in October 2022 at the Museu da Língua Portuguesa, until April 23, 2023. A genuine

parallel universe about the language of the forest, created from artworks and digital media, curated by the indigenous artist Daiara Tukano – an activist, educator and communicator.

Daira is actually called Duhigó, from the Eremiri Hãusiro Parameri clan of the Tukano – Yé'pá Mahsã people, from the Upper Negro River region, in the Brazilian Amazon. In Portuguese, here name is Daiara Hori Figueroa Sampaio, born in São Paulo. She holds a bachelor's degree in arts and a master's degree in human rights from UnB; one of her research works addressed the right to memory and to the truth about indigenous peoples, in the Brazilian Federal District.

Duhigó was also the coordinator at Rádio Yandê, the first indigenous web radio station in Brazil (www.radioyande.com), from 2015 to 2021. She won the Prêmio PIPA Online 2021.

She participated in several other collective exhibitions that have featured at MASP, Theatro Municipal de São Paulo (TMSP), and CCBB, in addition to showcases in Rio de Janeiro, São Paulo, Brasília and Belo Horizonte.

Outside Brazil, in April 2019, she participated in Lettre au Vieux Monde, as an invited artist in the collective exhibition at the Mottatton Gallery, in Geneva, Switzerland. From November 2021 to February 2022, she participated in the exhibition "Ka'a Body: Cosmovision of the Rainforest", a collective exhibition curated by Sandra Benites Guarani at the Paradise Row Gallery, in London, England.

In 2022, Duhigó is the curator of the exhibition at Museu da Língua Portuguesa, "Nhe'ẽ Porã: Memória e Transformação", which offers the public an immersion into a forest whose trees represent tens of language families that originated the languages spoken today by indigenous peoples in Brazil – each conveying different ways of expressing and understanding human existence. The exhibition, which is supported by the Instituto Cultural Vale, intends to show other perspectives to the material and immaterial territories, history, memories and identities of these peoples, revealing their trajectories of struggle and resistance, as well as their chants and millennial cultures.

With around 50 indigenous participants – including filmmakers, researchers, digital influencers and visual artists such as Paulo Desana, Denilson Baniwa and Jaider Esbell –, the exhibition had special advice from Luciana Storto, a linguist specializing in indigenous languages; research coordination and curatorial assistance were provided by the anthropologist Majoí Gongora, in collaboration with Isa Grinspum Ferraz, the special curator at Museu da Língua Portuguesa.

The exhibition marks, in Brazil, the launch of the International Decade of Indigenous Languages (2022-2023), established by the UN and coordinated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) around the world.

The project is also sponsored by the Volvo Group and Petrobras and supported by Mattos Filho – by means of the Brazilian cultural incentive law, known as Lei Rouanet. It also received cooperation from UNESCO – in the context of the International Decade of Indigenous Languages – and the following institutions: Instituto Socioambiental; Museum of Archeology and Ethnology of the University of São Paulo (USP); Museu do Índio, affiliated to Funai; and Museu Paraense Emílio Goeldi.

The invitation to meet the languages spoken by indigenous peoples and the transformations arising from the colonial invasion are also a call to experiencing other conceptions of the world, starting with two words: Nhe'ẽ means spirt, breath, life, word, speech; and Porã means beautiful, good. Together, the two words mean "beautiful words", "good words", that is, sacred words that give life to the human experience on Earth.

"For UNESCO, as the agency leading the International Decade of Indigenous Languages, this initiative is fundamental to mobilize everyone about the importance of preserving indigenous language diversity, in a global context with so many challenges. The launch of the Decade in Brazil, during the opening of this exhibition, shows the strength of a joint action, in the sphere of culture and education, for the recognition and valuing of the legacy of originary peoples, and guaranteeing their cultural rights. The initiative contributes to promoting cultural diversity, intercultural dialogue, and sustainable development, so that indigenous languages, as well as other symbolic and material expressions of these peoples, mighty be preserved and treated as a public and global wealth indispensable for humanity", emphasizes Marlova Jovchelovitch Noleto, the director and representative of UNESCO in Brazil.

Memories and expressions of indigenous peoples

"Nhe'ê Porã: Memória e Transformação" is an authentic cultural journey through several regions within a single physical space. The exhibition shows the several languages of indigenous people from the floor to the ceiling of the first floor of Museu da Língua Portuguesa. Walking through the room, the visitor will find a river of words written on the floor and walls. On the museum's columns, several headphones with QR codes and the identification of the indigenous peoples according to the trees that represent tens of language families which originated the languages spoken today in each community in several states.

Among the indigenous peoples identified in the exhibition's audios, according to their language families, are: Tukano (the origin of Daiara, curator of the exhibition); Yaathe; Pano; Tikuna-Yuri; Trumai; Bororo; Karib; Mura; Karoé; Charruá; Arutani; Guaikurú; Aikanã; Macro-jê; Bora; and Tupi. These are found in various states within the Amazon, such as Roraima, Rondônia, Maranhão, Mato Grosso, Pará, Amazonas, Tocantins, and outside the Amazonian region, such as Minas Gerais and Pernambuco.

Following the families of languages of the forest, in the room "Línguas Isoladas", the visitor can access digital totems where they can choose Portuguese words to hear in the languages spoken by the indigenous peoples, for example: mother – maama in the original Ye'kwana language; father – paapa, in the language of the Makuxis; or river – onipawa, from the Baniwa people, and hûveo ke, in the language of the Terena. According to the exhibition, there are over 175 indigenous languages in Brazil, and more than 5,000 indigenous peoples around the world.

The room "Língua é Memória", on the other hand, shows the history of contact, violence and conflicts resulting from the invasion of indigenous territories from the 16th century to the present, continuing the colonial process that calls itself "civilizing". In this environment, other stories are told through archeological objects, artworks by indigenous artists, documentary records, maps, and audiovisual and multimedia contents.

The exhibition shows the transformations of indigenous languages, treated in contents that explore the resilience and multitude of forms of expression of indigenous peoples: "We put into debate the fact that we are described as non-literate peoples, without writing, but our paintings are also writing – they're just not alphabetic", Daiara Tukano explains.

The struggle of Xingu in images

In the language of the Tuyuka people, Xingu is an example of "waku tutuare", which means courage, and, actually, a lot of it.

The first indigenous territory demarcated in Brazil, in 1961, Xingu is being narrated in images with its history of struggle by the traditional peoples. The images are part of the exhibition "Xingu: Contatos", featuring at the Instituto Moreira Salles, in São Paulo, from November 2022 to April 2023.

The exhibition contextualizes the numerous forms of intervention and violence that the traditional peoples of Xingu have endured for centuries. These movements were accompanied by a profusion of images: from records by European travelers to documents of Brazilian governmental expeditions; and of extensive press coverage of the revolution triggered in recent years by indigenous audiovisual production.

According to the IMS, the exhibition proposes a review of the history of these images, establishing dialogues between photographs and films made by non-indigenous persons since the 19th century and the current work of filmmakers, artists and communicators from peoples of Xingu and other origins. It has artworks commissioned from indigenous authors, public and private archive items, and allusions to other conceptions of images by Xingu cultures, such as designs and oral narratives.

The exhibition is curated by Guilherme Freitas and Takumã Kuikuro. Guilherme is an assistant editor at Serrote magazine and a journalism professor at Escola Superior de Propaganda e Marketing (ESPM), in Rio de Janeiro. He created and hosted the podcasts "Xingu: terra marcada", from 2021, and "Sertões: histórias de Canudos", from 2019, on Rádio Batuta.

A member of the Kuikuro village, Takumã Kuikuro is a filmmaker, currently living in the Ipatse village, in the Xingu Indigenous Park. He directed the documentary "As hiper mulheres" (2011), with Leonardo Sette and Carlos Fausto. He has received prizes in festivals such as Gramado and Brasília, and Présence Autochtone de Terres en Vues, in Montréal. In 2017, he received the honorary Fellow prize from the Queen Mary University, in London. And in 2019, he was the first indigenous member of the jury of the Festival de Cinema Brasileiro de Brasília.

From the skies to the grounds of the amazon, through the lenses of Pedro Guerreiro

Breathtaking images from high above, or heart-warming ones with riverside children. Pedro Guerreiro's photographs catch the extreme and the most delicate of great Amazon.

Born in Serra dos Carajás, in the state of Pará, the 32-year-old photojournalist and audiovisual producer started his career in photography in 2014. In his photography course for the community sector of the State Communication Department (Secom), he has learned from and taught students from Soure, a municipality in the Marajó Island. Guerreiro transmitted the importance about how to relate an image to an object to be publicized, and has trained over 60 students in professional photography courses.

Since 2020, he has worked for the Pará State Communication Advisory, and his material has featured in local, national and international media vehicles, such as Rede Globo's G1 website and CNN Brasil and International.

For these works, Guerreiro has taken flyovers on his way to Santarém and western Pará, where he captured unique aerial images of the Amazon. He has also photographed indigenous communities, such as Tembé Tenetehar, quilombola children from the municipality of Santa Maria do Muraiteua (PA),

buffalos in the Salvaterra community, in Marajó, and even riverside people on the banks of the Itacai*únas River and* the Amazon River.

Pedro Guerreiro says he still cannot recall every work he has done over the countless places he visited, but that it is hard to describe the importance of the act of photographing.

"I have many things related with photography, but nothing is as relevant as the desire to capture the best image, always".

Marcelo Seabra's angle on solidarity

That the beautiful images of the state of Pará can surprise people, it is no news, but no one can imagine that pictures of the Amazon region have become tools to promote solidarity. Created by the photojournalist Marcelo Seabra, the Surprised project brings together images of the state of Pará which are sold and pay for food baskets.

The food is donated to daycare centers and families from the communities visited by the photographer during a shooting expedition. The initiative emerged in 2020, in the pandemic period, a time when, according to Marcelo, empathy and solidarity values were put to test.

"During the pandemic, several photography sessions were canceled. In order to keep income steady and, on the other hand, be able to help our fellow man, I created the project", Seabra explains.

The photographer thus set up the Surprised project. The first stage was aimed at collecting images captured in Belém and other municipalities of Pará and turning them into pictures or other material for sale. Part of the money was used for buying food baskets which were distributed to vulnerable families and child and elderly shelter institutions.

Until the end of 2020, food baskets were delivered to the daycare Lar Cordeirinho de Deus, which serves over 300 children aged 0-5 in Belém. The project sold 67 photographs, in addition to t-shirts, puzzles and mugs with the images.

In 2023, the project intends to execute its second stage of donations. According to Marcelo Seabra, the idea is to explore the roads of Pará and visit 30 municipalities in the state, using photographs and videos to show the cultural, social and natural diversity of each location.

The lone photographer's biography

Marcelo Seabra began his professional trajectory in 1999, after taking B&W photography and laboratory courses at the Associação Photoativa and the Núcleo de Oficinas Curro Velho and Casa da Linguagem, of Fundação Cultural do Pará, respectively. In 2000, he worked at Kamara Kó Photografia, and in the following year he began his career as a B&W photographer and laboratory technician at InterPhoto studio.

In 2002, he began to work as a photographer for agencies, newspapers and magazines. In 2003, he joined Joe Eventos, and in 2004 he worked at Di*á*rio do Pará as a photojournalist. From 2005 to 2017, he worked for the newspaper O Liberal, in the same role.

In 2019, Seabra started a new challenge, this time at the Pará State Communication Department (Secom-PA) as a photojournalist, where he currently works.

Photos: Arquivo Reca

Duhigó, from the Manaus Galeria de Arte, exhibits her works in Brazil and abroad.

Photo: Arquivo FAS

Gustavo Paulino dos Santos, 25, or Ywytu, will represent Brazil in the 2024 Olympics.

Photo: Revista Gol

Denilson Baniwa, an indigenous artist and activist

Photo: Arquivo FAS

The Pontes siblings from the Kambeba people, in Amazonas, athletes who stood out in Brazilian canoeing championships.

Photo: Arquivo Manaus Galeria

Dhiani Pa'saro and his works

A photograph by Marcelo Seabra, in Santarém, Pará

Deputy Sônia Guajajara in a protest in Brasília

Edgard Alecrim, from the Manaus Galeria de Arte, and his work

Manaus Industrial Hub: facts outweigh controversy and the project of the future

It was 1957 and Brazilians would hear, amazed, the news of the launch of the first satellite to orbit the Earth, Russian Sputnik-1 and, months later, they would mourn the death of the bitch Laika in Sputnik-2. On the streets of the capital city ran Beetles, Kombis and the best-selling car in Brazil at that time, a Jeep so robust that it could survive a safari. On the TV sets, as heavy as tables, families were laughing at Chico Anisio's jokes at the beginning of the show called "*Escolinha do Professor Raimundo*", while in the TV news the beginning of the construction of Brasilia was informed. The Amazon was a remote land for a large part of the Brazilians, but it was also heard at that time of a project that, decades later, would place at the center of the region an industrial hub able to produce thousands of motorcycles, cars, TV sets, chips, and to distribute all around Brazil hitherto unthinkable technologies.

It was the beginning of the Manaus Free Zone (MFZ). At the same time while the pillars of Brasilia were raised almost 2 thousand km far from the northern city, the House of Representatives was passing a law creating a free port in Manaus. The text was an embryo of the potential that could already be seen in the area. It disposed imports, storage and sales of international goods directly from the city to the very northern populations. The creator of that initiative, Amazon representative Francisco Pereira da Silva, aka "Pereirinha", could not know at that time, but his project was to extrapolate by far his initial intentions and today, 65 years later its conception, it moved R$ 158.62 billion just in 2021.

The history of Manaus Free Zone starts at Juscelino Kubitscheck administration and has potential to expand for at least more half a century, because the model is officially maintained until 2073 by the Brazilian government. In practice, it was only implemented 10 years after the initial project was designed, in 1967, during the military administration, when a decree disposed how the MFZ would operate.

The first article of Decree-Law no. 288 of 1967 summarizes the proposal: "The Manaus Free Zone is an area of free commerce of imports and exports and of special tax breaks, set up for the purposes of creating, in the interior of the Amazon state, an industrial, commercial and cattle raising/agricultural center with economic conditions enabling its development considering local factors and the significant distance they are from the consuming centers of their products".

In practice, Manaus Free Zone operates as an area of free commerce with tax breaks of imports and exports of products. i.e., foreign goods arrive in the territory free from import duties and excise tax. Moreover, the export duty does not fall on items sent from abroad. Today, it concentrates about 500 companies and maintains more than 100 thousand direct jobs. However, since the 1970s, it has been the target of criticisms by those who believe that the benefits it enjoys are bigger than the advantages it brings to the country.

In 2018, FGV/EESP (school of economics of São Paulo of the Getúlio Vargas Foundation) presented a unique report mapping in depth the economic, environmental and tax effects of Manaus Free Zone. The document stresses a series of improvements that need to be institutionalized, but it ends: " it seems fair to conclude that the program of tax breaks of Manaus Industrial Hub has been successful". One of the points assessed in the study is the income created for each Brazilian currency spent by the Brazilian government in tax breaks. In any scenario assessed, each Real generates more than R$ 1 for Manaus and region, i.e., an increase higher than the expense. In Brazil, in general, observes the study, governmental expenses remain below one in that relation.

The Amazon still is one of the states with the smallest per capita income in the country. Without Manaus Free Zone, however, the situation would be more dramatic, according to the FGV analysis, because income in the capital city would drop to half.

"One can see that something is happening in Manaus Free Zone. The amazon state grows more quickly than other states. More than Pará, more than Rio de Janeiro. Its per capita income grows faster than that of the other states, but it does not mean that it has the biggest income. We also have many regional tax break programs. We must not forget that industrialization in São Paulo was strongly supported with tax breaks", elaborates the study coordinator, Professor Marcio Holland, in a seminar on the importance of MFZ for Brazil's growth, informed by the newspaper "*Correio Braziliense*".

When MFZ was regulated within the context of the military administration, occupation of the Amazon followed the notebook of "integrate not to deliver" during the summit of the preoccupation of the military about foreign interests in the Amazon. A project such as the MFZ dealt with that concern in multiple fronts: it increased settlements in the region, it stimulated national economy, and it marked the presence of the Government in the area. In that same year, the Funai (national foundation of the indigenous peoples) was created, other initiative that showed the interest of the government in the Amazon.

That region's economy at that time seemed to have reached its summit and started its decadence with the Rubber Cycle, which placed the Amazon state in the industrial route of production of rubber and

latex at the end of the XIX Century, but which fell at the beginning of the XX Century. At that time, rubber started to be produced in Asia, and the Brazilian monopoly ended. Despite the effort to resume the economic growth, MFZ took a while to take traction.

Soon after the 1967's decree, at the initial phase of the Free Zone, it basically worked as an import island - limited only to products such as electronics, weapons, cigarettes, spirits and cars. Before becoming an industrial hub, the region prospered with the arrival of tourists who came from afar to buy imported products that would not reach other parts of the country.

Despite far away from becoming the potency it is today, MFZ started to gain industrial outlines in 1968. On September 30th that year the foundation stone of the Industrial District was launched, today Manaus Industrial Hub (MIH). On the plaque set up in the region to mark the celebration we read: "Here the development of Western Amazon will be implemented". At that time, the concept of Western Amazon had been recently created and it would encompass, in addition to the Amazon, the states of Acre, Rondonia and Roraima, which enabled that the benefits of the MFZ model were extended to other states.

The Brazilian government marked an area of about 1.7 thousand hectares and some 150 lots to implement the Industrial District. However, even before it was officially inaugurated, the companies would already be set up in the region. The first among them was Beta S.A. Industria e Comercio, which produced jewelry and semi-jewelry and stopped operating at the beginning of the 1990s. In the first years of the 1970s the first companies officially set up in the Industrial District: CIA, to produce tin, and Springer, which produced air-conditioners.

Today, decades after the implementation of Manaus Industrial Hub, it congregates about 500 companies and employees 100 thousand people directly – in addition to some 400 thousand indirect workers. In 2022's first semester, the MIH made R$ 82.32 billion, a 10.74% increase compared to the same period in 2021. Within six months almost 8 million mobile phones and 677 thousand motorcycles were produced at the MIH.

The motorcycle market is the one that boosts the hub the most, and it continues to show resilience. In the first 2022's five months, production almost reached 570 thousand units, the highest volume in 7 years, according to Abraciclo, (Brazilian association of the manufacturers of motorcycles, mopeds, scooters, bicycles and similar articles). In the last decade, the fleet of motorcycles in the northern region of the country has grown more than the rest – while in Brazil it has increased 3.3 times, just in Maus it has been multiplied by 3.8 times, according to Abraciclo.

Honda was set up in Manaus in 1976 and in 2020 it recorded 25 million motorcycles produced in the city in the MIH. In addition to the production, one of the company's focuses is sustainability. Since 2006 it has maintained a private reserve of natural heritage (RPPN) in Manaus' urban perimeter. It is 16 hectares of woods – or 17 soccer fields – which shelter some 140 species of trees and three springs. Other project of the company is the Agricola project, implemented for almost two decades in the county of Rio Preto da Eva, 80 km far from the Amazon state's capital city.

In the same area where Honda does the quality and durability tests of motorcycles, approximately 80% out of the 802 hectares endangered species are protected, such as andiroba, ypê, mahogany and pau-rosa. Additionally, fruit trees are cultivated to supply restaurants of the plant and entities that take care of children and the elderly in need. Other example of actions focused on sustainability of the industries

in Manaus is Yamaha's Zero Earthwork project, which recycles 100% of the company's solid residues. The company was the first motorcycle manufacturer to arrive in Brazil and was set up initially in Guarulhos, in São Paulo, in the 1970s. In 1985 it inaugurated its plant in the Amazon state.

For green innovation, the industrial hub targets on bioeconomy

A concept that stimulates successive Suframa superintendents is that of bioeconomy. Within different contexts, it has more than one meaning but, generally speaking, it refers both to the use of biological resources for the development of innovative technologies, and to biodiversity. Suframa approaches the subject in its Amazon Project 2040, which started to be developed in 2022 by the superintendency for the purposes of joining analyses and projections of the public and private sectors for sustainable development of the region in the following two decades.

At Suframa website superintendent Algacir Polsin stresses that Brazil shelters about 20% of the planet's biodiversity and that the Amazon rainforest is one of the biomes with the highest potential of generating sustainable businesses. "There are studies pointing out a potential of about US$ 7 trillion if the Amazon rainforest is maintained standing, with rational use of its biological and ecosystem resources. There is a huge field of possibilities of generation of products, such as biofuels, industrial biotechnology, new diagnostic and therapeutic procedures, such as pharmacogenetics, functional foods, among others", he stresses.

Those are already existing fronts, and which have started to gain more traction. Several companies and organizations presented, at the Suframa forum dedicated to bioeconomy in 2022, proposals of foment to different forms of bioeconomy. For instance, Amakos, a company based on Manaus, still being developed, presented a project of production of cosmetics based on Amazon species. Today, one of the bottlenecks it faces, as it informed, is qualification of specialized labor in bioeconomy, from engineers and chemists to designers. Targeting on broadening this scenario, it proposes, for instance, to create a forum of updates in research on plants of the Amazon rainforest.

ApexBrasil (the Brazilian agency of promotion of exports and investments) emphasized the exporting potential of the regional economy. Today, it highlighted, the Amazon stands for 42.4% of the global market of Brazil nuts, for instance. With the world's demand for organic products, the agency sees potential to expand exports.

One of the most concrete examples of the focus on bioeconomy in Manaus Free Zone is the Center of Biotechnology of the Amazon. Inaugurated in 2022, today the center has spread its facilities around 12 thousand square meters of area and more than 30 spaces where laboratories and technological support units congregate, for instance. The challenge the institution faces is to develop technological options respecting the Amazon biodiversity. Now it works for structuring the New Center of Biobusinesses of the Amazon, which will guide the public call to have a private company take over the center administration.

"We have to improve our bioeconomy business' environment in the region and to invest in science, technology and innovation. We have particularities, we have a predominantly extractive culture, the forest has its seasons, but we must add technological intensity and have the center perform the technological role for that development", stated project manager Fabio Leandro Calderaro, in 2020, during a meeting of entrepreneurship and innovation hosted by the center.

In 2022, the principles of environmental, social and corporate governance (ESG) were the pillars of companies around the world. For the president of the Federation of industries of the State of Amazon (FIEAM), Antonio Silva, the industry in Manaus Free Zone traditionally deals with these questions.

For a long time, the MFZ industries have dealt with environmental problems, reducing and eliminating negative impacts and taking actions that resulted in a decrease in carbon emissions, water contamination, treatment of residues, and investments in clean energy, among others.

As to the social aspect, they take actions focused on respect for human rights, relationship and involvement with the community, performance in inclusion and diversity in their work teams, by means of education and social assistance. The MIH industries have helped to maintain a significant degree of environmental sustainability, offering economic options to the population in the interior of the Amazon, reducing disorderly exploration of natural resource", points out Silva.

Researchers also try to measure the impacts of Manaus Free Zone on the deforestation of the Amazon rainforest. The same FGV study, which in 2018 assessed the effects of tax breaks for the local economy, calculated the relation between the population occupied in the regional industry and the rate of deforestation from 2010 to 2015. The results were modest: in one of the scenarios, a 1% increase in the population formally employed in Manaus Free Zone represented a decrease in 0.006% of deforestation.

"Considering those results found in the analyses of the environmental effects of Manaus Free Zone, it is recommended that explicit actions of incentive to environmental preservation be taken, and also actions of disincentive to deforestation by agents and companies interested in the continuous development of Manaus Free Zone, in order to consolidate the MFZ's role to preserve the Amazon Biome and the Amazon State. Those actions would enable MFZ's direct and unequivocal attribution of the environmental conservation and would strengthen the relevant role it has in the sustainable development of the Amazon and the country", completed the report.

Manaus Free Zone in 2073

Almost 60 years after the establishment of Manaus Free Zone, its benefits were extended for over half a century, and they will last at least until 2073. They had already been extended until 2023 at the beginning of the 2000s. Still in 2013,before the decision of the National Congress, in the newspapers were discussed the advantages and disadvantages of extending Manaus Free Zone's tax breaks, which some deemed excessive.

In 2022, after the more turbulent times of the Covid-19 pandemic, Manaus Free Zone went back to the focus of the tax debate. During that year, the federal government reduced the IPI (excise tax) on a series of items of the national industry. That action alerted MFZ's entrepreneurs because, as they saw it, it could decrease the region's competitiveness, which has exactly boosted by the special tax conditions maintained since it was created. The impasse created juridical unsafety for months, as admitted that executive, a until new decree determined that the items manufactured in MFZ would no longer have the IPI cut out in other regions of the country.

Protection to Manaus Free Zone's competitiveness is guaranteed because the new decree maintains the IPI rates for 109 products manufactured in Manaus Free Zone, which are added to the 61 goods listed in Decree no. 11158 of July 29th, 2022. Thus, a total of 170 products of MFZ are reached by rates reestablished,

Photos: Divulgação

Senai Samauma school boat

Plant of watches in Manaus Free Zone

Foundation stone of the Industrial District

The Amazon Theater

for the purposes of complying with the judicial decisions awarded in direct actions of unconstitutionality (ADIs) no. 7153, 7155 and 7159.

This new list was the object of intense negotiations by the Superintendency of Manaus Free Zone (Suframa) with the main regional actors, targeting on ending the juridical unsafety triggered by the judicial decisions. The impacts that the tax reduction could cause to the regional development defined in the Federal Constitution for MFZ were dispelled. This model guarantees the differentiated treatment of the region as compensation for higher costs arising from the challenges faced by the local industry.

By projecting what it deems important to be developed in Manaus Free Zone by 2073, for the next 51 years, the chairman of the Federation of the industries of the State of Amazon, Antonio Silva, stressed the juridical safety for the local industries.

"I would like that in the discussion and approval of the Tax Reform, our politicians understood the importance of preserving Manaus Free Zone for the economic and social development of Western Amazon. That Manaus Free Zone was considered, as it was at the beginning, strategic for the integrity and maintenance of the national sovereignty. I would like that a joint effort was directed to dynamize Amazon's industrial production with the planned objective of production diversification based on bioeconomy, exploring with sustainability the manufacture of food products, pharmaceutical drugs and other opportunities our forest offers. That juridical safety was guaranteed for the undertakings implemented in Manaus Free Zone", says he.

Other challenge for MIH – and for the whole Brazilian industry – in the short and long run is the qualification of labor in the transition to industry 4.0. By 2025, Brazil needs to have qualified 9.6 million workers to meet the increasing technological demands of the plants, particularly due to the arrival of the 5G at the plants. The Map of Industrial Work 2022-2025, prepared by the National Observatory of the Industry, estimates that only in the Amazon 114 thousand people will have to be qualified, 19.3 thousand out of those with basic qualification. "That qualification will be recurrent along their professional trajectory. Those who stop studying will be left behind", assessed SENAI (National Service of Industrial Education) general manager Rafael Lucchesi, at the beginning of 2022.

SENAI Amazon was inaugurated in the same year MFZ was founded. In addition to specific qualification for the work in industrial plants, SENAI offers courses from bakery to electronics of motorcycles in the region and, in 1979, it inaugurated SENAI Samauma Boat School, which navigates the rivers in the Amazon offering qualification to the communities spread around the state. Before the pandemic, over 60 thousand people had taken the courses on that boat.

The Potassio Autazes Project intends to make history with its ESG actions

Production of Potassium Chloride fertilizers will significantly contribute to the national economy with a sound base on the sustainability of its actions before starting its operation in the Autazes mine in the Amazon state

The Potássio Autazes Project promises to be among the biggest investments in mining oriented toward the country sustainability. The company *Potássio do Brasil*, subsidiary of *Brazil Potash*, much earlier than obtaining the environmental license to set up and operate the Autazes mine, a county in the Amazon state, used the ESG concepts in its actions. One of the highlights is the creation of a seedling nursery of trees and plants native of the Amazon rainforest which has benefited the Autazes region with free distribution of forest specimens.

Under a technical point of view, it will set up a processing plant to produce Potassium Chloride as fertilizer, starting with Sylvinite extraction, a rock composed of halite (Sodium Chloride, common cooking salt) and Sylvite (Potassium Chloride). This process does not damage the environment. The company's operations, which will be set up in pasture areas, allied to the use of state-of-the-art technologies, will avoid potential damages to the soil, water and animal and vegetal species.

The *Potássio Autazes Project* is composed of an underground mine with low or zero impact on the surface: forests, rivers and lakes. Ore is retrieved at about 800 meters deep with

Seedling nursery of trees and plants of the Amazon rainforest of Brazil in Autazes, AM

state-of-the-art equipment remotely operated. The processing operation's residues, basically cooking salt (NaCl), will be temporarily stocked on the surface at places properly protected with a waterproof coating to protect soil and groundwater, and then they will be returned to the underground, filling up the spaces opened by the sylvinite extraction galleries. So, the extraction method used is called *chambers and pillars*, a conventional method often used and quite safe, where the chambers are filled up, a process called *backfill*.

In parallel, the undertaking is supposed to ensure tax income to the county of Autazes (112 km far from Manaus) and, as a result, to the State of Amazon and the Federal Government. Other factor able to stimulate the state of Amazon's economy is the creation of jobs and income, considering that *Potassio do Brasil* will hire and train 80% of labor for the operation phase in Autazes, in Careiro da Várzea (23 km far from Manaus) and in the region, areas under indirect influence of the implementation of the *Potássio Autazes Project*.

"On average, 2,600 direct jobs will be created per year plus indirect ones in the construction of the ore access shafts, of the improvement plant, of the road, the harbor and of all supporting structures. In the operation phase, 1,300 direct jobs will be created plus 16,900 indirect ones", explains Adriano Espeschit, *Potássio do Brasil* CEO.

Technical Process

To remove the ore, which is about 800 meter deep, it will be necessary to excavate two deep shafts through which Sylvinite will be brought up to the surface, processed, and Potassium Chloride (fertilizer) will be separated from the Sodium Chloride (cooking salt). After that phase, the fertilizer will be carried with truck as far as the harbor to be set up at Urucurituba village, on the left bank of Rio Madeira, and from there it will be shipped on barges to the end consumer market.

Most of the potassium used in Brazil comes from mines located over 20,000 kilometers far, in Canada, Russia, Belarus, Germany and Israel. Once the mineral deposits in the counties of Autazes, Itacoatiara and Itapiranga are located in Brazil, a few kilometers far from the main rivers in the Amazon state, the distance to carry the ore will be substantially decreased. Due to that, issuance of greenhouse gases produced by the transport, one of the causes of global warming, will also decrease significantly.

That decrease in issuance of gases will be about 70% compared to, for instance, that of the potassium produced in Saskatchewan in Canada, considering that the Brazilian energy matrix is almost 85% renewable.

The potassium coming from abroad travels on roads, ships and trucks as far as it reaches its final destination in Brazil, issuing millions of tons of CO yearly. Considering the rate of production of the *Potássio Autazes Project* at 2.2 million tons yearly, and by exchanging the Canada reserve for that of Autazes, it will be possible to reduce greenhouse gases emission equivalent to planting some 57 million new trees.

Social and Environmental Responsibility

Referring to social, economic and environmental responsibility, right from the beginning *Potássio do Brasil* makes it clear that in the area where the *Potássio Autazes Project* will be implemented there will be no deforestation of primary forest once the site of the industrial facilities has already been degraded by

other previous economic activities, such as, for instance, cattle husbandry, the base of Autazes' economy. Therefore, there is no primary forest in the region, just grazing areas.

Additionally, the company stresses that it will reforest the region where the Project will be implemented by meeting strict ESG criteria (Environmental, Social, and Governance) to guide corporate sustainability actions. "We will not deforest one single hectare because this area has already been deforested by previous occupations. There is no degradation in the areas on the surface we are going to occupy. Nevertheless, we are committed to reforest an area ten times larger than the area we are going to occupy on the surface. No structure and no residue will remain on the surface, and the whole area of the *Potássio Autazes Project* will be rehabilitated", restates the president of *Potássio do Brasil*, Adriano Espeschit.

Potássio do Brasil also relies on a set of socioeconomic and environmental programs including over 30 projects to be implemented by means of partnerships with public, private and social entities to be applied in the region. One of those is a subsidized supply of Potassium Chloride to family farmers in order to avoid any deforestation resulting from the activity.

Investment and national economy

The Potassium Chloride fertilizer is quite important for the Brazilian agribusiness and for food safety in the planet. The undertaking has a life span estimated at more than 23 years and it will place the State of Amazon in the ranking as the biggest producer of fertilizer in Brazil. When it reaches an annual production of 2.2 million tons on average, the offer of this input will correspond to about 20% of the volume consumed in Brazil. However, preliminary studies point out a potential increase in the production capacity able to reach up to 45% of the Brazilian needs.

Therefore, *Potássio do Brasil* will help decrease the dependence of imports of that input from other countries, such as Canada, Russia, Belarus. Germany and Israel. Currently, Brazil is the second biggest consumer of Potassium worldwide, but it produces less than 5% of its increasing demand.

Some US$ 230 million have already been invested in the discovery and development of the *Potássio Autazes Project*. More US$ 2.5 billion are forecast to be invested. The project has potential to produce 2.2 million tons of raw material for fertilizer.

The Project's Status

Currently, *Potássio do Brasil's Potássio Autazes Project* is undergoing the phase of environmental licensing, it already has the Previous License, and it is waiting the Installation License once the consultation with the indigenous people Mura de Autazes and Careiro da Várzea has been happening since 2019, the fruit of a court agreement between the company and the Mura People in the Federal Justice.

Potássio do Brasil

Potássio do Brasil is a Brazilian private company, a subsidiary of *Brazil Potash Corp*, which manufactures fertilizers and have been operating in the Amazon region since 2009. It has Brazilian, British, Australian and Canadian investors, and it will possibly attract more investors inasmuch as the project is built and starts operations, based on extraction and improvement of potassium ore in the Amazon state.

Map showing the distance from the Potássio Autazes Project to the indigenous land homologated in the county

Photos: Divulgação

Autazes dwellers visiting Potássio do Brazil's booth at the Milk Festival in Autazes, AM

Plants produced in the seedling nursery of Potássio do Brasil in Autazes (AM) being carried to an environmental action in a partnership with Autazes city hall

Potássio do Brasil CEO, Adriano Espeschit, visiting the booths at the Milk Festival of Autazes, AM

Carajás: the railroad that changed the history of the North region

At 11:50 a.m. of February 28, 1985, a Thursday, the first ore train departed from Serra Norte, in Pará, to São Luís, in Maranhão. It was the materialization of the ambitious and also controversial project of construction of a railroad connecting the Carajás mines, in Pará, to the Ponta da Madeira Maritime Terminal, in São Luís (MA). By connecting both states, "Projeto Ferro Carajás" officially became a reality, completing the integrated mine-railroad-port chain in the North system of then state-owned Companhia Vale do Rio Doce (CVRD).

On that Thursday in 1985, the composition with 160 wagons loaded with iron and manganese completed the 890 kilometers of the railway in about 24 hours, in a travel that culminated with the first shipment of ore from the world's largest mineral province.

A little more than a year later, on March 17, 1986, the EFC Passenger Train was inaugurated. Today, 46 years later, the train is one of the few passenger trains, though one of the most modern in Brazil, transporting around 350,000 people per year. It is the only means of transport for many communities along the route.

This story began much earlier. In 1967, the ore deposits in Serra do Carajás, in southeastern Pará, were discovered by the American mining company US Steel, after geological research conducted by its Brazilian subsidiary, Companhia Meridional de Mineração. In 1977, the deposits were transferred to CVRD (for more details, see the chapter Mineral Provinces).

It was the world's largest reserve of high-grade iron ore, in addition to millions of tons of nickel, cooper and manganese ores, and tons of gold. The railroad thus emerged as an alternative to enable the commercialization of these ores.

Some said the ores should be carried out through local rivers to a port to be built in the outskirts of Belém, from where it would be exported. The governments of Pará and Maranhão were also discussing the subject, and disputing over the infrastructure.

Initially, the capacity to receive large ships in the surroundings of Belém and on the coast of Maranhão was also presented as a justification for building the railroad. Thus, the waters in Pará would not be able to receive large bulk carriers. This would raise the freight and could make exports to Japan – one of Vale's main clients – unfeasible.

The works began in 1978 and were carried out by the engineering companies contracted by the state-owned CVRD, with funds from the World Bank, as well as fiscal incentives and resources from debentures issued by the mining company. The World Bank provided funds on the condition that the company and the government ensure minimum conditions of survival for the region's indigenous peoples.

The railroad was inaugurated a year and a half before planned, in 1985. Although the port tests started in 1985, its regular operation only started in 1986, when 11.6 million tons of ore were shipped.

In 1997, CVRD was privatized, changing its name to Vale S/A, and won the auction for the EFC concession for a 30-year period. The work represented a great engineering challenge as it crossed inhospitable areas, from mangroves to the Amazon Forest.

The last tracks were placed in the "railroad pear' (thus called due to its shape's similarity to the fruit), the place where the train makes the turn so the ore can be shipped on the wagons. The placement process followed the standard procedure: the tracks were laid on the roadbed, then the sleepers were placed with the right spacing. Later, specialist machines laid the tracks on the sleepers, and finally, the clamps were fixed.

The photographs – made by the engineer Carlos Moreira – and information about this historical moment were sent by João Jaques, an employee from Maranhão who has been with the firm for 30 years and witnessed the completion of the railroad. At the time, Jacques worked in the electronics area, at the work site. "It was a party. I knew it was important, but at the time I had no idea how large it would be", he recalls. Today, he tells the stories about the days when he worked at the construction of the EFC and sighs in satisfaction: "I experienced all that".

"The Carajás Railroad was built in 1985 with an initial transportation capacity of 35 million tons per annum (mtpa). Currently, the EFC can transport up to 230 mtpa per year, nearly seven times more than its initial capacity. The last expansion project was completed in 2018, and increased the capacity from 150 mtpa to 230 mtpa", explains João Junior, EFC's operations executive manager.

According to him, the Vale railroads stand out for their efficiency and technology, but also their safety. "Currently, our railways are classified by the National Land Transportation Agency (ANTT) as the two safest railroads in Brazil. To reach these results, year after year, Vale has been investing in new technologies, crossings, campaigns, and communication with the public".

Currently, the EFC operates with a fleet of 300 locomotives and 20,000 wagons, including an electric locomotive, which is already in the testing phase. In 2021, the EFC transported 202.3 million

tons. In 2022, from January to July, 76 million tons have already been transported. The standard trains run with 330 wagons.

Regarding the passenger train, João Junior says that it continues to be an important and advantageous transport alternative between Maranhão and Pará. "Among its differentials, it's worth mentioning safety, comfort and the fare, all of which have the greatest weight on choice, according to a survey with users". A single EFC railway travel transports up to 1,500 people in high season, the equivalent to 28 buses or 325 fewer vehicles circulating on highways. "In practice, we're talking about safer road traffic and even less CO2 emissions to the environment. Each year, our train transports up to 300,000 people", he adds.

With regard to price, the fare also wins. While a sleeper bus ticket from São Luis to Açailândia (MA) costs around R$ 150, by train, the price drops to R$ 54 for the economic class. Another detail that stands out is that while in the passenger train people can have their meal in the wagon, in the bus travel, they can only have a meal at the lunch or dinner stops, which further increases travel time.

Currently, the EFC passenger train is the one that covers the longest departure-arrival distance in Brazil. The route is 861-km long, with 15 stops along 27 municipalities, 24 of which in Maranhão and 3 in Pará. In all, the journey lasts 16 hours. The stops with the greatest number of boarded passengers are in the cities of São Luís, Santa Inês, Açailândia, Marabá and Parauapebas, in Pará.

According to the National Land Transportation Agency (ANTT), there are only two regular passenger train lines in Brazil. The EFC, connecting Maranhão to Pará; and the Vitória-Minas Railroad, with 664 Km in length, connecting Minas Gerais to Espírito Santo. Both are operated by Vale.

The manager João Junior talks about the importance of the EFC for the company and the region, pointing out that the company keeps in Maranhão strategic assets of its operation in Brazil, as well as the Ponta da Madeira Maritime Terminal.

For him, operating this entire structure generates several social and economic benefits. He provided a few numbers:

- 14,000 jobs, between employees and permanent contractors
- R$ 446 million in payroll, the sum of all salaries and benefits, paid by Vale to its employees, who circulate in the local economy
- R$ 166 million in ICMS and ISS tax revenues
- R$ 41 million in social investments and another R$ 50 million in environmental actions
- R$ 2.1 billion in purchases from local suppliers
- 221 suppliers from Maranhão do business with Vale

In addition, according to him, municipalities neighboring the railroad benefit from the Financial Compensation for Mineral Extraction (CFEM), the financial consideration paid by Vale regarding the Carajás Railroad and the Ponta da Madeira Maritime Terminal, in São Luís.

"In 2017, a change in the federal law that regulates the CFEM distribution extended it to municipalities affected by railroads, ducts and ports. These values are paid to the National Mining Agency, which is responsible for distributing the resources to the municipalities", he concludes.

A single EFC railway travel transports up to 1,500 people in high season

Photo: Jornal O Imparcial

Photo: Divulgação Vale

861 km, with 15 stops along 27 municipalities, 24 of which in Maranhão, and 3 in Pará

Power generation with the Amazon's natural gas strengthens local development

It is well known that there are still many places in the Amazon state that depend on diesel-fueled power generators. Locate in the county of Silves, Campo Azulão was the first to produce natural gas in the Amazon Basin. The field was discovered in 1999, but only after its acquisition by Eneva, in 2018, did it receive investments making it operation feasible, contributing to the development in the interior of the state based on new jobs, qualification of local professionals, increasing the income and payment of taxes and royalties. It was the beginning not only of cleaner and stabler power production, but also of a strong impulse to the local economic development.

Since March 2022, the natural gas extracted from Campo Azulão has been used to feed the turbines of Eneva's thermoelectric plant Jaguatirica II in Roraima. The gas is liquefied and carried by cryogenic trucks as far as the plant, which supplies power to half the state. That power is substituting for thermoelectric plants run with diesel oil, which corresponded to 100% of the power generated in the state up to then. The Azulão-Jaguatirica integrated project supplies cleaner power to Roraima, which has been decreasing by 35% emissions of greenhouse gases at over 10 fields.

In addition to Campo do Azulão, Eneva operates at 11 natural gas fields in the basins of the Parnaiba River (MA) and the Amazon River (AM). Additionally, it has a total area under concession over 60 thousand km2 large and a park of thermoelectric generation with 6.3 GW of installed capacity and projects being built.

In the state of Maranhão, the company's operations are

spread in five counties: Santo Antonio dos Lopes, Capinzal do Norte, Lima Campos, Pedreiras and Trizidela do Vale. At those sites assessments of impact and development programs are promoted oriented toward the communities, targeting on generating income, local development, education and entrepreneurship.

Among the projects implemented are: Nova Demanda Agriculture Project, in Santo Antonio dos Lopes; HortCanaã Agriculture Hub, in Paco do Lumiar (MA); Association of Women Breakers of Babaçu Coconut (Amuquec), in Capinzal do Norte; and She-Entrepreneurs, an ongoing project in Maranhão, Amazon and Ceará.

"We believe that in countries with a significant part of the population still poor and asymmetric income distribution, such as is the case in Brazil, commitment to social development deserves a lot of attention. So, our strategic plan contemplates improving the Social Progress Index (SPI) in the counties where we operate, doubling the number of people impacted and, through the projects supported, contributing to the consolidation of 500 thousand hectares of protected areas in the region of the Legal Amazon", Anita Baggio, Director of Eneva's People, ESG, Health and Safety, Social Responsibility, Communication and Culture.

Anita presents the positive results of the partnerships consolidated along that story in favor of Sustainable Amazon. "In 2021, 9 thousand people were directly and indirectly impacted by our social projects in four states, 14 counties, totaling 75 thousand people assisted along our history. We are developing partnerships with local NGOs and supporting the populations by promoting sustainable activities, generating income and enhancing education without destroying the forest. It also contributes the fact that we are replacing substituting oil fuel and diesel with natural gas as primary source to produce electric energy in the Amazon", she stresses.

HortCanaã Agriculture Hub

Eneva has created, together with the community of Vila Nova Canaã, an agriculture project as alternative income for the families resettled: HortCanaã Agriculture Hub, which has become a source of fixed income and which strengthens the family agriculture in the region. Zacarias Passos dos Santos, who was president of HortCanaã farmers association while the project was implemented, and is its founding partner, tells how the hub of the first family farmers started.

"My idea was to have an area of agriculture because many people lived from cultivation, and I wanted a project for everyone to have their means of survival. Then, before we created HortCanaã, I had a small farm where we founded the first association called Vila Madureira. In 2008 I talked to Eneva, which accepted to support and stimulate the family agriculture hub", told Zacarias dos Santos, who was a builder before becoming a farmer.

According to him, currently the project has 25 active farmers who plant and sell several agricultural produce such as: cassava, papaya, corn, beans, vegetables and pineapple: "We sell at street markets and deliver in supermarkets and stores. Every Friday I go to the street market. And every month we also deliver in schools. Monthly, sales yield up to 2 thousand reais for each farmer on average", he explains.

After the success of the project, the novelty of HortCanaã is planting cacao, which started at the beginning of 2022. According to Zacarias, there is a total of 6 thousand cacao tress planted expected to bear fruit in 2024. "We already have a collective area where we have planted about 600 cacao trees, plus the plantations of the project producers at their private areas. This cacao project started in 2022, and 8 thousand seeds were planted and now about 6 thousand trees have already grown", tells Zacarias.

Who is also writing the history of Vila Canaã is Cleonice Eulalia da Silva. She was responsible for the educational process during the period of resettlement of the community, contributing to eradicate local illiteracy, coordinating a project in a partnership of EJA. After teaching in the first years of the Vila Canaã school, Cleonice da Silva decided to live 100% from family agriculture.

"At that time, we had been given a piece of land for us to work on. To adapt to farming better, we took many courses. We wanted to get used to working with agriculture. I started in the project when I was about to retire as a teacher, I liked it got engaged in the idea. We started with vegetables and then we learned how to plan other produce", remembers Cleonice da Silva, who always says to be grateful to HortCanaã for the income the project provides: "By means of this project I have made many friends and today our income comes from it, so, I am grateful to the project for this opportunity".

HortCanaã Agriculture Hub has 60 hectares of land donated by farmers. The project has the Family Agriculture Seal and has already been granted the awards Brasil Environmental and Best Practices of Environmental Education. The hub had its first production of organic chocolate in 2021, which was fully traded inside the state of Maranhão. It was the first chocolate ever produced with organic cocoa 100% from Maranhão. Additionally, 27 thousand new hybrid plants of cacao were planted by the farmers and their families, followed up by the state university of Maranhão.

Other good news is that the HortCanaã Agriculture Hub has been approved in another public notice issued by Embrapa Maranhão for the project "Pedagogical Garden". The initiative's objective is to promote nutritional and medical food safety for vulnerable communities.

The Amuquec Project values women's work

To strengthen empowerment of the women who break babaçu coconuts in the region of Capinzal do Norte. This is one of the main objectives of the Amuquec project, supported by Eneva since 2017. About 200 babaçu coconut female breakers work with the produce after the harvest. The process includes breaking the fruit, trading the shells and the coconut almond and manufacturing soap (handmade).

That activity brings income and has changed many women's life, improving their self-esteem. It was the case of Maria da Paz Pereira, who has a life story marked with resilience. Maria left school when she was 11 after catching measles and started to work. As if it were not enough, Maria da Paz lost her children in her three pregnancies. Without any perspectives, she accepted the invitation of her godmother to join the Amuquec. In the beginning, when the association was still being shaped, her routine was to get together with the breakers at 6 in the morning, to collect coconuts and break them, and she would even break from 10 kg to 15 kg of coconuts in one day.

"After Eneva's support of the association, our income improved, and opportunities started to come up with projects and courses. Today, I am grateful to be part of the group, because I have developed skills and knowledge through the courses. It increased my self-esteem and I wanted to study again", tells us Maria da Paz. She is also part in the project Knowledge Revolution, which seeks to decrease the rate of illiteracy among the members of the social projects supported by the company in the region of Complexo Parnaíba (MA).

Following Maria da Paz's steps, other woman joined the Amuquec project seeking income to support her family was Francisca Maria Moreira. She also tells that her life was marked with difficulties, and she started to support her children by working with babaçu coconuts.

"Since I was a child, my life was to break coconuts and go to work in the fields. I started to break coconuts when I was 9, helping my grandmother and my mother. I got married, had eight children and separated. I raised by kids with the income from coconuts. In the beginning, one coconut kilo had no value, you just would get some change to buy rice. I would take 5 kg of coconuts to the grocery store and traded them for 1 kg of rice, 250 g of sugar, 250 g of coffee, but the money was not enough to buy some flour. Through Maria da Paz and her mother I joined the Amuquec project in 2020. Today we are able to pay our bills just by selling coconuts", celebrates Francisca Maria Moreira.

In 2021 a new cycle of qualification for coconut breakers started to produce handmade soap from oil of babaçu coconuts. The associates of Capinzal do Norte, in Maranhão, were accompanied by the SESI team for 6 months and were trained on financial education, fighting against waste, preparing a menu, organizing and storing products, and articulation to start sales.

The "She-Entrepreneurs": from sewing to cooking

The initiative's name already informs its objective. The "She-Entrepreneurs" is a project of actions oriented toward women of the communities near the Eneva's operations in Maranhão, Amazon and Ceará. In 2021, 230 women were benefitted by the project. In that same year, qualification relied on a partnership with SESI Entrepreneurial Kitchen, transforming cooking into a source of income, with courses and workshops involving several products, such as: handmade organic jams, preserves, compotes, antipasti, bread, cakes, and juices, among others. Classes would be ministered at a semi-industrial kitchen.

Among the women that joined the program there is Julieta Serrão Barbosa, from Itapiranga, in the Amazon state. A seamstress for 18 years, Julieta, a single mother, started to learn how to sew to support her children. Currently, president of the project in Itapiranga, she tells how she joined the "She-Entrepreneurs" by also remembering the trajectory of the project at the height of the Covid-19 pandemic.

"At the beginning of the pandemic, the project started with the name "Sewing for the Good", where we would manufacture masks for Eneva. We made the masks and the company donated them to entities and schools in Itapiranga, Silves and other counties in the region, among other hubs in Maranhão. During the pandemic, each seamstress did their individual work with material supplied by the project and, later, they would buy our production. The pandemic ended, and we were already known. It was then that the company proposed we put together an association. We were very happy because it was to be goodbye to the "Sewing for the Good" project, but we saw an opportunity for us to be much more than seamstresses", tells Julieta Barbosa.

According to that seamstress, at the first meeting there were 25 women, which elected her the president of the association. Currently, the project relies on 40 participants. "We had many courses valuing our femininity. Several instructions focused on empowerment, on having us find our potential. It was then that we saw we could be whatever we wanted", she stresses.

According to Julieta Barbosa, now the group of seamstresses supplies from uniforms to covers for water-fountains to Eneva, in addition to school uniforms to other institutions. Moreover, through the qualification courses, the project participants broadened the services to the area of cooking by working as buffets.

In addition to income, our knowledge improved. We do from sewing to coffee breaks for meetings.

Photos: Arquivo Eneva

Zacarias Passos dos Santos, former president of the HortCanaã Association of Farmers.

President of the association of agri-ecological produces of Nova Demanda (APRANDI), Dario Mota Sampaio.

Leader of the project She-Entrepreneurs, Julieta Serrão Barbosa, from Itapiranga, in the Amazon state.

Cleonice Eulalia da Silva, a teacher and a farmer of Vila de Canaã.

The knowledge the project has brought us will last forever. Now, we can see many possibilities we did not realize", says the president of the new association.

Nova Demanda agriculture attracts new dwellers

The project of incentive to family agriculture at Nova Demanda started in 2020, and made significant headway in 2021, with the Association of Rural Producers and Farmers inserted in public policies by means of the More Seeds Project.

The president of APRANDI (association of agri-ecological producers of Nova Demanda), Dario Mota Sampaio, was one of the dwellers who was given a house in 2016 through the Program of Voluntary Settlement. In addition to the house, Dario received an area proper to plant and, as much as other dwellers, he started to produce in agriculture.

"After the families were resettled, the company contacted me and showed the example of the Hort-Canaã project. When I was given the house, I also wanted to learn to produce in my own land. Thus, we founded the association and 34 families started to work directly with family agriculture", he remembers.

According to him, APRAND's objective is to create autonomy, sustainable entrepreneurship and to increase income among the associates. The small association is expanding and seeking to supply produce to other regions through governmental programs. "In the beginning it was very hard for the community to believe that it would work out. We talked about the programs of the federal government and stimulated them to plant. Today, farmers of Nova Demanda already see things differently, and the income help us a lot", says Dario Sampaio.

One of the participants of the agriculture project Nova Demanda was Jadilene de Oliveira Souza, aka Nega. Married and mother of three daughters, she believed in the project right from the beginning. "The older guys, at that time, did not believe, but I accepted it quickly because we did not have any land. When we moved to Nova Demanda we were already sure that we would have our own house and 3 hectares of land where we could sew and harvest inside an area that was ours. And it was very good to accept it because we have improved the life of our family. My husband and I can offer better quality of life to our daughters. We take care of the land and currently we are planting passion fruit. We plant it, we sell it and make the pulp, which also a high demand", highlights Jadilene, who is also a member of the She-Entrepreneurs group.

Jadilene remembers that she learned to make passion fruit jam in one of the courses offered by the project: "Passion fruit jam is our powerhouse. Additionally, today we offer services of coffee break. Now we have good income, we are seen with other eyes by the society", she praises.

In addition to the local growth and trade, Nova Demanda is taking its produce to other regions in the country. According to president Dario, APRAND is participating in a nation auction to supply fruit. "We have advanced a lot, we are participating in the auction of CONAB (national company of supply). If we win, we will have to produce and supply tons of produce. We are gradually moving on, trying to bring more jobs and income to the community", states the farmer.

In July 2022 Eneva delivered the first seedling nursery of the Reforest program, located in the area of the Legal Reserve in Nova Demanda. The objective of the Reforest program, launched in 2021, is to recover degraded areas in Maranhão. The area to be recovered initially is of 60 hectares, equivalent to some 85 soccer fields.

The obstacles to getting the forest online

Around 80 calls and contacts were made for 14 of the 21 themes of this book, 90% of these being conducted via WhatsApp and at night, when the people to be interviewed were at home. That happened because most inhabitants of the Amazon, the characters of this book, didn't have a telephone signal for direct calls, or had to be in a place with wi-fi access for some communication – when that did work! All too often, the calls dropped during the interviews.

In the contacts with residents of communities in the municipality of Moju, in the state of Pará, one of them, out of solidarity, picked up other neighbors with his car so the interviews might be held in groups, with everyone gathered at a company's main office, due to poor signal in their region.

This account is also part of the book "The Paths to a Sustainable Amazon", since without communication, it isn't just the interviews that fail, but the entire routine of these inhabitants for their basic needs, such as accessing banks or paying bills via cellphone apps, as well as learning platforms, medical services, and all kinds of services relying on telecommunication to work.

However, despite the communication difficulties that affected the interviews for the book in contact with inhabitants of the Amazon, several telecommunication companies show that they have been operating in the main capitals and some remote areas. According to data from the National Telecommunications Agency (Anatel), in the period from September this year, in the states of Amazonas and Pará, for example, the following access numbers were recorded: in the former, 481,000 fix or wi-fi

broadband accesses; and 4.2 million access through mobile phones. In Pará, there were 699,000 broadband or wi-fi accesses and 8 million accesses through mobile phones.

This data is provided to Anatel by the telecommunication service providers themselves, which record the total accesses by subscribers of fix broadband, mobile telephone, pay TV, and fix phone lines. Regarding broad band or wi-fi internet providers, in Amazonas, the following companies operate: Claro, Oi, Tim, Vivo, Fiber Network, Clickip, Intlink, Sky, Hughes Telecomunicações, and other local companies. As for mobile phone services, the providers are Vivo, Claro and Tim.

In Pará, the broadband providers are: Oi, Claro, SEA Telecom, Vivo, Você Telecomunicações, JC Serviços de Internet, Sky, Click Enter, Júpiter Telecomunicações, Garra Telecom, and others. For mobile phone services, the providers are Vivo, Claro and Tim.

Among these local operation companies is HughesNet, of Hughes do Brasil, which became known for installing internet access in places away from larger urban centers, where there is no cellphone signal or communication infrastructure, such as rural areas, riverside communities, islands, and indigenous villages – one of which is actually becoming famous in social media.

From the Negro River banks to Tik Tok

Among the five thousand municipalities in the country served by Hughes Brasil with satellite broadband service, the Tatuyo indigenous community, in Amazonas, transcended Brazilian borders by means of its connection. Located on the Negro River banks, and approximately 1 hour by boat from Manaus (AM), the indigenous village gained visibility through the contents of the forest's new digital influencer: Jugoa, whose name means young female artist. Her Portuguese name is Maira Gomes Godinho. On the internet, she gained a third name, Cunhaporanga, the Guarani word for pretty girl.

The 22-year-old has already gathered over 6.5 million followers in social media, showing curiosities and the routine of her life in the Tatuyo community, on the Negro River banks. A hit in TikTok, Instagram and Facebook, Cunhaporanga has featured in the Spanish newspaper El País. She became known in the US, France, Germany, Greece, Poland, Romania and even in China, showing the indigenous culture of the Amazon Forest.

Her interest in social media began with the arrival of internet in the community, which happened during the pandemic in 2020, when her father, chief Pinõ, responsible for the Tatuyo village, contracted HughesNet's satellite broadband internet service.

"When we arrived at the community, it was all woods. I founded this village thinking about my children and for other people. My thought was, "I'm going to live here and send my children to school. They had been studying, but at a certain point, they needed a cellphone, they needed internet access to study. Then we decided to set up the satellite dish in the community", says chief Pinõ.

With internet access, Cunhaporanga began to share the routine of her people on social media and went viral after a video where she revealed the custom of eating the Mochiva larva, a traditional indigenous food.

"We had internet access in the village early on in the pandemic. Besides using it for online classes, I began to share our day-to-day. When I shared the video eating the larva, it was just to show a custom of ours. I wasn't thinking of reaching such a wide public", says Cunhaporanga. From then on, she gained more and

more popularity in the virtual environment, and that drew the attention not only of Brazilian media, but also the press in several countries.

The view figures are impressive. A video where she presents her meal with typical food, including Mochiva, has reached over 31.7 million views in TikTok. In another shooting, Cunhaporanga shows and explains the use of "pega-moça", a kind of indigenous wedding ring used by the bride and the groom on the wedding day. This video has had 17.2 million views in the same network. Contents with pop music dancing, so popular on TikTok, are also in her profile – one of them has reached 42.9 million views.

The Tatuyo indigenous community lives basically on tourism and handicraft sales, besides hunting and fishing. With the publicization of the people's customs and traditions, the internet has helped even with sales payments: "Many tourists are interested in the handicrafts and ask if they can pay for it via internet; now we can use our access so that they can make instant online payments" said Cunhaporanga.

For chief Pinõ, the father of the now famous young woman, the Internet brought not only publicity, but digital inclusion for the community: "We believe the Internet is important, as it won't let our culture die out. It is also brings us information from other places, and communication", says the chief.

Today, Hughes operates in the Amazonian regions, offering satellite broadband service for residences and small retail. It uses technology such as Ka band, with three satellites currently operating in Brazil. This service is ideal for people living far from urban centers.

In addition, the company provides the service Hughes Wi-Fi Xpress, in which retailers in small communities acquire satellite online access and sell prepaid internet credits to locals. The service is provided mainly for low-income communities and touristic places, where visitors can buy internet packages from R$ 4.00.

Hughes emphasizes that the Amazon region has many peculiarities. According to the company, its presence in remote places collects interesting stories, besides the Tatuyo community's fame. One of them refers to a video recorded by one of its installers and technicians in the region, who, while performing the maintenance on the antenna during the Negro River's flood season, was greeted by a pink river dolphin. The unexpected visit led the technician to immediately film the mammal native to the region, considered an Amazon folklore character.

The video was made in 2021 in the municipality of Iranduba, in Amazonas, during the river flood, at the antenna maintenance spot. At that occasion, the technician joked about the situation: "That's the Amazon, we come to repair the antenna, and our buddy dolphin here shows up for his connection, too. The Negro River flooding covered the antenna, and in came our buddy here. Nature is really surprising!", narrates the technician during the video, enjoying the moment with the dolphin, which opens its beak to the camera.

The link to access the video of the dolphin with the HughesNet technician is:

https://www.linkedin.com/company/hughes-do-brasil/videos/native/urn:li:ugcPost:6820736059068952576/?viewAsMember=true

An inhabitant of Amazonian rivers, and known as a charismatic animal, the pink river dolphin is also one of the main characters of Brazilian folklore, better-known in the North Region. According to the legend, during the period of the June festivals, the dolphin will turn into a handsome and attractive man, who seduces women in the riverside communities during the festivals. It wears white clothes and shoes, as well as a hat concealing the top of its head, covering the dolphin's nostrils. The pink river dolphin then lies with

a woman, who becomes pregnant and gives birth to a child without the father's presence, as the animal has returned to the water.

In addition to its Brazilian folklore story, the pink river dolphin is an essential part of the country's fauna and the largest river dolphin species of the four existing in the planet: males can reach 2.5 m in length and weigh up to 200 kg, while females measure around 2.2 m and weigh 150 kg.

The publication is in the company's LinkedIn page. According to HughesNet, the greatest challenge to offering internet in the Amazon region is always the location, due to access difficulties, since this is an area with many rivers. For technicians and installers to reach these places, they face hours of boating, trails and dirt roads.

In addition to Iranduba, the company operates in the Amazon since 2016, in over 5,000 municipalities in Amazonas and Pará, including the region of the Marajó Island, a place also hard to access in order to provide communication.

Connecting the Marajó Island to the world

From a banking boat to medical appointments through telemedicine programs. The importance of the Internet in remote regions goes far beyond the use of social media. It is the connection to meet basic needs of inhabitants of rural and riverside areas, as well as islands, such as Marajó.

This task is also performed by the local provider, Top Net, responsible for providing internet to around 1.800 customers in the Marajó Island, between individual and company contracts, as with the banking boat of Caixa Econômica Federal. This type of vessel provides banking services in view of the difficulty accessing the regions where riverside populations of the Amazon live.

In addition to the banking boats, Top Net provides wi-fi internet services to several public and private organizations in the three municipalities in Marajó: Soure, Salvaterra, and Cachoeira do Arari.

Top Net's owner, Walter Cleber Campelo, 34, explains that the company has been providing internet services in the region for 10 years, but before getting to the provision of these services, they faced many difficulties to their installation, precisely because it is an area surrounded by the river.

"It was really hard work, it wasn't easy, because we're isolated in the island. So, we began to transport the links, which are internet networks via radio signal. And as is well-known, it rains a lot in the north. To get internet from one point to the next, it's 47 km of challenges, and 90% of the way is water. We crossed the Marajó bay with that installation", Walter Campelo emphasizes.

According to the entrepreneur, two towers were installed, one to catch the link in Vigia de Nazaré (PA), where a 72-m high tower was set up, and then the satellite dish was installed, transmitting the signal to Marajó. This antenna, which is 1.8 m in diameter, points to the municipality of Soure (PA), where there is another, 60-m high tower and a 1.8 m diameter receiver, which receives the link. The process involves varied equipment, including fiber optics distributed to the whole city.

"Ten years ago, we didn't have any structure, we were selling 1 Mb plans, the biggest one at the time, for R$ 300. We received the link via satellite and transmitted it via radio. By and by, we evolved the systems, but we've always faced difficulties, because in our region it has always rained a lot, with a lot of lightnings, which caused us trouble, burning cables, for example. Some 6 years ago, a lightning burned one of our towers, we lost everything, we had to buy the equipment and start from scratch. I went to São Paulo to buy new equipment and

ended up meeting Rede Metro, which works with fiber optics in scale, with network cabling to the customer's home. Then we managed to expand our portfolio and renewed all of it to fiber optics. Today, our smallest plan is the 10 Mb one, and the biggest one is 50 Mb. We were studying possibilities to increase to 100 Mb", Campelo recalls

Currently, Top Net has over 100 km in fiber optics in the region. A transformation not only in the company, but in the municipalities where it operates.

"Everything became more practical, the study and several activities, but the spark for internet was the pandemic. We were essential in the pandemic. Today, nobody survives without water, electricity and internet. And for us, it is a great source of pride, bringing internet to remote areas, because Soure is actually a capital, but, for example, we are serving customers in the Caju-Uma and Vila do Céu communities, which are beaches protected by ICMBio.

There you have two communities with over 100 houses combined, where I have more than 50 customers.

It's very rewarding to see people who had never had internet access, and now they're developing. God forbid the internet breaks down there, I'll go running like crazy to sort it out. People pay their bills and get personal things done via cellphone. And recently, in less than 2 years, the federal government implemented the telemedicine program, to make appointments easier. For me, it's a great source of satisfaction to be able to serve these people", Walter stressed.

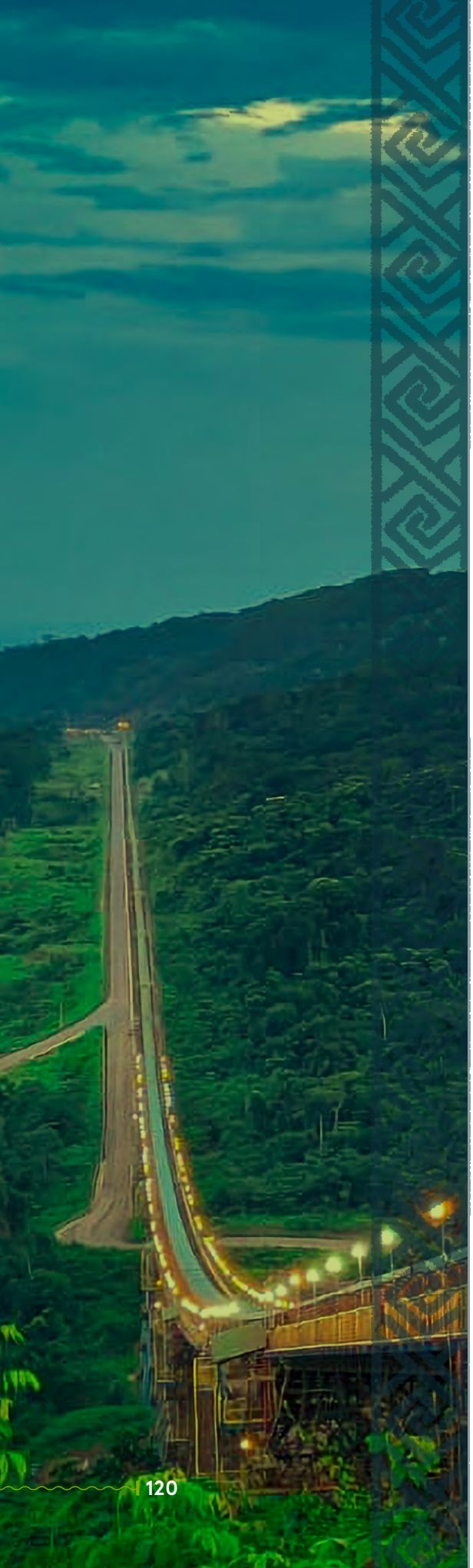
According to the entrepreneur, currently, in Soure alone, there are already seven local providers, not to mention the telephone companies: "Everything is possible with internet, just like I'm giving you an interview from an island in real time", he concluded.

The "Programa Amazônia Integrada e Sustentável"

In addition to data from the companies providing telecommunication services, Anatel also highlighted the Programa Amazônia Integrada e Sustentável (Integrated and Sustainable Amazon Program, or Pais, the Portuguese abbreviation), which aims to implement a network for transporting high-capacity fiber optics along the rivers in the Amazon region and in the metropolitan areas of the municipalities connected to the transport network.

The decree from 2021 also authorizes partnerships with public or private organizations to enable use of the surplus capacity of the implemented networks. The document created the Pais Management Committee, a demand of the Federal Court of Accounts (TCU), which will ensure the operational and commercial sustainability of the implemented network and make the surplus capacity available to the private sector in a non-discriminatory manner to the private users interested.

According to the note from the TCU's General Secretariat, "the regulation of the program gains relevance in view of the 5G bid notice, which should consider the establishment of comprehensive commitments, including the mandatory implementation of Pais".



Mining is part of the history of the Amazon territory

Mining is an activity whose history intertwines not only with the occupation of the Brazilian territory since the colonial times, but also with its own geological formation. To have an idea, the industry moves R$ 339 billion in Brazil, paying R$ 117 billion in taxes, R$ 10 billion in royalties at federal, state and municipal levels, according to 2021 data of the Brazilian Mining Institute (Ibram).

Traditionally acknowledged for its extensive impacts on nature, which are remediated with programs validated by environmental agencies, the industry has searched for more sustainable models to explore mineral deposits underground, a requirement not only legal, but also necessary in the current scenario where companies do their best to consolidate themselves with their ESG programs – environment, social, and governance. This is a huge challenge, particularly in critical biomes such as that of the Amazon rainforest, where are located one of the main Brazilian mineral provinces.

Some regions in the national territory are called mineral provinces because they are characterized with the existence of a set of relevant resources for mineral production, and the occurrence of mineral deposits that may be the target of investigations with geological surveys aimed at economical use. To conduct such studies the companies depend on authorizations and licenses granted by the national mining authority (ANM), subordinated to the Ministry of Mines and Energy.

"The expression "mineral provinces" is very broad and, at the same time, technical. They have a geological vocation for

polymetallic deposits, i.e., deposits of metals, such as gold, copper, iron, manganese, etc. Those are regions rather geologically favored, with several active mines. This set of mining activities grants this character of ***province"***, stresses geologist Romulo Angelica, tenured professor with the institute of geoscience of the federal university of Pará (IG-UFPA).

The mining activities in the northern region of Brazil are relevant sources of generation of wealth and social benefits, enabled with the installation of large and small mining companies, which must comply with strict legislation to protect the environment and remediate the impacts generated by the activity. Currently there are about 1 million km2 of area with mining potential that are under the companies' control. However, only 1% of that area is being effectively explored.

"We are just beginning, in Brazil, a phase of leaving aside superficial discoveries, where a geologist works with a hammer walking around the field looking for samples on the terrain's surface. We have to start now a phase of underground mines, of deep deposits. We have very few mines underground, which are deposits that have not surfaced and can only be explored in depth, different from those of iron and bauxite, for instance, which are out in the open. Countries such as Australia and Canada have been doing this activity for decades, and we are just starting now. This happens due to the lack of a consistent mineral policy, of investments in the country, and of the inaptitude of the Brazilian capital to invest in mining", ponders geologist and consultant Elmer Prata Salomão.

The industry's programs show considerable variety of geological environments of minerals, from the more used in industries as raw materials to those most valued in the global market. 40% of the Amazon territory is estimated to have its origin in the Precambrian period, from the formation of the Earth – about 4,600 million years ago – to the beginning of the Cambrian period. It corresponds to approximately 1 million years ago, a period with huge potentialities for mineral deposits of iron, manganese, copper, aluminum, zinc, nickel, chromium, titanium, phosphate, gold, silver, platinum and palladium. Most soils composing the Amazon state were formed in periods of the history of the Earth where the main mineral deposits were originated in many regions of the planet.

Ibram's data illustrate the increasing importance of the state of Pará as an important destination of investments in mining now and in the future. It is where one of the largest mineral provinces known is, Serra dos Carajás. In addition to having the biggest iron ore deposit being produced worldwide, and an expressive deposit of copper, the province concentrates other potential deposits. Other two provinces can be highlighted in the country: the Tapajós region, in the southeast, and the northern region.

In the region called Baixo Amazonas, there are still three active mines of bauxite. Part of that ore is exported and part supplies one of the largest industrial complexes of production of alumina and aluminum in the world located in Pará.

Carajás

A mineral province located in the southeast of Pará, in the county of Parauapebas, Carajás has the biggest deposit of iron ore with the best quality in the world. It also has expressive reserves of copper, gold, uranium, manganese, nickel, zinc, silver, bauxite, chromium, tin and tungsten. Just the Salobo Project, of the company Vale, has deposits estimated at 70 million tons of copper, which contribute to reduce Brazil's dependence on imports.

After its discovery as a mineral deposit in 1967, the Carajás Project was started in 1978 by the then state company called Vale do Rio Doce. The first mine started to operate officially in 1985, with the inauguration of the railway and ore shipping facilities to countries abroad.

As from the 1970s, the Brazilian government made many investments in the region's infrastructure.

The main program implemented by the government was given the name of Grande Carajás, with approximately US$ 5 billion investments, a high amount for the construction of Tucuruí hydroelectric plant in the Tocantins River, and the Carajá Railway, which enabled draining the production and creating the Ponta da Madeira port, located in the city of São Luiz, in Maranhão. The construction of this port enabled the access of ships coming from different places around the world, easing the exporting process.

"At the end of World War II, in 1945, due to the destruction of many countries, reconstruction was needed. Then came the demand for mineral raw materials. The whole world started to make large projects of geological mapping, of prospection of minerals looking for metallic goods. As from the 1950s, in the US and in European countries. In Brazil it started in the 1970s, with the Radam Brasil Project", remembers Professor Romulo Angelica, mentioning the plan created in 1970 for the purposes of mapping and surveying natural resources in the Amazon. Five years later it was expanded to the whole national territory and was called Radam Brasil.

"It was an idea of the military. Radar technology had just arrived here – today satellite images are used. Based on radar images geological maps were drawn. Teams would go to the field to map based on initial photographs produced by the radars. The project was a success, it levered the discovery of many mineral deposits in Brazil", highlights Romulo Angelica.

The first big mining project in the Amazon occurred in the 1950s: exploration of manganese in Serra do Navio". Within the post-war context, it was conducted by an American company. The classical story of this project is that a "super-friendly agreement" was made with the Americans for 50 years of exploration. Before that, manganese ended. An excellent example of a project without any environmental concern at all. There was no legislation for it, nor dispositions on residue disposal, the pits were just abandoned", emphasizes the geologist.

Carajás was discovered in 1967. Accidentally. A well-known Brazilian geologist, Breno Augusto dos Santos, worked for an American company (US Steel) looking for manganese in the southern region of Pará. One day when he was inspecting the region, the helicopter where he travelled had problems and had to land. The place chosen by the pilot was one of the plateaus where later it was found to be a deposit of iron. In the team was also geologist Erasto Boretti de Almeida, and others".

There was great political agitation because it could not fall on foreign hands. And then happened the whole story of the company Vale creation and nationalization", reports Romulo.

The first shipment of iron ore, however, only happened in 1985. It had taken 18 years because that was the time necessary to set up the whole local infrastructure. A railway was built, and also Ponta da Madeira port, in addition to the work of geology and construction of the very mine. In that period started other large mining projects in the Amazon region: bauxite in the Trombetas region (PA), and kaolin in the region of the Jari River (AP/PA). Also the Tucurui hydroelectric plant was built in the Tocantins River (PA) to supply power to those large projects. Currently, Tucurui is the biggest 100% national hydroelectric plant, except for Itaipu, which is binational (Brazil and Paraguay).

"The example of the manganese project in the 1950s was a disaster from an environmental point of view, because there was no legislation at that time. Currently, the companies' strategy is impressive, the mining plan, reusing the terrain, replating, recovering degraded areas, zero-residue projects, among others", states Romulo.

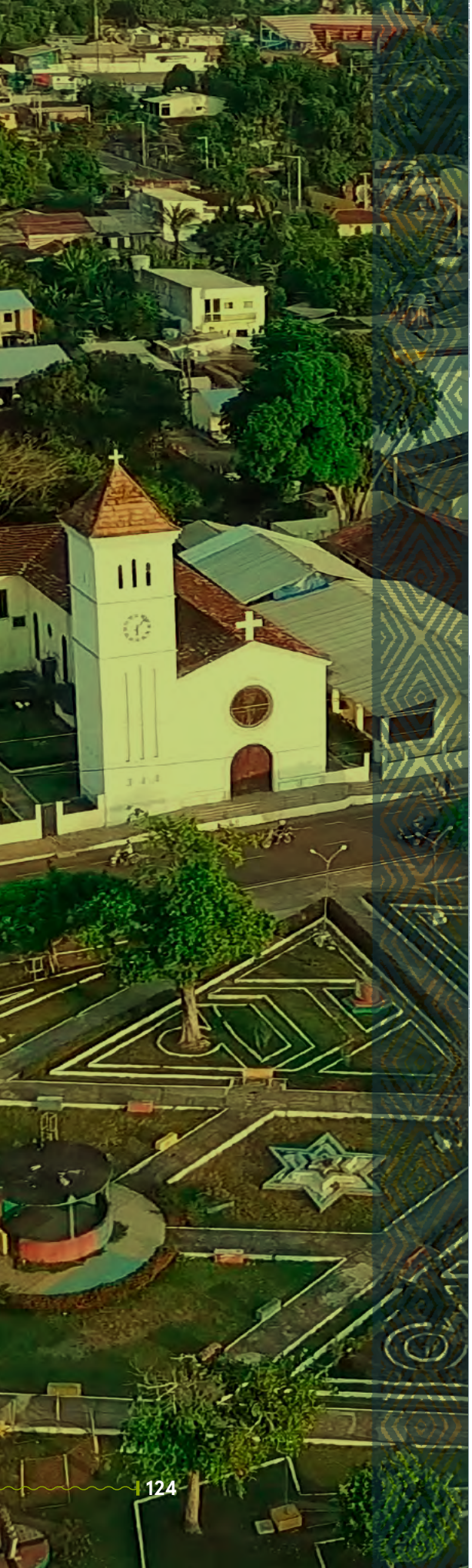
The mining's future in the Amazon

Once it is an indispensable activity, in addition to Brazil, particularly the northern region being the holder of many mineral reserves, expansion projects and others still being prospected, mining can be considered the safest and proper path to keep and develop the Amazon rainforest. This opinion is of geologist and consultant Elmer Prata Salomão, who assesses the future of the industry.

"It will go on being subject to specific actions. Mining will not stop from being set up in a region. Where there is a deposit, there will be mining. And the place, within that piece of land, will be protected. The concern should not be mining, but where it is not there, because it will be handed in to land grabbers, drug dealers, criminals. Mining is the best way to develop the Amazon, unarguably. It will not be in most of the region, but it will be at specific points determined by the nature, at the sites where God placed the mineral deposits", he ends.

Photos: Divulgação / Alcoa

Mined areas in a recovery process carried on by Alcoa



Juruti developed and recovered the forest

In the beginnings of humanity, the copper age and the subsequent iron age were critical for man to be able to make the first tools and artifacts for hunting and fishing, which would then evolve to allow working the land, through the rudimentary planting of species that would serve as food. In the modern age, the advent of aluminum – a light and resistant metal – revolutionized the mass production of household wares. Incredible as it may seem, this story has a little-known ramification in an Amazonian region.

The municipality of Juruti became an example of economic and sustainable development through an industrial installation that extracts bauxite, the raw material for obtaining alumina, from which aluminum is produced. Located on the right bank of the Amazon River, on the border between the states of Pará and Amazonas, Juruti has almost 60,000 inhabitants and an area of 8,300 m^2 – more than five times the size of the city of São Paulo – and is home to 174 rural communities.

In 2005, the municipality received a 1.8 billion-dollar investment from Alcoa to build facilities for the sustainable production of bauxite, the raw material of aluminum. It was the beginning of a challenge, not least because of the complexity of the territories, associated to geographic distances and the customs of traditional populations. However, the project had the ambitious goal of generating positive impacts for an entire society in the middle of the forest.

Alcoa's operations began with a production capacity of 2.6 million tons of bauxite per year, and nowadays the plant pro-

duces 7.5 million tons per year. Over time, the social, economic and sustainable transformations in Juruti were nitid.

Helio Lazarim, the operations director of the company in the municipality, highlights that Alcoa understands its role for sustainable and responsible development in the Amazon, and therefore recognizes the importance of a good relationship with the communities of Juruti.

"We operate through partnerships to support the training of local human capital, protect and conserve native forest, restore degraded areas and still foment entrepreneurship and the structuring of sustainable development indicators in the municipality, based on the UN's Sustainable Development Goals (SDG). We work to overcome every challenge and establish legacies of sustainability", Helio emphasizes.

The beginning of development, where it was least expected

Since the arrival of the mining company, the municipal Human Development Index (HDI), gross domestic product (GDP) and social capital for public management, including important environment conservation initiatives, advanced in Juruti. According to data from the Brazilian Institute of Geography and Statistics (IBGE), the HDI increased from 0.389 in 2000 to 0.592 in 2010. Three dimensions of human development were assessed: longevity, education and income. The index ranges from 0 to 1. The closer to 1, the higher the human development.

The DGP of Juruti, which is situated in western Pará, has also increased. In 2010, it was slightly over R$ 400,000; in 2019, it jumped to R$ 1.2 million. This result comes from the opening of work and job opportunities and stimuli to local entrepreneurship such as retail and services. The number of formal employment positions also increased. According to IBGE, in 2000, there were only 185 workers with employment contracts; in 2019, this number reached 5.403. It rose by more than 2,900%.

Alcoa's investments expanded the economy in Juruti. The creation of jobs and income are the main direct contributions for the municipality. Over 2,700 workers are involved in the mining, railroad and port operations. Of that workforce, over 50% of workers were born in Juruti.

Added to the values in expenses, salaries, taxes and service purchases are the participation in mining results, Environmental Control Plans, MCC Socó 1 and the construction and execution of the Positive Agenda with 54 activities that directly benefit the municipality; the Sustainable Juruti plan; in addition to voluntary actions and community projects periodically carried out, as well as projects encouraged by Instituto Alcoa.

Environmental restoration generates economic recovery

A method developed by Alcoa in the municipality of Juruti, in western Pará, has enabled not only the restoration of mined areas, but also contributed for the social and economic development of rural communities in the Juruti Velho area. Over 1,200 hectares have already been recovered, the equivalent to 1,700 FIFA-standard soccer fields. These are the results since 2012, when the Mined Area Recovery Program was implemented in the unit.

According to Susiele Tavares, the forest engineer responsible for the program, the process applied adds a social component through the participation of communities in the production, sale and planting of

seedlings. "That is the differential of our program. Here we are connected to the communities. They know the demands of each location, they know what types of seedlings can grow in a particular place. It's a two-way lane: we do our part regarding the protection and recovery of mined areas, and the company helps residents increase their income, from the planting of seedlings", Susiele explained.

Cleide Xavier, 47, is a community resident and the mother of eight children. She says her life was transformed over the last four years, the period in which she has been involved in the Rehabilitation Program for Mined Areas. "Part of my income comes from replanting in Alcoa's mined areas. It's rewarding to be part of all this, because it's learning built by us, which is passed on to those who join the team", she says.

It is the small farmers themselves who produce and plant the seedlings in the pre-determined areas. These are seedlings of large species, such as Brazil nut trees, massarandubas, pau d'arco, among others. "We produce the seedlings, we treat and take care of them until it's time plant them. That's why we respect, nurture and care for them and do our best so they can grow. We're the children of Juruti, and it's a great joy to contribute to recover the mined areas", the farmer explains.

Susiele Tavares explains that the nucleation method speeds up the process of natural soil formation to leave the environment as close as possible to the original, using organic soil, branches, trunks and roots which are provided in the areas to be reforested in the form of nuclei.

"The process is conducive to the rehabilitation of the whole forest system, becoming an inviting environment for the return of animals and, consequently, for the transporting of seeds to the area. The branches, trunks and roots serve as perches and burrows for these animals. In these places, the pollination of flowers, fruit trees, and occupation even by medium-sized animals have been observed. In the nucleation areas, the vegetal cover exceeds 80% already in the first year of implementation", she stresses.

A hospital ship for the riverside people

In a partnership with Associação Lar São Francisco de Assis na Providência de Deus, the entity that manages Hospital 9 de Abril in Juruti, a hospital ship was inaugurated in August 2019 in the municipality. Measuring 32 meters in length and named after Pope Francis, the hospital ship has brought medical care in several specialties to over 1,000 riverside communities since its inauguration.

The structure is of paramount importance because it serves inhabitants who cannot travel to municipalities' urban areas to receive various healthcare services, such as: outpatient and clinical care; laboratory tests, imaging (mammography and x-ray), ultrasonography; electrocardiogram; dental care, among others.

Since it was inaugurated, the hospital ship has carried out 61 expeditions, with 309,700 appointments and procedures in communities located in the following municipalities of Juruti, Pará: **Óbidos;** Faro; Terra Santa; Oriximiná; Almeirim; Curuá; Alenquer; Prainha; Monte Alegre; Itaituba; Aveiro; Porto de Moz; and Santarém.

Sixty-four thousand appointments were carried out, as well as 98,000 diagnostic tests, 12,000 ophthalmology appointments, 14,000 dental procedures, and 3,000 surgeries. During the height of the COVID-19 pandemic, in mid-2020, Alcoa allocated R$ 400,000 for the Franciscan association to serve the communities directly in their territories.

The Wildlife Rehabilitation Center (CRAS)

A modern specialist unit dedicated to the care and recovery of small, medium and large animals. This is the Wildlife Rehabilitation Center (CRAS), based in Juruti, a municipality in western Pará. In operation for 2 years, CRAS is part of a system of management and conservation of the flora and fauna in the mining area explored by Alcoa, a company that operates in the extraction of bauxite and has treated 1,173 animals.

CRAS' team is formed by eight employees on duty, with two in each shift: a veterinarian and an assistant, ensuring round-the-clock operation. Its structure consists of a record and control room; a general hygiene room; an outpatient triage room; a surgical center for low and medium-complexity procedures; a pharmacy; a nutrition room, a necropsy room; a sterilization room, and 12 other rooms.

In May 2022, the mining company and the Juruti municipal government, through the Municipal Environment Department (Semma), signed a partnership agreement expanding the center's services. The department became responsible for the processes of triage and referral to the Alcoa specialist unit for the treatment of wild animals found in the municipality's urban area and in the Jará Lake Protection Area.

The Jará Environmental Protection Area (APA)

Alcoa's flora and fauna conservation program also includes the continuous monitoring of animals, among which are some species which are bioindicators and demonstrate aspects of the conservation and ecologic services of the ecosystem in the area directly influenced by mining. The same type of monitoring is carried out for the flora, including the monitoring of some endangered species.

Besides taking care of the fauna and flora in operations, Alcoa supports and boosts conservation initiatives in the entire Juruti region. With support from the Alcoa Foundation, the municipality already has two conservation units: the Jará Environmental Protection Area (APA), which conserves the main fountainhead in Juruti's urban area, and the Lago Mole Wildlife Refuge (Revis), a region considered the nursery of the fauna and flora of both the municipality and surrounding areas. The unit is dedicated to nature conservation, and its environmental services ensure the sustainable use of natural resources for the traditional populations.

The Green Locomotive

Compensating a railroad's emissions of carbon dioxide (CO2) through reforestation. That is the mission of the Green Locomotive Project implemented in Juruti. The impact caused by the operation of the locomotive that brings ore from the mine to the port through a 55-km route is neutralized through the replanting of native seedlings.

The project, supported by the Alcoa Foundation in partnership with the American Forest and Instituto Vitória Régia, began in 2015 and includes the participation community people. In a little more than 7 years, 40,000 tree seedlings were replanted in 24 hectares distributed around six communities, among which is the Galileia community, in the Juruti Velho region. For 20 years, these seedlings will offset 1,600 tons of CO2 emitted by the locomotive.

The initiative comprises three phases. Phase one consists in an inventory to quantify the emitted CO2, that is, the amount of gases emitted by the railroad operation. The measurement is carried out by Alcoa in its annual sustainability report. The second phase consists in defining the species that will be planted for compensation, and the third phase defines of areas to be covered.

Training and valuing employees

With the installation of Alcoa, the population's expectations about hiring were high, but one issue stood in the way of that integration: qualification. However, the company itself understood this need in Juruti. With the arrival of the mining company, which has been in the municipality for 12 years, education investments were perceived to be necessary in order to qualify the city's inhabitants so they could be hired to work in the operation. From then on, through a partnership with Senai, the mining company held training programs to qualify local labor. Jeander Melo, 27, is a 'jurutiense' trained by the Alcoa-Senai partnership. He used to work at Alcoa's administrative area, and after taking an operator training program, his life changed.

"After finishing the course, I began to work at Alcoa as an operator, and I took the opportunity to change areas and grow professionally", explains the employee, now responsible for the company's fuel control.

Each worker who concludes a course is assessed and included into the talent bank kept by the company and Senai. Until August 2020, 8,757 students were trained by the partnership in more than 100 different professionalizing courses, totaling 101,918 class hours.

More than half of the students from Juruti who were trained in the operator training programs (PFO) and maintenance training programs (PFM) were absorbed by the company and show an excellent performance.

Since it started its partnership with Alcoa, Senai has already trained over 15,000 people in a wide range of professional training modalities. Among the current demands of the National Industrial Learning Service (Senai, in the Portuguese abbreviation) is the construction of the new Senai facilities in Juruti, in a 9,000-m² area donated by Alcoa, where modern laboratories for professional courses will be installed. The construction will also be made in partnership with the mining company.

"The new facilities will be a new milestone in the development of professional education in the municipality. Our view is to continue to train more people for the local industry and the job market, in order to improve employability rates in the municipality", says the director of Senai in Santarem, Peter Rasera.

The Alcoa-Senai partnership brought excellent results over the years. The company keeps an average 80% of employees at the company and at contracted firms who were born in the state of Pará, and 50% with a birth certificate from Juruti.

For Alcoa's operations director in Juruti, Helio Lazarim, in 13 years of operation, the company has contributed with advances in all areas of Juruti.

"Our operation has been an innovative mining project from its inception. In addition to the care and investments in healthcare, safety, environment and infrastructure, we have contributed for the population of Juruti to participate more and more in this project, through training and qualification, which can generate opportunities for joining the company's workforce", Helio highlights.

The Future of Juruti

The economic impact of the company's operation in Juruti has produced many positive results. This return can be measured by the increment to the social capital of the municipality. From 2006 to 2021, the Juruti operations generated R$ 79.2 million in royalties for the association of communities of Juruti Velho (Arcojuve), R$ 22.2 million in royalties for the Institute of Lands of the State of Pará (ITERPA), and another R$

131.9 million in CFEM for the municipal government of Juruti. Also in CFEM, the state government received the equivalent to R$ 46.6 million, and the Union, R$ 24.3 million.

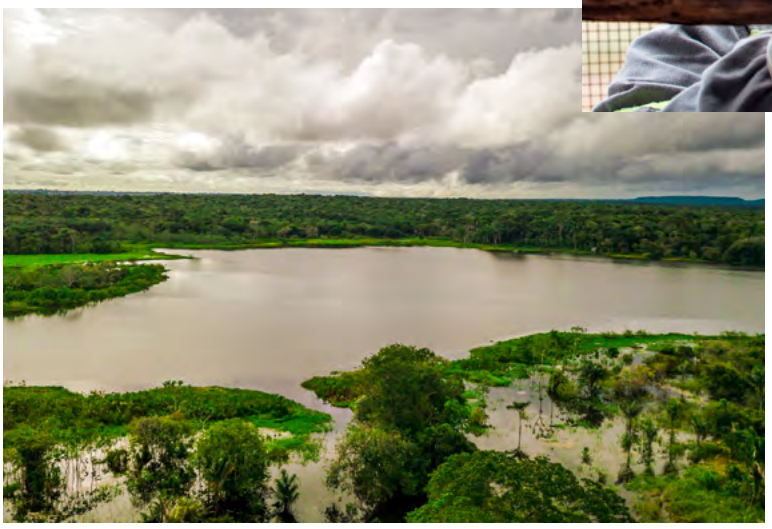
From 2006 to 2021, Alcoa transferred R$ 264.1 million to the Municipal Government of Juruti; R4 416.3 million to the Government of the State of Pará, and around R$ 96.1 million to federal institutions.

"Today, the town already has paved streets, and education is in full operation. There was an expansion in the number of schools, including in rural areas. Another point we highlight is healthcare, which has a strong dynamic in the municipality", argued the Juruti manager, Lucídia Benitah.

Photos: Divulgação Alcoa

Cleide Xavier, a resident of Juruti, participates in the program for the recovery of mined areas

CRAS – Alcoa's Wildlife Rehabilitation Center



Over 1,200 hectares of mined areas have been recovered by Alcoa's program

A history of invasions, destruction and hunger challenges a Sustainable Amazon

The Amazon is in the world's imagination for its rich and unique biodiversity and its history of disorganized occupation, conflicts and deaths. In a brief trip back in time, who does not remember the human anthill so brilliantly photographed by Sebastião Salgado, which took over Serra Pelada in the 1980s. The scene became a representation of the "gold rush" motivated by a surge of development in the 1980s and 1990s. In those two decades several gold-digging set up in the region, seriously impacting on southeast and southwest of Pará, Amapá, indigenous areas Ianomami and the city of Porto Velho, the capital city of Rondonia.

It was a kind of Western movie. Degraded areas without any participation of the federal government and an explosion of gold production, reaching 13.9 tons extracted in one single year (1983). As well analyzes Professor Cristovão Barcelos, with the foundation Oswaldo Cruz (Fiocruz-Rio), it was clear that the phenomenon would not last forever. And its impacts would soon come up. In addition to mercury contamination, there was an environmental and social degradation never seen before in the region. Malaria cases skyrocketed.

It was not an isolated example, but a modus operandi related to the Amazon rainforest that was kept as one of the main challenges to a sustainable development of the region. A region that encompasses 40% of the Brazilian territory and only 13% of the national population.

Thus, still today the Amazon rainforest keeps on being explored with minimum participation of the federal government, a

fertile terrain for criminals and undertakings of small groups, many of them armed, which frequently invade indigenous lands. Not by accident the tension between diggers and the Ianomami population remains an ongoing problem.

On the other hand, when the federal government is present, the development of the Amazon Region has always been thought by central administrations based on the construction of large infrastructures that have brought few local benefits. The construction of hydroelectric plants and roads have caused significant socioenvironmental changes, including increase in poverty, violence and disease outbreaks.

"A significant part of the projects in the Amazon has aimed at taking development up to there. This is arrogant because it assumes that only the southeast has the solution for the Amazon. Other famous line is that of the military dictatorship, "integrate not to deliver", in an attempt to occupy the forest to avoid losing sovereignty", says Fiocruz Professor Cristovão Barcellos, in an interview granted to Fapesp Agency.

In hindsight, it is impossible not to remember the unfinishable road, Transamazônica – a construction work that has become symbol of destruction of the forest by the civil-military regime – and in the re-democratization because of the disaster of the construction of the Belo Monte hydroelectric plant. The same logic can be seen in the construction of the hydroelectric plants of Santo Antonio and Jirau, both near Porto Velho (RO).

"According to the studies we conducted at the time when the dams were built, transmission of leishmaniasis transmission increased significantly, including in areas not so close to the dams, and the incidence of AIDS skyrocketed in the whole country. Those data resulted in controversies with the construction companies, which would say that hydroelectric does not cause AIDS. There was also accelerated deforestation", comments the professor. Barcellos also tells that after the construction was over, job offers dropped dramatically and urbanization occurred quickly.

"Those were people without a job and who needed to go to big cities. It caused a devastation of that area not only by the gold rush, but also by wood logging", he tells. In addition to big jobsites of infrastructure construction, there is also a trend to stimulate short-time wood logging and mining, with limited scope and unable to create production chains. "In other words, they do not retain the wealth, do not create technology and do not qualify labor. Those are projects that stimulate population and capital mobility instead of the development intended", he explains.

Possible paths

Once it is a region that progressively interests the whole world, it is inevitable to ask: How is the Amazon rainforest today? The true is not much different from that in the time described above. The absence of the federal government remains a problem leaving territories under the domain of criminal groups which deforest illegally, invade indigenous communities and occupy their legally protected land. Conflicts go on. Diseases as well. Deforestation grows.

"The Amazon rainforest is the biggest Brazilian biome as to length, occupying almost half the national territory. We need to broaden this debate in all areas, both in politics, academically in research, and in the press, besides looking for more participation of the civil society", claims the coordinator of FGV post-graduation program in Finance and Economics, Marcio Holland.

Debates and studies point out two different visions about the conservation of the Amazon rainforest.

The "first path" would be to fully isolate large areas of the forest, targeting on conserving it. The "second path" advocates a development model that includes monocultural agriculture, extensive cattle husbandry, and mining in areas already deforested between the Cerrado biome and the beginning of the Amazon rainforest. Both paths divide opinions and seem irreconcilable.

It was based on this dichotomy that a "third path" was thought, the so-called "Amazon 4.0". The model conceived by climatologist and associate researcher of Advanced Studies of the University of São Paulo (IEA-USP), Carlos Nobre, would stand for an opportunity to develop a green economy, which would take advantage of the forest and its biodiversity and, with the help of technologies of the fourth industrial revolution (or industry 4.0), it would set a modern and socially inclusive economic development.

The "Amazon 4.0" project, as he defined it, is a new paradigm of sustainable development which would be created from scratch, because there is not a developed tropical country based on this model. It would be through it that we could lead by using bio-industrialization tied to modern technologies – internet of things, communication networks, artificial intelligence, etc. This model creates deep roots in the Amazon rainforest, and it does not see the place just as some soil for extraction and production of primary commodities to be sent abroad. "It is a fusion of idealism, realism and innovation", summarizes Nobre.

He advocates that the Amazon is coming close to a tipping point. "Fifty years ago, ,when the military dictatorship expanded to the Amazon, nobody saw the forest, only an area for expansion in a development agriculture model. In the 1990s I created what was more like a hypothesis, the "savannization", which warned that if we deforested the Amazon rainforest, large areas would turn into savannahs, and they would not become forest again". And now we are already seeing a series of very worrying signs pointing at that direction".

Nobre explained that this phenomenon occurs because although 86% of the Amazon soils are very poor, within tens of thousands of years of evolution, the forest has developed a quite efficient recycling system of water and nutrients. That is why it is so rich in biodiversity, biomass and carbon. However, if we deforest the forest, we end this complex system. "The Amazon rainforest only exists because the forest exists", highlights the climatologist.

Can we avoid this tipping point? This question has stimulated Nobre to develop, since 2017, a project called Amazon 4.0. "It is a human choice. Which path will we take? The dystopic one, with a continuous increase in deforestation, which is what we have witnessed for the last years, mainly between 2019 and 2020, or the utopic one, with zero deforestation and recovery of a significant part of the forest, mainly with agriculture-forest systems, by absorbing carbon and reducing the risk of reaching the tipping point? It is for us to decide".

Endless deforestation

Under the point of view of the PhD in agriculture economy and Embrapa Eastern Amazon, researcher Alfredo Homma, agriculture without deforestation and fires is possible.

As he sees the matter, many extraction products have already reached their limit, such as Brazil nuts, pau-rosa and bacuri. The agronomist advocates perennial crops as a big opportunity. Agriculture without deforestation and fires in the Amazon is possible, he explained, provided that accompanied with an increase in productivity and technological levelling, in addition to promoting the transition of the forest.

A mistake Homma observes in the Brazilian environmental policy is lack of use of areas already de-

structed in the past. We have already deforested 18% of the Legal Amazon, so it would only use a fraction of that area to open the possibility to reduce the pressure and mitigate future damages.

"The forest will still burn for a while – if it will be for 3, 4 or 15 years, it will depend on some technological options that need to be adopted now. So, we need to hurry up and not to depend on futuristic proposals", warns Embrapa researcher. But which proposals would they be?

A first proposal would be to work intensively with cattle husbandry, which is already present in 61% of the area deforested in the region. That industry would need to undergo a technological shock, making sure to recover 10% of grazing area yearly to avoid occupational pressures of the dense forest. "The idea is to reduce grazing fields based on an increase in productivity", advocates Homma.

Other short-term proposals Homma presented include doubling the current reforestation area and perennial crops, stimulating the production of fish, speeding up environmental transition and prohibiting illicit actions. These actions target on trying initially to end up illegal deforestation (which configures over 90% of that activity in the Amazon), for later to end legal deforestation.

Reducing emissions

Brazil ranks fourth among the main countries that issue greenhouse effect. By ending deforestation, the country would rank 18th. In addition to the areas protected, another way to contain deforestation and, consequently, climate changes, it is to develop sustainable economic activities in the forests in order to strengthen the local communities and take advantage of the resources available at the regions. The list of actions includes: supporting forest handling projects, both community and corporate ones; handling fishery; initiatives of qualification, education and environmental awareness; and action of communication and public policies.

With that objective, the World Wildlife Fund (WWF-Brasil) has created the Program of Support to Sustainable Development (PADS). The PADS projects help families live from collecting Brasil nuts, copaiba oil, crafts, ecotourism and other forest products without having to fell trees to get wood or to open grazing areas, thus ensuring the conservation of the forest and of the biodiversity.

Additionally, handling sustainable development in the forest is to develop and stimulate its adaptative capacity to future climate changes, which take place gradually as the planet warms up.

Brazil has about 20% of the planet's biodiversity, which should be seen as an economic asset with many business opportunities. However, for the country to become a potency in bioeconomy it takes investment, knowledge and strategy. The discussion about the subject raises, among other aspects, the main threats and opportunities to the conservation of the Amazon rainforest. Ultimately, the path to sustainable socioeconomic development passes necessarily through political willingness and paradigm break in the whole production chain, in addition to raising polemic subjects, such as the fight against illegal deforestation and the resolution of land issues.

Bioeconomy: solutions demand more knowledge

The model of economic development aimed at conciliating generation of income and environmental conservation is not new. But is it urgent. We are talking about bioeconomy, using renewable or recyclable biological resources, focused on sustainability of production systems, holding innovation as one of the pil-

lars. The Amazon rainforest is the biggest tropical forest in the world, with over 40 thousand plant species, where live indigenous peoples and traditional communities, and where about 240 languages are spoken.

In a debate promoted by the Getulio Vargas Foundation (FGV) in June 2022, former ministry of agriculture and FGV Professor, Roberto Rodrigues, said: "The pandemic turned on two big headlights: food safety and sustainability. Brazil has a huge environmental asset and young people willing to defend the environment. Now it is necessary to converge speeches and find solutions based on public policies and private actions targeted on the future desired".

For the former ministry of the environment and co-president of the UN Panel of Natural Resources, Izabella Teixeira, Brazil needs to take back its leading role in international discussions: "Diplomacy is the path, and the moment is not for polarizations". Izabella remembers also that the country hosted Rio-92 and Rio +20, but that in the last years it has been left behind as to fighting climate issues. " It is not just about bioeconomy. We are talking about a set of green economies, as they are called, to build up solutions for global challenges [...] we have to define which strategic vision Brazil is willing to have for the next 30 years", she said in that debate.

One of the main challenges, according to the former ministry, is related to controlling carbon emissions into the atmosphere, which happens in two different ways: by formal activities that generate income, such as industries and agriculture/cattle husbandry, and by informal activities, which refers to emissions of irregular or criminal actions.

In this first aspect, research shows that replacing technologies oriented toward generating clean energy and adopting new practices already show stimulating results, such as the cases of investments in low-carbon cattle husbandry and the açaí chain, which moved in 2019 R$ 3 billion in the Amazon economy, according to the Embrapa survey. In the second case, more severe actions against illegalities need to be taken urgently. The scenario is challenging.

To professor and researcher Augusto Rocha, with the Federal University of the Amazon, there are many opportunities to develop bioeconomy in the state, however, the processes are still dissociated from what happens in the rest of the country and in the world. Despite the significant tax collection, Manaus has one of the lowest rates in human development (IDHs) in the country:

"It is necessary to take what we already learned from the macro scenario and bring it to the micro one, i.e., to apply what is already effectively known about the subject in the region. However, changes should integrate the current production chains and respect the Amazon people's knowledge".

The Amazon is the biggest tropical forest in the world, with over 40 thousand plant species, where indigenous people and traditional communities live, where about 240 languages are spoken. Structuring bioecological development models for economies based on biomes, for instance, would enable facing the environmental challenges. But it is necessary to look beyond environmental and economic matters, strengthens the FGV Professor, Daniel Vargas.

Usually, when we talk about bioeconomy and sustainable development in the Amazon, we still tend to deal with the problem as mainly economic or environmental. However, it is also a problem of knowledge. Only scientific knowledge can help structure consistent bases and proposals", he declares.

The debate on "Potentials of bioeconomy in the Amazon" is part of the series "Dialogs of the Amazon" and is available at YouTube.

A sustainable Amazon is only possible without hunger and violence

Hunger, violence, illegal exploitation of the territory, precarious infrastructure, diseases, low educational rate, technological delay. Discussing a Sustainable Amazon for the future essentially involves resolving historical bottlenecks for the region to exercise in full its potential to transform the man-nature relation and to be effectively a main character in a new era.

Based on a systemic approach, the initiative "A concertation for the Amazon" launched in October 2022, with the Network of Political Action for Sustainability (RAPS) and the newspaper Estadão, the document "100 first days of the administration: proposals for an integrated agenda of the Amazons". Concertation is a network composed of people and organizations that work for the development of the region. According to those entities, the conception of the document, done collaboratively, involved 12 theme meetings and 130 proposals in areas that go from health and education to public security and innovation.

Considering the perspective that the Amazon can found a new model of development for Brazil, the group presented the proposals translated into normative acts, such as decrees and bills. According to the authors, the purpose of a text with legal support is to ease the implementation of the proposals, which can begin in the first year of the Executive administration within federal and state levels and the National Congress.

"The premise guiding the work is that the actions of command and control to fight against deforestation are indispensable, they are insufficient, and due to that it is necessary to combine them with improvements in quality of life and the creation of economic opportunities able to conciliate natural capital and social justice. The challenges are many, and the path is long, but the ambition of that document is to support the country in the decision with the contemporary world and to move ahead, considering the Amazon a solution", they state.

Two of the proposals are directly linked to mining. One of them advocates that the Program of Support and Development of Artisanal Mining and in Small Scale be revoked, and the other requests that new parameters for purchasing, selling and carrying gold in the national territory are set.

According to that document, discussions and assertive actions based on the mining activity are extremely important for the conservation of the Amazon rainforest, and also for the maintenance of and increase in sustainable economic activities in the territories composing it.

"Currently, destructive ways of environmental extraction, such as illegal mining, are legitimated and they rely on an extended social base, because they are an economic alternative for some low-income sectors. Additionally, important actors to inspect and make operational the products of those activities are far from the local reality, which makes control even more difficult", the authors say.

The action would be possible by means of a decree proposing, initially, that Federal Decree 10965/22 and Federal Decree 10966/22 be revoked, in addition to amending Decree 9406/18. It also sets a positive agenda that stresses the distinction between formal activities and its relative distinction from illegal mining. The infra-national action is observed through its social aspect, becoming aware of the people reached and looking for enabling economic alternatives. Still, there is the possibility of restructuring the National Mining Agency, including, again, the society in critical decisions to protect the forest.

About the second proposal – to set new parameters for purchasing, selling and carrying gold in the national territory, the study justifies it as follows:

"In 2013, once the market was unregulated, it resulted in an unexpected consequence, with actions

that ease the process of "laundering" or "warming up" rough gold illegally extracted. Said change in regulations discouraged the first gold buyer to check the origin of the product. That responsibility was substituted for a declaration of the gold-digger. As a result, illegal extraction increased and there was significant growth in violence and violent conflicts in areas of illegal gold extraction. However, the logic of fighting those illegalities happens through repressive actions with high investment in reactive actions, without proper incentive to intelligence-based inspection".

Therefore, the document deems "essential" to strengthen the State's role in the fight against smuggling gold ore to reduce the cycle of violence and environmental crimes in the Amazon, mainly in indigenous lands. The mechanism suggests editing a Provisional Remedy setting rules for purchasing, selling and carrying gold in the national territory. "Moreover, it is necessary to attribute to the National Mining Agency, together with other public organizations, the structuration of a transparent tracking and monitoring system of gold. And, so, to bring intelligence to the processes of monitoring, inspecting and correctly punishing", complete the specialists.

Fighting the increasing poverty is of the essence

In the economic area, the study proposes to reestablish the Green Pocket Program, which prioritizes extremely poor families located in the forest areas of the Legal Amazon. And it uses as basis for the proposal recent data divulged by the continuous National Research for Sample of Domiciles (PNAD) of the IBGE (2021), according to which the percentage of people living below the poverty line in the Legal Amazon reached 45%, 18 points above the rest of the country.

The IBGE also shows that unemployment in nine states of the region has significant worsened (13.8%) in the last years: despite the fall, informal work reached 48.7% against 32.6% in the rest of Brazil. These indicators point out a systemic problem. Although it is not a determining factor for deforestation – it makes the most vulnerable parcels of the rural populations strongly dependent on illegal environmental activities and those environmentally predatory.

That decree proposes immediate reestablishment of the Program of Support to Environmental Conservation, known as the Green Beret Program (PBV). Families extremely poor will benefit from it in areas of the Legal Amazon and which are in conformity with the dispositions in art. 5 of Decree 7572/11.

Historically, the PBV has fought extreme poverty by means of sustainable productive inclusion. It being done in the format of a policy of income transfer able to contribute to maintain the forest standing. Resuming the program stands for an important step taken in the offer of options to illicit activities, responsible for the environmental degradation. It must also be accompanied with other policies in order to improve the quality of life and access to services by those populations.

Check all the proposals of the "100 Days" project of the initiative "A concertation for the Amazon"

To give back spaces of participation and social control within the ambit of the Federal Public Administration to follow and assess the policies of food and nutritional safety, among others.

To give back the National Council of Food and Nutritional Safety (Consea) within the ambit of the agencies of the Presidency of the Republic and the ministries.

To qualify infrastructure projects of the Legal Amazon in the Program of Partnerships of Investments, forecasting assessment of socioenvironmental impacts on the decision-making process.

Revoking the Program of Support to Development of Artisanal Mining and in Small Scale. To set new parameters for purchasing, selling and carrying gold in the national territory.

To reestablish the Green Beret Program, by prioritizing the extremely poor families located in the forest areas in the Legal Amazon. To integrate the data in the Subsystem of Attention to Indigenous Health (Siasi) to the System of Information in Health and Basic Attention (Sisab) and the remaining information systems of the SUS at national level. To create a work group oriented toward healthcare in the Legal Amazon.

To prioritize the destination of resources of the Fund of Universalization of Telecommunication Services (Fust) to projects to assist traditional communities and small rural producers, particularly as to public equipment of education and health.

To create a State Department of Climate Emergencies directly bound to the Presidency of the Republic.

To develop technological options for decentralized solutions. To set commissions to study technical, juridical and operational feasibility to integrate real-estate and land registrations.

To create an inter-ministerial work group to prepare a National Policy of Governance of Lands and a National Land Use Plan of territorial ordination. To prioritize an Operational Tactical Program in Public Security within the ambit of the Interstate Consortium of Sustainable Development of the Legal Amazon.

Photos: Pedro Guerreiro

Children of the quilombola community Santa Maria do Maraiteua and fishermen of Marapanim, Pará.

eneva

A new energy transforming Brazil.

Eneva is one of the largest integrated energy operators, with activities from natural gas exploration and production (E&P) to delivering energy solutions.

The company has assets in the states of Amazonas and Maranhão. Currently, it operates 11 natural gas fields in the Parnaíba (MA) and Amazon (AM) basins. Additionally, it has in these regions a total area under concession covering more than 60,000 km².

With a thermoelectric generation park with a generation capacity of 6.3 GW and projects already under construction, Eneva produces safe and competitive electricity for the Brazilian electric system. Its generation assets are located in the states of Maranhão (Parnaíba and Itaqui complex), Ceará (Pecém II and Termofortaleza), Sergipe (UTE Porto de Sergipe), and Roraima (Jaguatirica II). In renewables sources, Eneva possesses two operational assets and a centralized and distributed power generation projects pipeline, located in the states of Minas Gerais, Bahia and Rio Grande do Sul.

The company also operates in the Free Market of Energy and Natural Gas, offering a robust business platform to the market.

Eneva is listed in the segment Novo Mercado of B3 (the Brazilian Stock Exchange) since 2007.

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Alcoa

We are Alcoa. We have operated since 2006 the Juruti Bauxite Mine, and we understand our role for a sustainable development in the Amazon. We recognize the importance of a good relationship with the Juruti communities, seeking to set the best strategies for the protection and conservation of the forest and of the people.

We perform through partnerships to support the qualification of local human capital, to recover degraded areas and also to foment entrepreneurship and structuration of sustainable development indicators in the municipality, based on the UN Sustainable Development Goals.

Internal procedures added to rules and regulations in force make it possible to operate mining sustainably. Full respect to people and to the environment is part of our daily operations. We prioritize dialog with the community looking for solutions able to promote local sustainable development.

We work to overcome all challenges and to set legacies of sustainability in order to ensure that future generations also have the privilege of enjoying the natural good of Juruti and of the Amazon.

www.alcoa.com


Alcoa
Alcoa

A leader in the segment of special and healthy bread, Wickbold commemorates in 2023 its 85 years of operation in the Brazilian food market. Founded in 1938 by Henrique Wickbold, an immigrant of German descent, it started as a small bakery in the Brooklin district of São Paulo, which he ran under the name Padaria Wickbold. Currently, the company has factories in four cities: Diadema, where the headquarters are also located; Hortolândia, which has one of the highest production capacities in Brazil; and the units in Rio de Janeiro and Guarapuava, Paraná. Continuously in expansion, the company acquired Seven Boys in 2015, a brand specializing in industrialized bread with 72 years of tradition, with the famous mini loaves as its flagship. A pioneer in meeting customers' demands for healthiness, the brand's products are also recognized for their flavor and high quality. The current portfolio comprises over 70 items, divided into categories such as sliced bread, snack bread, special line (wholegrain and with grains), light line, gluten-free line, mini loaves, tortillas, toasts, and cakes. Always attentive to the consumers, Companhia Wickbold was ranked among the top 10 positions in the food-grocery category of the 2021 Época ReclameAqui Award, with both the Wickbold brand and the Seven Boys brand.

www.wickbold.com.


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agropalma

We rely on over 5 thousand employees working at four business units where we produce palm oil, palmiste (palm kernel oil) and their refined and fractioned byproducts.

Altogether, we rely on over 107 thousand ha of land divided into 64 thousand ha of forest reserves and 39 thousand palm trees planted.

We operate with a chain of supply fully traceable, and we guarantee a production process based on sustainable practices, from tillage and preservation of the forest and of biodiversity to economic and social development of the communities that work with us.

We have seals and credentials certifying us and adding value to products of our clients.

Our products are destined to several industries, and they are mainly used in the segments of bakery, confectionery, cooking, dairy products and ice creams, industrial frying, cosmetics and oleochemicals.

Our portfolio also includes organic formulations and multi-oil and customized solutions.

www.agropalma.com.br

BENEVIDES MADEIRAS

Benevides Madeiras has been in existence for 22 years, although its founder, Arnaldo Betzel, has been working in the lumber industry for 50 years. The company operates throughout the production chain, from documentation to project development, execution, forest management, river transportation, beneficiation, and sales, both in the domestic and the foreign market.

Another differential is social responsibility. For the last 12 years, the company has been promoting the value of local labor and undertaking projects with traditional communities, with a focus on sustainable development. This approach aims to strengthen the culture of these communities and preserve the environment.

Benevides Madeiras operates nationwide in Brazil, and supplies the American, European, Asian and Caribbean markets.

www.benvidesmadeiras.com.br

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