

Americas

QUARTERLY

**COULD THIS
MONSTROUS
(BUT DELICIOUS!)
FISH HELP
SAVE THE
AMAZON?**

**A SPECIAL REPORT ON
SUSTAINABLE DEVELOPMENT**



Americas

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The Case for Sustainable Development in the Amazon

Brazil and other countries could become green superpowers in coming years. But they'll have to better protect the forest, and make it easier to do business, too.



HALF A CENTURY AGO, during Brazil's military dictatorship of the 1960s and '70s, magazines burst with propaganda portraying the Amazon as a "Green Hell" to be conquered at all costs. "Here, we defeated the forest!" boasted one ad showing bulldozers and fallen trees. In the decades since, an area bigger than Texas and Pennsylvania combined has been razed, reducing the forest's area by some 20%, mostly to make room for cattle ranches, soy farms and illegal mines.

Today, we know this was a disastrous growth model for the planet—but also for the 35 million people who live in the Amazon basin, which includes parts of eight countries. Whatever profits came from destroying the forest went to a miniscule number of ranchers and companies. In the Brazilian Amazon, residents have incomes 40% lower than the national average, while suffering higher rates of unemployment and health issues. Meanwhile, a resurgence of the slash and burn model under President Jair Bolsonaro, a former Army captain still enamored by some of the former dictatorship's ill-advised ideas, has put Brazil's entire economy at risk of consumer boycotts and sanctions from a world no longer willing to tolerate such devastation.

The good news is that another model is possible; one in which the standing Amazon forest is treated as a one-of-a-kind, priceless economic asset, rather than an obstacle to progress. Recent technological advances, as well as changing global consumer preferences, point to a future in which Brazil and other countries could become green superpowers, harnessing the Amazon's natural wealth to export everything from sustainably cultivated cocoa, açai and fish to promising new inputs for cosmetics and pharmaceuticals. Such business, if managed the right way, could generate millions of green jobs inside and outside the region.

The idea of sustainable development tends to generate skepticism, and with good reason. Bolsonaro's recent embrace of the concept feels to many like a cynical diversionary tactic. Others worry about "greenwashing" by corporations. But simply building a fence around the Amazon will not work. After progress in the 2000s, deforestation rates started to rise again in 2012, just as Brazil's economy began its current struggles, and have doubled since then. It is clear that poverty,

The Quest for Sustainable Development in the Amazon

An expedition to monitor river dolphins via drones at Mamirauá Sustainable Development Reserve in Amazonas state.

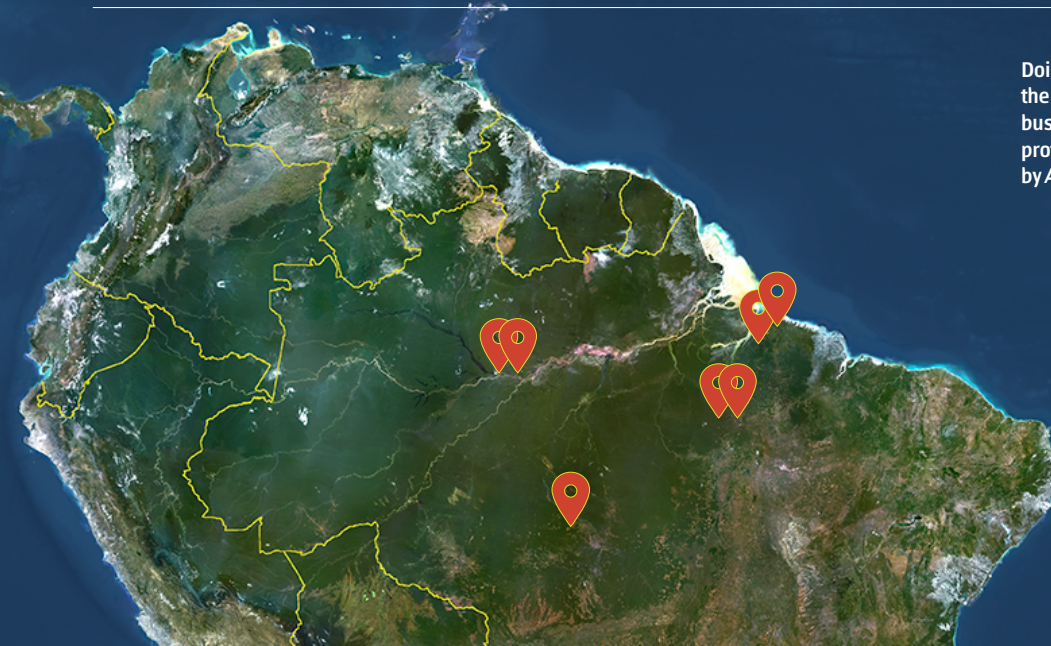


along with corruption and organized crime, must be addressed to help keep the Amazon intact.

Going forward, governments, companies and civil society should work together to help build a virtuous circle—in which Amazon communities see the value of the forest, work to preserve it, and benefit directly from its bounty. In this issue, we highlight several cases where this is already happening. Our cover story looks at the pirarucu, a monstrous 450-pound fish that will never win a beauty contest, but has a delicious white flesh that gourmets find irresistible. Other case studies range from coffee to highly regulated mining to jaborandi, a once-endangered Amazon shrub that is used in eyedrops for glaucoma.

There is much work to be done to make this vision a reality: Global consumers will never pay a premium for Amazon products as long as deforestation continues—it must fall to zero as quickly as possible. Governments need to resolve the poor logistics, high taxes and other challenges that make doing business in the region so difficult. Some Wall Street investment funds complain they can't find nearly enough viable businesses capable of achieving scale.

But there is a list of powerful reasons to keep pushing, including the quest for social and racial justice in a region where more than 80% of residents come from historically marginalized Black and Brown communities. Speaking before the US Congress in April, President Joe Biden said the key to dealing with the global climate crisis is “jobs, jobs, jobs.” Under the right conditions, it could be a strategy for saving the Amazon, too.



Doing business in the Amazon, seven businesses that match profit and environment by AQ editors.

The Case for Sustainable Development in the Amazon

A special report on new initiatives to bring sustainable economic development to the Amazon region and the 35 million people who live there—without resorting to deforestation.

6 What an Ugly (But Delicious!) 450-Pound Fish Tells Us About Sustainable Development in the Amazon

By Brian Winter, Beto Verissimo and Juliano Assuncao

15 Robusta in the Rainforest

By Brendan O'Boyle

17 River Uber

By Cecilia Tornaghi

19 Greener Pastures?

By Mariana Reina

22 Can the Amazon Save Us ... from a Global Chocolate Shortage?

By Leonie Rauls

25 Healthy Eyes Need the Forest Too

By Edmund Ruge

28 Making Mining Work

By Emilie Sweigart

31 Building a Supply Chain from Scratch

By Cecilia Tornaghi

33 The Amazon's Big Cities Need Green Jobs Too—It's a Challenge

By Monica Prestes

Op-Eds

37 Governor Flávio Dino: The Amazon Is Brazil's Future

By Flávio Dino

39 Afro-Brazilians Must Be Included in the Quest for Amazon Sustainability

By Elza Fátima Rodrigues

41 Brazilian Agribusiness: We're Not the Enemy in the Amazon

By Teresa Vendramini

2 From the Editor



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Americas Quarterly Virtual Event: **Making Sustainable Development a Reality in the Amazon**



May 27, 2021

4:00 – 5:00 p.m. ET

Watch this event live on www.as-coa.org

Conservation is good for the planet, but it's also a smart business strategy. This event will showcase experts' experiences doing business in the Amazon, existing sustainable economic opportunities, and the barriers entrepreneurs face in the region. Join us in launching the new *Americas Quarterly* issue, which will illustrate why the rainforest is more valuable to Brazil and other countries when it's standing.

Event information:

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**AMAZON
BUSINESS**

What an Ugly (But Delicious!) 450-Pound Fish Tells Us About Sustainable Development in the Amazon

The pirarucu could be a global sensation, producers say. But politics, poor logistics and other challenges stand in the way.

by Brian Winter, Beto Verissimo, Juliano Assunção and Cecilia Tornaghi

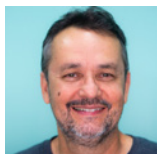


The pirarucu is the largest freshwater fish in South America, living in the Amazon.

VINCENT JARY/GETTY



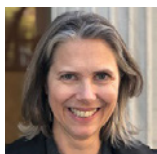
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The first thing people tend to notice about the pirarucu, a fish native to the Amazon, is that it's absolutely, utterly horrifying. Adults in the wild can grow to a whopping 450 pounds (200 kg) and nine feet in length, which combined with its scowling face makes it look like a kind of Amazonian Loch Ness monster as it ploughs through the freshwater rivers of the world's largest rainforest, surfacing every 10 minutes or so to gasp for oxygen (in another novelty, it is among the roughly 1% of fish species that breathe air).

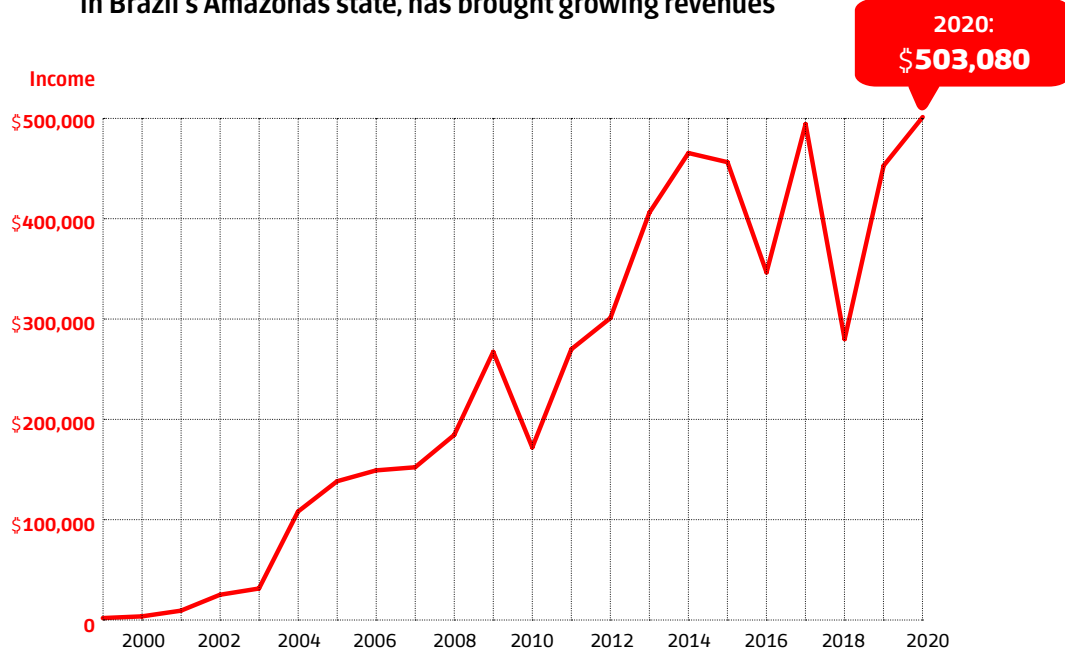
Yet the pirarucu has an even more surprising characteristic, one well-known to both riverside communities and gourmets in faraway cities: It is *delicious*. With a tender, flaky white flesh that is flavorful without being overpowering, the pirarucu is often served in moquecas, the rich Brazilian stew of coconut milk, palm oil and cilantro, or just on its own. Figueira Rubaiyat, a famed steakhouse under a giant fig tree in Sao Paulo, long featured a simple grilled pirarucu alongside its better-known picanhas and bifés de chorizo. A few blocks away, Alex Atala's D.O.M., which routinely makes global top 10 restaurant lists, has served pirarucu with tapioca or açaí, the purple berry that also hails from the Amazon.

Perhaps unsurprisingly, given its taste and inconspicuous size, the pirarucu was nearly fished to extinction by the 1990s. A government attempt to ban all fishing failed to replenish its numbers. The turnaround didn't begin until 1999, when the Mamirauá Sustainable Development Institute, a body funded by Brazil's Science Ministry, launched an innovative plan in an Amazon reserve that allowed local communities to fish for pirarucu, but within set quotas and only during the dry season. It also incentivized them to better protect the rivers and surrounding forest while guarding their territory from poachers and loggers. This created a virtuous circle that allowed the pirarucu population in the Mamirauá project area to soar from an estimated 2,500 in the 1990s to 160,000 today, all while supporting a small fishing industry.

The prevailing sentiment in the Mamirauá reserve today is of under-exploited potential—that the industry could be worth more than the 2.5 million reais, or roughly \$450,000, it currently generates per year for area fishermen. Producers elsewhere agree the pirarucu has room to grow. Foreign demand for it “exceeds all of Brazilian production, definitely,” Celso Gardon Machado, a fish farmer in Bahia state, told *AQ*, citing interest from the United States, China, Europe and Saudi Arabia. “I have received proposals where I had to ask for clarification because I thought a comma was in the wrong place.” Wild-caught pirarucu is especially sought after. But fishing collectives throughout the Amazon face numerous bottlenecks, from the region's notoriously unreliable river-based transportation system to a lack of proper refrigeration equipment and continued high spending on security to chase

Booming Business

Sustainable pirarucu fishing in the Mamirauá Reserve, in Brazil's Amazonas state, has brought growing revenues



SOURCE: MAMIRAUÁ INSTITUTE FOR SUSTAINABLE DEVELOPMENT; REFLECTS APRIL 2021 EXCHANGE RATE OF BRL TO USD = 0.179

away illegal miners, loggers and others who would destroy the fish's habitat. A 112-page market study on the pirarucu published in 2016 by SEBRAE, a Brazilian small business agency, proclaimed the fish was "attracting the attention of numerous international investors who see high potential." But five years later, that is still mostly a dream.

This blend of promise and frustration makes the pirarucu a symbol of today's sustainable development efforts in the Amazon. The concept is clear enough: The natural wealth of the world's largest rainforest could represent an economic bonanza for the Amazon basin's 35 million citizens, potentially generating millions of green jobs inside and outside the region, if it is exploited in a sustainable and intelligent way. In an era when global consumers are willing to pay a premium for green products, and environmental and sustainability goals (ESG) are en vogue among multinational corporations and investment funds, this could have been the Amazon's ideal moment for takeoff.

Some industries, such as cocoa, açai fruit and plant-based treatments for diseases like glaucoma, are indeed enjoying success. But most are still in an

Today, the Amazon region accounts for just 8% of Brazil's economy, exactly the same ratio as in 1980.

embryonic stage. Projeto Amazonia 2030, an initiative whose aim is to develop a blueprint for sustainable development, compiled a basket of 64 agricultural and natural products worth \$177 billion on the global market—and found the Brazilian Amazon accounted for just a 0.17% share. Other countries with Amazon territory, including Bolivia, Peru and Colombia, face similar challenges. The barriers include logistics, a lack of capital, insufficient coordination among producers—and, almost always, politics. In Brazil, which accounts for about two-thirds of the Amazon's overall territory, President Jair Bolsonaro's insistence upon deforestation as an economic growth strategy has put Brazil on the verge of pariah status with the very global consumers whom sustainable producers need to win over. And while Bolsonaro's government, particularly Environmental Minister Ricardo Salles, has tried to embrace at least the idea of sustainable development in recent climate talks with the Biden administration and others, this has in practice fed fears the whole concept is just a smokescreen, meant to distract public opinion while illegal loggers, gold miners and land-grabbers continue to set the forest alight.

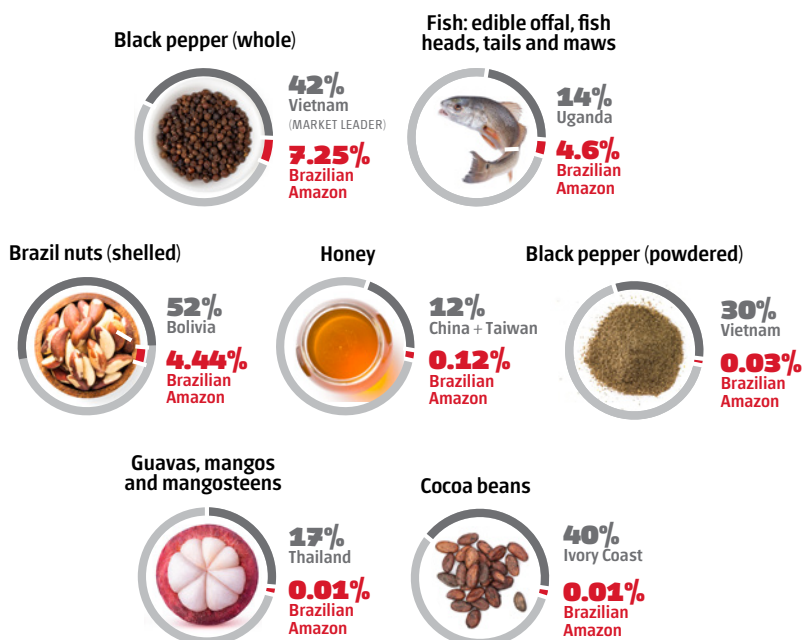
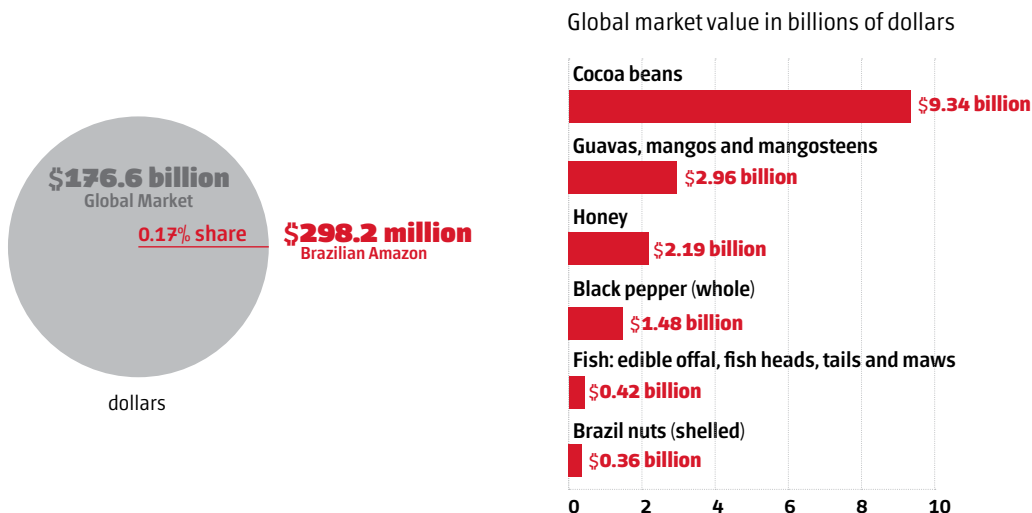
Brazil's private sector, including some agribusiness leaders, have energetically promoted sustainable development efforts over the past year - partly because they see its economic potential, and partly because they fear boycotts of their own products by US and European consumers. But for sustainable development in the Amazon to be more than a feel-good story, or a nice side project for green investors and NGOs, there are numerous challenges it must still overcome.

Conserving the forest is key

The environmental and moral case behind sustainable growth efforts is compelling. The Amazon has been a global treasure for more than 30 million years, demonstrating incredible resilience through ice ages and other oscillations in the climate. The human presence there is recent by comparison, going back some 15,000 years. Deforestation has only been a major issue for the past half-century, since Brazil's 1964-85 military dictatorship constructed highways and other infrastructure to stimulate development in the region. The regime did this not just for economic reasons, but also to

Brazil's Amazon: Giant in Size, Tiny in Global Markets

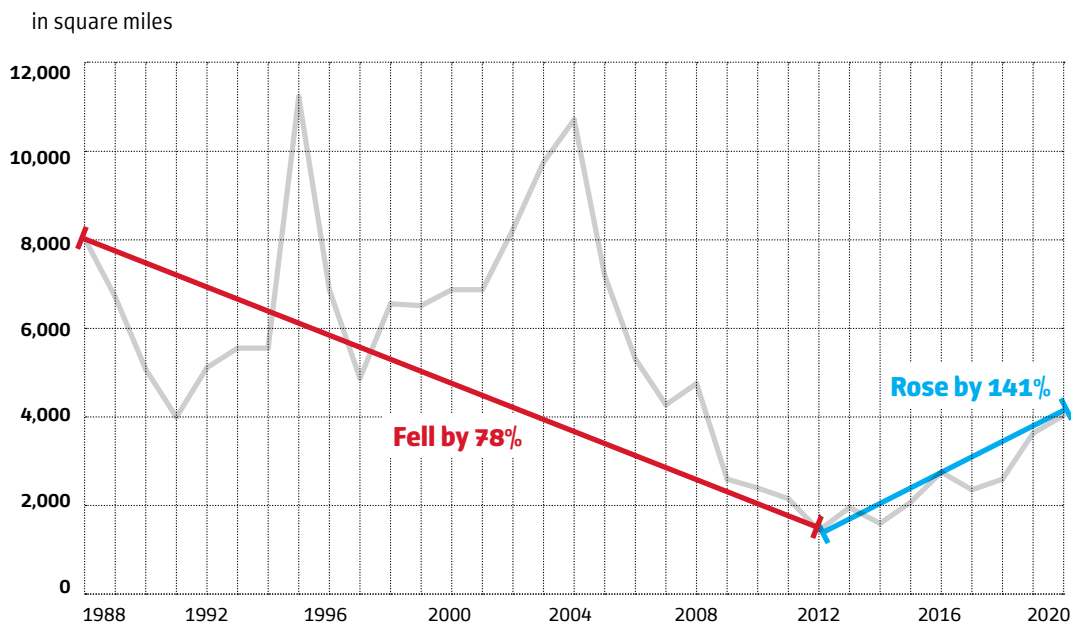
Products from the Brazilian Amazon account for just 0.2% of a multi-billion dollar market for 64 agricultural and natural products



NOTE: FIGURES REFLECT AVERAGE FOR 2017-2019 IN MILLIONS OF DOLLARS

SOURCE: BRAZIL TRADE MINISTRY AND CENTRE D'ÉTUDES PROSPECTIVES ET D'INFORMATIONS INTERNATIONALES. ORGANIZED BY SALO COSLOVSKY, NYU, FOR PROJETO AMAZÔNIA 2030

Brazilian Amazon Deforestation Rates 1988–2020



SOURCE: TERRABRASILIS/ BRAZIL'S NATIONAL INSTITUTE OF SPACE RESEARCH (INPE)

prevent the region's occupation by foreigners, reflecting a deep-seated fear of outside interference in the Amazon that has been at the heart of Brazilian military doctrine for more than a century. Integrar para não entregar, or "Integrate the Amazon so as not to give it away" in free translation, was a guiding slogan of the era.

The disastrous effects on the environment are now well-known, with the Brazilian Amazon having lost about a fifth of its original area to fires and bulldozers since the 1960s. This has released massive amounts of carbon into the atmosphere and also threatened the integrity of the forest itself, which many scientists say is nearing a tipping point that could cause it to transform into dry savanna unless deforestation is halted in the next few years. Without a standing Amazon, the world will never meet the goals of the Paris accord; the damage to weather patterns (including the rains that sustain agriculture and hydroelectric grids throughout South America) and biodiversity is already being felt, and may turn catastrophic.

But the supposed tradeoff for all this destruction—economic growth—also failed to materialize. Today, the Amazon region accounts for just 8% of Brazil's economy, exactly the same ratio as in 1980. Meanwhile, unemployment among young adults in the Amazon is 13 percentage points higher than Brazil's national average, and especially affects the Black and brown communities that make up 80% of the region's population. Bolsonaro, a retired Army captain who still clings to many of the former dictatorship's old philosophies, has argued that further deforestation is necessary to reduce poverty—"so that Indians can have a dentist, a TV, the Internet," in his words. But that is clearly at odds with the experience of the last 50 years, in which the fruits of deforestation have accumulated only to a select few.

At the same time, forbidding all development in the Amazon hasn't worked, either. The causes of deforestation are complex, with criminal gangs, legislation and political alliances in Brasília, and global commodities prices all playing a role. But efforts to create green jobs, and give local communities (as well as faraway politicians) a greater stake in keeping the forest intact, have helped inhibit deforestation in areas beyond the Mamirauá project. It's also true that, for productive purposes, Brazil has already cleared all the land it would ever need. Of the 80 million hectares that have been deforested since the 1960s, roughly 60% is used for cattle ranching with low productivity, while most of the rest (30%) is degraded or abandoned. Only the remaining 10% or so has been used with relatively high agriculture productivity. By using existing land better, there is plenty of room for growth; new techniques have been proven to increase cattle yields by more than 500%, to cite just one example.

Coping with a tough business climate

However, the pure economics of many sustainable industries remain challenging, without a doubt. Many Amazon products will probably always require customers to pay a higher price, given the expenses imposed by difficult logistics and sheer distance. Ana Claudia Torres of the Mamirauá Institute, which helped create the pirarucu rescue program in the 1990s, says the fish has clear appeal as a "premium product ... a wild animal that comes with all the appeal of conservation and in the name of the Amazon." Alexandra Bentes, a fish farming production researcher at Embrapa, Brazil's prized agricultural research body, says consumer tests have shown "great acceptance" for the pirarucu in foreign markets. Others see potential for pirarucu skin, collagen from its scales and even digestive enzymes and soaps extracted from its entrails that could exceed demand for the filets themselves. But this all remains mostly a dream—in 2020, Brazil exported a measly four tons of pirarucu, about .07% of its total fish exports that year.

Entrepreneurs and local leaders point to several steps that could help make pirarucu and other Amazon products more competitive and scalable. Further research and access to capital will help maintain quality standards as producers try to meet demand while nurturing a fish that can grow by 15-20 pounds in a single year. “When you go to market with that kind of scale and volume, you have to have total control over the supply chain,” said Carlindo Maranhão, a fish farmer based in Rondonia state. In fishing and other industries, more skills training programs for workers would help create an environment in which products aren’t immediately exported to Sao Paulo or other faraway cities, as tends to happen today. More value-added production could take place in the Amazon itself, particularly in cities, where two-thirds of the region’s population resides. Another idea would be to connect early-stage Amazon entrepreneurs with peers in Silicon Valley and elsewhere in the world, so they can gain visibility and learn more about what it takes to compete on the global stage.

But the most urgent step is clear: For Brazil to begin to rehabilitate its image among global consumers, much less become a “green superpower,” it must first do a better job conserving the Amazon itself. Deforestation has to fall to zero, and soon, or the virtuous circle that helped save the pirarucu will never realize its potential—in this and other industries. Adevaldo Dias of the Carauari Rural Producers Association, which has helped organize Amazon-centric food fairs and “audition” the pirarucu for high-end restaurants throughout Brazil, says the model clearly works under the right conditions. “If the communities are given just and decent compensation for the sustainably managed pirarucu that they are bringing to market, the greater their motivation will be to protect the area,” he said. “And people will understand they are contributing to a better world.”

Additional reporting by Edmund Ruge.

AMAZON BUSINESS

Café Apuí

Founded 2014

Annual revenue
\$38,000 (2020)

Revenue growth
47% (2020)

Jobs created 40
families benefited

Global market
value of coffee at
least \$200 billion
(projected)

Global market
value of organic
coffee \$6.8 billion
(2018)

Robusta in the Rainforest

Apuí Agroforestry Coffee provides a
lifeline to farmers and the forest.

by Brendan O'Boyle

A Café Apuí farmer.

COURTESY: IDESAM

In a swath of the Amazon that cattle ranching has turned into Brazil's new frontier of deforestation, one company is helping farmers find an alternative in coffee—and regenerating deforested land in the process.

Launched by the Institute of Conservation and Sustainable Development of the Amazon (IDESAM), Café Apuí Agroflorestal (Apuí Agroforestry Coffee) took root in 2012 when IDESAM staff met Maria das Dores, a small-scale farmer. Das Dores and her husband had abandoned an unprofitable plot of coffee bushes. To everyone's surprise, IDESAM found that the crop was quietly thriving amid the encroaching forest.

Today, the couple is among 40 families cultivating coffee for Café Apuí by intercropping native trees with coffee. The method improves soil fertility and provides shade for coffee bushes, which grew wild in the forest before coffee's mass commodification centuries ago. The families have seen their coffee's productivity double using the method, and their incomes have grown at least 300%.

The method improves soil fertility and provides shade for coffee bushes, which grew wild in the forest before coffee's mass commodification centuries ago.

The approach shows it's possible to “produce in a way that dialogues with the forest,” said Felipe Villela, co-founder of reNature, an NGO helping Café Apuí connect to markets and funding.

Many other farmers in Apuí, a municipality in Amazonas state, have since the 1980s traded coffee farming for cattle ranching, resulting in 1,100 square miles of forest cut down, mostly for pasture. Between 2013 and 2018, deforestation in the municipality was more than double the rate for the entire Brazilian Amazon.

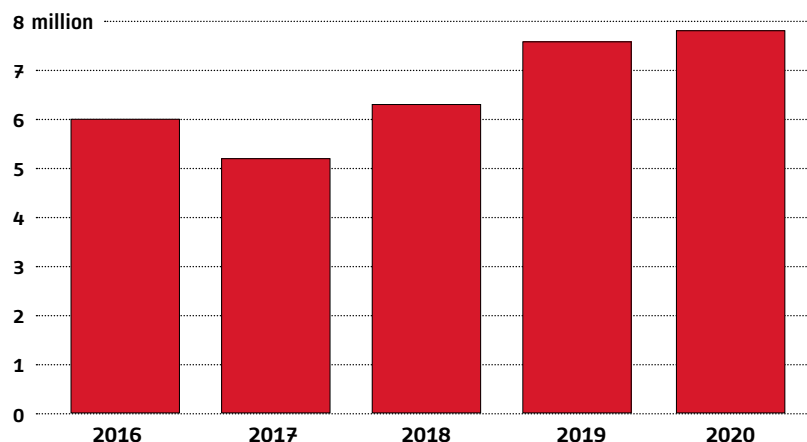
But since 2015, Café Apuí has reforested nearly 100 acres, with a five-year goal to reforest 600 hectares (1,483 acres) farmed by 600 families.

“We want to provide a new, sustainable model for farmers,” said Pedro Soares, a manager at IDESAM.

After a round of investor funding, Café Apuí transitioned into a

Brazil's exports of differentiated* coffees have been increasing, even during the pandemic

Exports (in 132-lb sacks)



SOURCE: BRAZILIAN COFFEE EXPORTERS COUNCIL

*DIFFERENTIATED COFFEES INCLUDE ORGANIC, SUSTAINABLY GROWN, AND OTHER COFFEES THAT GO THROUGH A NON-STANDARD PREPARATION PROCESS.

startup in 2020, with IDESAM owning 51% of its shares. Its certified-organic blends are for sale online, and in 2020 the company made its first shipment to a Dutch producer of Nespresso pods. As the “first coffee sustainably produced in the Amazon,” (according to the company) Café Apuí’s specialty status—and the premium price that entails—is a key plank in its business model.

Annual revenues grew 47% in 2020, but the company hasn’t broken even yet. The logistics of rainforest production entail high costs, which the company and IDESAM work to offset through grants from international funders and the sale of carbon credits.

“There’s a market out there” for Café Apuí, said José Sette, the executive director of the London-based International Coffee Organization. In 2020, Brazil increased its exports of differentiated coffees, which include organic and sustainably grown beans, by 4.4% over 2019, reaching a value of \$1.29 billion. “There are challenges involved, but it’s certainly viable.”

O’Boyle is senior editor at AQ

AMAZON BUSINESS

Navegam

Founded 2019

Annual revenue
\$134,000 (2020)

Jobs created
15 direct jobs;
50 vessels
registered

Brazilian Amazon
market over 22
million individual
trips, 3.4 million
tons of cargo

Brazilian river
transportation
market 90 million
individual trips

River Uber

2.4 million square miles worth of waterways can be the answer for the region's logistics bottlenecks.

by Cecilia Tornaghi

A Navegam client carrying cargo in the Amazon.



Reliable transportation remains a major hurdle for business in the Amazon—and a barrier between locals and access to education, shopping and jobs. Then there is the world's largest river network. About 30% of urban communities in the state of Amazonas are accessible only by boat. "Our rivers are our roads," said Geferson Oliveira, founder of Navegam, an app to connect boat owners and users.

In 2012, Oliveira lost a job for lack of transportation. "I could only reach the town I was supposed to report to by boat, and for days there were none to take me there on time," he told *AQ*. The disappointment became a challenge for the systems engineer.

Jorge Alves, a friend who works at the port of Manaus, had developed a system for managing cargo loaded on and off vessels at the busy port. "To this day, many captains—even those with revenues in the millions of reais—still rely on paper and pencil to account for their passenger and cargo traffic," Oliveira said. Alves' spreadsheet had already started to change that.

The duo set to work developing a digital application offering vessels a simple tool to manage both cargo and passenger transportation.

The Navegam app allows passengers to book trips, e-commerce companies to plan their shipments and buyers to track purchases. Most importantly, community-based businesses (such as Café Apuí) can use it to lock in transportation costs. "We are now working on a version for individual trips, allowing smaller vessels to sign up," Oliveira told *AQ*, adding that they are also ready to expand to other states.

If the opportunity is immense—the Brazilian Amazon's 12 river basins are home to 24 million people in 773 municipalities—the challenges are just as big. Many vessels operate informally, and several areas lack reliable Internet connections and even electricity.

"We track our boats using a Wi-Fi system we developed ourselves," said Oliveira, "but there are blind spots out there." Besides expanding the app, the team is researching solar energy for vessels. "Everyone is concerned with the forest," said Oliveira, "but the rivers are just as important. We can't go on spilling fuel in our waters."

Tornaghi is managing editor at *AQ*

Greener Pastures?

One company shows that with the right investments, ranchers can make better use of already deforested land.

by Mariana Reina

Founded 2015

Annual revenue
\$10.3 million
(2020)

Global beef
market \$332.92
billion (2020)

Brazil beef
market \$40.4
billion (2019)

Projected growth
in Brazilian beef
production 4% in
2021, according
to the U.S.
Department of
Agriculture

PECSA's ranches sustain a larger herd of cattle, reducing the need to clear new pasture to increase production.



Cattle ranching brings some \$2 billion to the Brazilian Amazon every year, but the industry has taken a toll, with ranchers clearing forest to expand pasture that has become degraded by soil mismanagement and the lack of trees. As a result, the industry accounts for more than 80% of Amazon deforestation since 1985. Even though approximately 174,800 square miles of forest have been turned into pasture in the Brazilian Amazon, 44% are degraded.

Sustainable Livestock of the Amazon, or PECSA by its initials in Portuguese, is breaking this cycle by partnering with local ranchers to sustainably intensify production on existing pastures without cutting down more forest.

To do so, this cattle ranching management firm institutes changes on their partners' ranches, such as moving to rotational grazing modules to allow for soil regeneration and help sustain a larger herd of cattle. Its model increases productivity five to seven times the average in Alta Floresta, the region where it first started operations, and increases profits. By restoring soil quality and changing the cattle's diet, independent studies also found that greenhouse gas emissions on PECSA ranches have been reduced by up to 85%.

This cattle ranching management firm institutes changes on their partners' ranches like moving to rotational grazing modules, to allow for soil regeneration and help sustain a larger herd of cattle.

Additionally, PECSA requires its partners and suppliers to register in a state-level zero deforestation database to assure clients that they're not adding to deforestation.

With funding from climate-focused investors, PECSA tailors contracts based on the financial capacity of ranchers and the initial investment needed. When output increases, PECSA keeps a percentage of the profits.

"We wanted to create a business model that is inspiring and can serve as a reference for others to adopt," Laurent Micol, PECSA's co-founder, told *AQ*.

PECSA has increased ranch productivity by over 500%

Annual yield per acre



SOURCE: PECSA; BASELINE: ERMAGASSEN ET AL 2018 / MULTIDISCIPLINARY DIGITAL PUBLISHING INSTITUTE (MDPI) SUSTAINABILITY

PECSA's main challenge to scale is raising the capital to finance initial investments with partners, Michol said. The upfront investment to regenerate ranches is, on average, \$630 per 2.5 acres, which is unattainable for most ranchers without PECSA's help. Despite this, PECSA has plans to scale across Mato Grosso state.

Incentives are mounting for an industry-wide transformation and PECSA shows the profitability of certifying zero deforestation for larger clients. International pressure for beef traceability has grown, said Johnny da Silva, an analyst at Fitch Ratings who covers large meat companies. "Five years ago, investors were not asking whether JBS or Marfrig had an impact on deforestation. Now everyone asks."

Reina is production editor at AQ

AMAZON BUSINESS

Chocolates
De Mendes

Founded **2014**

Annual revenue
\$18,000 (2019)

Jobs created
5 employees
in factory and
about **3,000**
forest suppliers
in **36 Amazonian**
communities

Global cocoa
market
approximately **\$9**
billion (2019)

Global chocolate
market **\$135.65**
billion (2019)

Projected growth
of chocolate
market **4.6%**
from 2020 to
2027 annually,
according to
Grand View
Research

Can the Amazon Save Us ... from a Global Chocolate Shortage?

Growing production, sophisticated flavors and a standing forest are De Mendes' plan.

by **Leonie Rauls**

Cesar De Mendes
harvests cocoa beans
in the Amazon for his
chocolate business.

COURTESY: CHOCOLATES DE MENDES

With chocolate becoming ever more popular (even as a stress-buster!), global consumption is outstripping production. Western Africa produces three-quarters of the world's supply of cacao, but the Brazilian Amazon—a native region for this fruit tree—could become a new frontier. Production in the state of Pará has increased more than 70% since 2014 and productivity is double the national average.

“In the rainforest there are more than 35,000 varieties of cacao,” said Cesar De Mendes, a chemist who traded a doctorate at Cambridge University for a life of chocolate in the Amazon. In 2014, he founded a tree-to-table chocolate business in the Colônia Chicano community in Belém, betting on specialty flavors.

“Cacao trees that grow among other vegetation give chocolate different tastes,” De Mendes told *AQ*.

De Mendes has been working with traditional communities to meld his knowledge and theirs, creating blends like Yanomami chocolate. His company sources cacao exclusively from traditional communities and pays them up to six times the market rate for the fruit.

**“In the rainforest there are more
than 35,000 varieties of cacao,”**

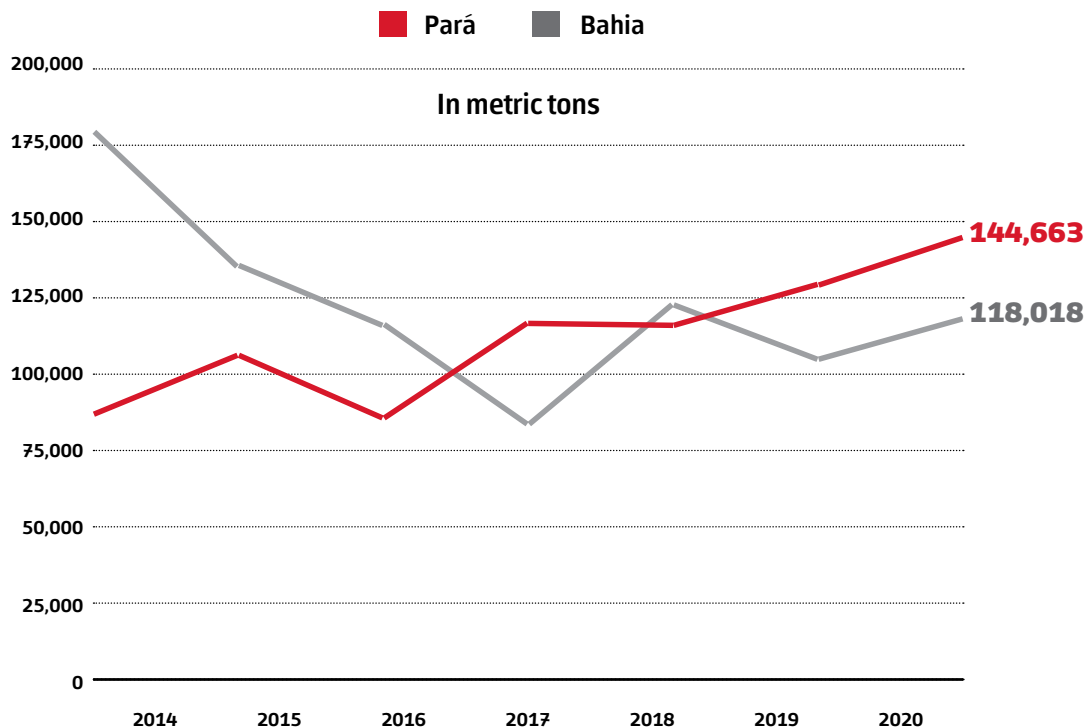
**—Cesar De Mendes, a chemist who traded a
doctorate at Cambridge University for a life of
chocolate in the Amazon.**

Although current profits are modest, De Mendes is breaking into international markets.

Today, De Mendes produces 1 ton of chocolate a month and decided he had to grow his business to have a greater impact on the rainforest. The first challenge was to find an investor who respected his relationship with local communities. In late 2020, he signed a partnership with CBKK, an impact investor based out of São Paulo, and now Chocolates De Mendes is looking for land to build a larger factory to increase production fivefold, upgrading standards for exports and implementing blockchain systems to manage cocoa traceability.

Pará has taken the lead in cacao production in Brazil

Bahia state, once the traditional producer and exporter, has lost its place to the Amazon region



SOURCE: IBGE—NATIONAL INSTITUTE OF GEOGRAPHY AND STATISTICS

Pará today accounts for more than half of Brazil's cacao production, from a mix of wild, agroforestry and monoculture plantations. Yet the real opportunity lies in specialty chocolate production, according to CBKK. And a growing trend of artisanal chocolate makers are following De Mendes' footsteps.

"The region can become a destination for boutique blends, attracting tourists as well as exporting," De Mendes told AQ. "I don't want to be the owner of this, but to promote a chocolate-producing ecosystem."

Rauls is assistant editor at AQ

**AMAZON
BUSINESS**
CoEx-Carajás

Founded 2011

Annual revenue
\$260,000 (1.5
million reais)
(2020)

Jobs Created
36 cooperative
members

**Global market
for glaucoma
medications \$7.6
billion (projection
2026)**

**Pharmaceutical
components**
pilocarpine

Healthy Eyes Need the Forest Too

A cooperative within the Amazon is supplying the world with an essential component for glaucoma treatment.

by Edmund Ruge

Dried jaborandi leaves
are the only known
natural source of
pilocarpine.

COURTESY: COEX-CARAJAS

Each year, several dozen leaf collectors dedicate six months to foraging the leaves of the jaborandi, a once-endangered shrub found in the north of Brazil.

Members of CoEx-Carajás, a sustainable gathering cooperative, spend three to four weeks at a time deep in the Carajás National Forest. They return with massive sacks filled with dried jaborandi leaves, the only known natural source of pilocarpine, an alkaloid long used as the main component in eyedrops for glaucoma. Founded in 2011, CoEx-Carajás has cultivated an extractive method that preserves the jaborandi plant—nearly picked to extinction only decades ago—and provides livable income for locals.

Trained by Brazil's Chico Mendes Conservation Institute (ICMBio), collectors pick leaves from trees of a certain size, and only between June and November, allowing the plants to regrow during the Amazon's rainy season. CoEx, located in Brazil's northern state of Pará, thus manages a sustainable but impressive haul, gathering an average of 30 to 50 tons of leaves per year at about \$2 a pound, bringing in a monthly average income of \$400 (more than twice the national minimum wage) for each of its 36 members during picking seasons. The rest of the year, CoEx members forage native seeds from Carajás, selling them to mining companies for mandatory reforestation projects.

CoEx was included in AMAZ, a business accelerator based in the Amazon, and invested the funds in infrastructure and equipment purchases. What's missing, said 25-year-old CoEx president Ana Paula Ferreira, is climbing to higher value-added portions of the supply chain. The cooperative currently sells the raw material to CentroFlora, a botanicals processing firm in São Paulo, which then extracts the pilocarpine for sale to pharmaceutical companies.

Ruge is editor at AQ

Rainforest remedies: promising plants

The Amazon is home to more than 150,000 plant species, many of them rich in medicinal properties



Forest Garlic

Cipó-d'alto

Used to treat high blood pressure, cough, nausea and constipation



Diesel Tree

Copaiba

Anti-inflammatory, used to treat minor wounds, dermatosis, rheumatism and herpes



Kunth Greene

Capim doce

Natural sweetener, used to treat diabetes



Cricket Vine

Pariri

Anti-inflammatory



Pataqueira

Pataqueira

Used to treat vitamin B deficiency and in therapeutic baths



Amargo

Quina

Anti-inflammatory, used to treat malaria, skin conditions, blood disorders and congested liver



Estoraque

Estoraque

Astringent, stimulant, used to treat hemorrhoids, insomnia, infection and flu



Paracress

Jambú

Used to treat toothaches, gingivitis and herpes

SOURCE: DR. OSMAR LAMEIRA, PHD IN PLANT BIOTECHNOLOGY AND RESEARCHER AT EMBRAPA AMAZONIA ORIENTAL

AMAZON BUSINESS

Vale's Carajás
Complex

Founded 1985

Vale's annual
revenue from
ferrous minerals
\$32 billion (2019)

Jobs created:
9,600 from
S11D complex at
Carajás (direct
and indirect)

Global market
for iron ore \$124
billion (2019)

Brazil share: Vale
accounted for
72% of Brazil's
national iron ore
production in
2019

Making Mining Work

The world's largest iron ore mine is a study in
mitigating the environmental impact of mining.

by Emilie Sweigart

The S11D complex
at Vale's iron ore
mine in Canaã dos
Carajás, Pará state.

The blueprint for a sustainable economy in the Amazon may include a surprising industry.

While the harm from illegal, makeshift mines has been well-documented, “Legal, industrial mining has minimal impact when it comes to deforestation,” said Beto Veríssimo, senior researcher and co-founder of Imazon, an environmental NGO.

In the Canaã dos Carajás municipality of Brazil’s Pará state, the world’s largest iron ore mine offers what some call a model for more sustainable mining.

Operated by mining giant Vale, the mine sits on a 3,000-square-mile tract of forest, which Vale helps protect in partnership with the Chico Mendes Conservation and Biodiversity Institute. While 60% of Vale’s iron ore production comes from this area, the company’s activities take up less than 1.5% of the land, said Leonardo Neves, Vale’s environment manager in Pará.

After the deadly 2019 disaster at Vale’s mine in Brumadinho, Brazil, investors are demanding cleaner mining practices, reflecting pressure “to show they are investing in solutions, not problems,” said Júlio Nery, director of sustainability and regulatory affairs at the Brazilian Mining Institute.

While the harm from illegal, makeshift mines has been well-documented, “legal, industrial mining has minimal impact when it comes to deforestation,”

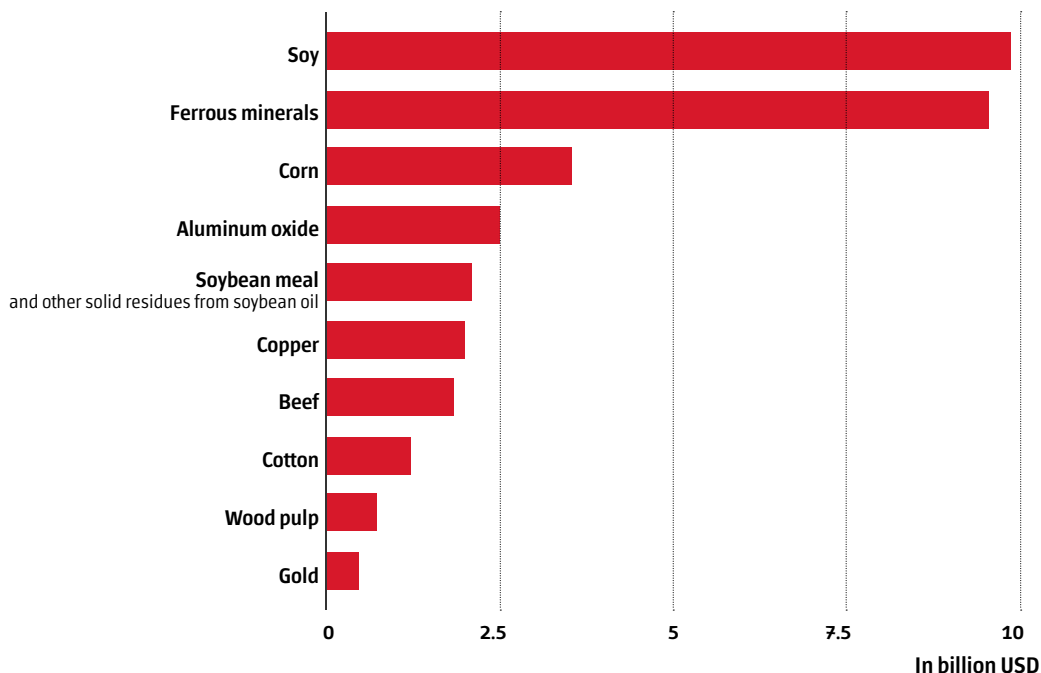
—Beto Veríssimo, senior researcher and co-founder at Imazon.

Last May, Norway’s sovereign wealth fund divested an estimated \$375 million in Vale stock, citing “serious environmental damage” at the mine in Brumadinho, where the collapse of a tailings dam (an embankment that stores mining waste) killed 270 people. In February, the company reached a \$7 billion settlement with the state of Minas Gerais.

The Carajás mine offers a contrast—and the “best practices in terms of environmental impact,” said Barbara Mattos, a senior vice

Top 10 legal exports from the Brazilian Amazon

Industrial mining is a main source of revenue for the region



SOURCE: BRAZILIAN MINISTRY OF DEVELOPMENT, INDUSTRY AND FOREIGN TRADE, COMPILED BY SALO COSLOVSKY FOR AMAZÔNIA 2030

NOTE: EXPORT VALUE IS THE ANNUAL AVERAGE FROM 2017-2019.

president for Moody's Corporate Finance Group in São Paulo.

The mine does not use tailings dams, and more than 80% of all production in Carajás is done without the use of water, said Neves. A system of conveyor belts rather than trucks cuts down on emissions and fuel.

The 48-year lifespan of one of the mines suggests iron ore mining will likely be part of the Amazonian economy for decades. Surging Chinese demand made iron ore one of the best-performing assets of 2020, and Vale will spend \$1.5 billion over the next three years to expand capacity at Carajás. While mining, by nature, is not sustainable, Carajás may show it is possible to reduce its long-term effects on the environment.

Sweigart is editor at AQ

AMAZON BUSINESS

Natura

Founded 1969

Annual revenue
\$6.6 billion
(2020)

Jobs created
7,000 families in
33 communities
work directly
with Natura,
supplying oils,
seeds and other
components used
in cosmetics and
personal care
products

Global market for
cosmetics and
personal care
products \$530
billion (2018)

Global market
for organic
cosmetics and
personal care
products \$35
billion (2018)



The company maintains a reliable flow of rainforest components through a unique system that values local suppliers.

Building a Supply Chain from Scratch

Using traditional knowledge to develop new products was a risky bet—one that paid off.

by Cecilia Tornaghi

Place the words “sustainable business” and “Amazon” together and the word Natura is likely to follow. A global conglomerate that includes Avon, Aesop and The Body Shop, Natura began betting on biodiversity in the 1990s, before its expansion outside of Brazil. But incorporating forest components into its product lines and finding suppliers in the Amazon was no simple task. “Hiring local experts from the beginning helped them structure a supply chain that simply didn’t exist before,” INSPER business school professor Leandro Pongeluppe told *AQ*.

The use of Amazon compounds—grown or collected by hand by local communities—also made Natura’s products more expensive than those of their competitors. But their risk paid off. Consumers are paying more for environmentally friendly products, and investors have taken notice: Since going public in 2004, Natura’s stock has risen by more than 4,000%.

Today, some 17% of Natura’s components are sourced from the Amazon, including ucuuba seeds, murumuru almonds and andiroba oil, according to Luciana Villa, Natura’s sustainability manager. Their impact goes beyond economic support for locals. “They pay suppliers for components, but also for carbon captures and royalties for their traditional knowledge, which gives locals strong incentives to protect the forest,” Pongeluppe told *AQ*. Comparing historical data for Natura-linked communities and similar areas without such incentives, Pongeluppe calculates the company has helped preserve almost 4.5 million acres (1.8 million hectares) of forest. “In perspective, that’s 1.7 million soccer fields standing because of this business model,” he said.

Yet, despite its success, other large-scale companies have yet to follow suit in investing the time and effort needed to work with forest dwellers as suppliers. “Natura, like Danone, may still be a unique case in terms of embedding social and environmental concern into its business model, but business leaders will have to change their minds soon,” said Pongeluppe. “Otherwise, they will lose competitiveness. And it will happen sooner than they may think.”

Tornaghi is managing editor at *AQ*

**AMAZON
BUSINESS**
Green Jobs

The Amazon's Big Cities Need Green Jobs Too- It's a Challenge

The region's cities face dire poverty
and unemployment.

by **Monica Prestes**



Aerial view of Manaus,
the capital of Brazil's
Amazonas state.

MANAU, **Brazil**—For much of the world, coverage of the devastating COVID-19 outbreak here in Manaus was a reminder that the Amazon is more than just the rainforest.

In fact, more than 60% of the Brazilian Amazon region's 30 million people live in urban centers, and every year thousands more leave rural communities for Manaus and Belém—the region's largest cities—to look for jobs and a better life. Most city newcomers, however, end up living in slums, peddling candy at busy intersections or, with luck, finding informal or domestic work.

The picture is similar in other Amazonian cities, and the quest is underway to create green jobs that preserve biodiversity and benefit not just deserving small communities in the jungle, but urban dwellers everywhere.

The need is dire: 41% of Amazonians live in poverty, almost double the national average of 22%. Even before the pandemic, more than 12 million Brazilian Amazonians were looking for work. About 5.5 million, or more than half, of those who did have jobs were employed in the informal sector—the highest rate of informality in the country.

41% of Amazonians live in poverty, almost double the national average of 22%. Even before the pandemic, more than 12 million Brazilian Amazonians were looking for work.

Creating good jobs “is possibly the biggest challenge the region faces,” said Denis Minev, an entrepreneur based in the state of Amazonas, who is also considered the largest angel investor in the region.

The region's limited private sector presents numerous roadblocks. A report by Imazon shows only 24% of the region's workforce holds a formal job, with about 10% of Amazonian workers employed in public service. The region's urban Human Development Index is also the lowest in the country, and Black and Brown residents' HDI is at even lower levels locally. And while Black and Brown Brazilians

constitute 80% of the population and the majority of the labor force in the north, their earnings are half the wages paid to white workers.

In Manaus, the free trade zone (Zona Franca) has been the main private-sector employer since its creation in 1957. But the model of subsidizing manufacturing plants in the farthest—and least connected—corner of Brazil has not been enough to absorb the region’s growing workforce. In fact, since its peak in 2014, employment in the Zona Franca has been decreasing steadily.

“We can’t have jobs if we don’t have new enterprises,” said Mariano Cenamo, founder of Idesam, a sustainable development NGO based in Manaus.

In 2017, Cenamo joined Minev to launch a business accelerator, the Partnership Platform for the Amazon, and now the accelerator AMAZ, to invest in companies that show the business potential of the rainforest while generating jobs and income for locals, all with a focus on environmental sustainability. In a little over two years, AMAZ has worked with 30 startups responsible for 251 direct jobs, and the accelerator has attracted more investors and increased its funding, aiming for a larger portfolio in 2021.

An economist by training who also runs the largest Amazon-based retail chain, Grupo Bemol, Minev believes the region’s urban centers offer the biggest opportunities today to build job-creating enterprises in sectors like technology and venture capital. But the hurdles are immense.

“You can find good entrepreneurs anywhere, but it is hard to thrive here because of the region’s business environment,” he told *AQ*. Brazil as a whole ranks at 124 out of 190 countries in the World Bank’s Doing Business Report, but in the Amazon the combination of bureaucracy and a lack of investment in communication, research and logistics infrastructure has created a context where it is “close to impossible to build a legal business. This scenario spooks investors, impedes prosperity and creates a vicious circle,” said Minev.

Plenty of hands

While Brazil’s demographic bonus is rapidly disappearing on a national level, the Amazon’s population is younger than the country’s average. Still, the region is losing out on this advantage because of low education levels. A fifth of 15- to 29-year-olds are neither studying nor working, and Raphael Medeiros, at the Amazon Center for Entrepreneurship, said that while the world is in



awe of the rainforest, young Amazonians don't think their home states are cool, which also incentivizes a brain drain. "The kids that do get an education very often leave for the south," said Medeiros.

At his own business, Minev has diversified into solar energy, fintech and digital training for young people, looking to foster development of new technologies for Bemol's e-commerce division.

"We need qualified labor to be able to develop a biotechnology hub or digital startups," said Minev. "While there are a few great initiatives such as at the University of Amazonas, they are too few to make a dent."

"In the three main fronts needed for a green economy to flourish—science, legislation and logistics—there is a need for government action," said Minev. He said the National Research Institute of the Amazon, INPA, the largest in the region, has an annual budget of less than \$9,000. "This is some 700 times smaller than just my alma mater, Stanford University. We can't be serious about playing the bioeconomy game with this level of investment in the region."

Minev credits his grandfather, Samuel Benchimol, who started the Bemol group in 1942, with instilling in him an appreciation for the wealth inherent to the rainforest. "My grandfather engaged in sustainable development projects for the Amazon since his youth," he said. "But timber, felling a tree and raising cattle are still worth more than the standing forest. That is the crossroads we find ourselves at. We need to offer sustainable alternatives to those who want to be entrepreneurs."

Prestes is a freelance journalist based in Manaus, Amazonas

Governor Flávio Dino: The Amazon Is Brazil's Future

The region's governors envision a win-win strategy that differs in many ways from the Bolsonaro administration's approach.

by Flávio Dino



Dino is governor of Maranhão state and current leader of the Forum of Governors of the Legal Amazon.

SÃO LUÍS, Brazil—The Amazon is Brazil's path forward. The region's nine governors share this vision, even as we recognize the area's deep paradox. In spite of the immense potential the Amazon's resources offer, its population registers the lowest human development indicators in Brazil. It has the highest unemployment, the least education and the least access to health care. The COVID-19 pandemic pushed the region over the brink in terms of health care and food access, exposing the Amazon's endemic inequalities.

Yet we see the Amazon as an opportunity for national development. The region's strategic resources stand to make it one of the planet's wealthiest—if there is a thoughtful, planned and coordinated strategy.

Developing a comprehensive, sustainable plan for the Amazon is urgent. We need a transition plan to a green economy that takes into account the region's existing development framework. Making this transition sustainable means adopting a combination of models for production and habitation that create jobs and income for the population, improve human development indices, and reduce disparities.

Although opinions in Brazil vary, increasingly public and private actors are embracing a low-carbon development approach. Yet interruptions to environmental policies and challenges with deforestation and illegal fires end up undermining Brazil's credibility when it comes to handling greenhouse gas-related issues. Still, we recognize that the more control Brazil has over the region, the greater our ability to implement a development strategy that recognizes the

Amazon's significance to Brazil and the world. To this end, we welcome international efforts aimed at mobilizing public and private resources to protect the rainforest while respecting Brazil's sovereignty.

To help overcome these challenges, the Amazon Interstate Consortium for Sustainable Development, led by the region's nine governors, has developed a plan. Called the Green Recovery Plan for the Amazon (GRP, or PRV in Portuguese), it offers a comprehensive approach to the region's economic and environmental problems. It also reinforces the consensus calling for a regional, green economy.

We will recruit our universities, public agencies, businesses and institutions. We will attract national and international investments. We will operationalize the Payment for Environmental Services process already approved by Congress. These efforts fall into three thematic areas: 1) innovation and technology; 2) urban and rural infrastructure; and 3) production and tourism. The first area addresses projects related to biotechnology, pharmaceuticals and the monitoring of deforestation and fires. The second focuses on expanding infrastructure to boost digital access and electronic businesses; preserving and decontaminating rivers; decentralizing the availability of goods and services and transportation. The third sector will encompass initiatives ranging from family agriculture and regional product certification processes to ecotourism.

The GRP's success will depend on our ability to attract a range of sectors and to catalyze domestic and international institutions engaged in climate-change mitigation, transforming the biome's potential into our greatest ally.

To ensure the Brazilian Amazon continues providing the planet with climate security, we are adopting a collaborative approach based on open dialogue where all parties win. We lament misguided positions that sometimes confuse the legitimate defense of national sovereignty with environmental irresponsibility. We also reject sanctuary conceptions of the forest that call for removing people from the environmental debate, perpetuating social injustices and denying rights.

We know this is no small challenge. Still, the current international landscape favors better climate-related global governance. The resulting cooperation must take into account local, national and global needs to both develop and preserve the Amazon rainforest.

Brazil's future is tied to the Amazon's. The region's governors see the GRP as part of their constitutional responsibility to defend and preserve the environment for present and future generations.



Rodrigues is an activist at the Center for the Study and Defense of Afro-Brazilians of Pará - CEDENPA and the Network of Black Women. She is a journalist with a doctorate in media studies from the Complutense University in Madrid, Spain, and the coordinator of the City of Belém's Anti-Racist Coordinating Committee.

Afro-Brazilians Must Be Included in the Quest for Amazon Sustainability

The Amazon's Black community, one of Brazil's largest, faces numerous challenges.

by Elza Fátima Rodrigues

BELÉM, Brazil—For decades, the Brazilian Amazon looked to external observers like an area with enormous economic potential, a wealth of biodiversity and no people. This “unpopulated” Amazon could be occupied and developed—even after acknowledging the presence of “a few” indigenous people.

To transform this distorted vision, the peoples of the forest have had to organize determinedly. They have fought to affirm the region's human diversity as well as its ancestral traditions of respect for the environment. Today, debates about sustainability in the Amazon recognize how indigenous peoples and traditional communities like the quilombos (communities established by self-emancipated people of African descent) have preserved the forest until now.

Still, Afro-Brazilian communities have been historically overlooked in both the urban and rural Amazon. After Bahia, the states of Amazonas and Pará are home to the largest number of Afro-Brazilians in the country. Nearly 50,000 enslaved people were brought to the Amazon between 1755 and 1820, according to Vicente Salles' seminal book *O Negro no Pará*. In fact, Pará has the highest percentage of people who identify as Black and Brown of any Brazilian state. These statistics make it impossible to think about the Brazilian Amazon without considering the significant presence of Black folk, many of them young and in vulnerable living conditions.

Along with racism, rural Black communities face environmental degradation inflicted by predatory approaches to development. Even so, their struggle—a fight for land rights and against discrimination—has

become a powerful movement. Pará has one of the highest numbers of quilombos in Brazil, with roughly 125 communities, though only half of them hold titles to their land. And institutional racism persists. Over the past decade, federal resources for quilombos have been slashed by 90%.

Meanwhile, anti-Black racism expresses its full force in urban areas of the Amazon. Black women are especially affected by workplace discrimination, but the monster truly rears its head in the areas of health care, inadequate housing and a lack of basic sanitation. Police violence has contributed to a genocide of Black youth, while racism in schools chips away at Black children's self-esteem and contributes to truancy. Followers of Afro-Brazilian religions, meanwhile, are being openly disparaged by Pentecostal church leaders encouraged by presidential statements. This has led to attacks and even murders.

Collective action groups such as the Center for the Study and Defense of Pará Blacks, or CEDENPA in its Portuguese acronym, have helped me, at least momentarily, overcome the accumulated pain of implicit and explicit racism that I face as a Black woman, teacher, journalist and now as head of the first Anti-Racist Coordinating Committee of the City of Belém. Collective movements enable us to surmount the daily dehumanization we experience as Black women and men.

Cooperative efforts enable us to face down structural racism. They may also allow us to build new social and economic relations based on a just development model, one of solidarity that respects different lifestyles and racial identities. However, for the Amazon to be truly sustainable, the Black population must be included in this new approach. Black movements in Pará are already doing this arduous work alongside researchers, historians and progressive faith leaders.

Overcoming racism, creating sustainability and developing a new economic order must be collective processes that enable the Black population—in all its diversity—to choose its destiny and its engagement with a regional economy focused on a new paradigm for quality of life.

Brazilian Agribusiness: We're Not the Enemy in the Amazon

Law-abiding farmers strongly oppose illegal deforestation, an industry leader writes.

by Teresa Vendramini



Vendramini is president of the Brazilian Rural Society.

The agribusiness sector has never been as pressed on the issue of the Amazon as it is right now. We are consistently being questioned—globally, but also by Brazil's urban population—about the destruction of the rainforest.

First, it is important to point out that when we refer to *Amazônia Legal*, we are describing an area that incorporates nine states and represents 61% of the country's territory. And what defines this region goes beyond geography. Looking at its structural characteristics we see that *Amazônia Legal* includes an important socio-political component, expanding beyond the rainforest to include 20% of the Cerrado savanna and part of the Pantanal wetlands—over 2 million square miles, home to more than 27 million Brazilians.

Our answer to the assertion that our sector is partially responsible for destroying this area lies in the Forest Code of 2012, the most important regulatory framework that we have in terms of environmental protection. Brazil's environmental legislation, hailed globally as a model for its strictness, requires that 80% of native vegetation within private properties in the Amazon be preserved. Only 20% may be used for production, making the Brazilian Forest Code unique and exemplary in the world.

We are not denying the need to address the horrific problem of illegal deforestation, which is a major challenge that the Brazilian government must fight. I'll add that stopping the destruction of the forest is also extremely important for rural producers, for two main reasons: First, even if legal agribusiness players are not involved in deforestation, it sullies our collective image. The second reason, of

course, is climate change. We too need a healthy natural environment and a stable climate in order to produce while conserving the land. A healthy soil is our main treasure.

It is unfortunate that we are often mistakenly associated with the illegal mining groups, loggers and land-grabbers that purposefully fell trees, burn land and degrade soil and water. We are often described as criminal enterprises ourselves and have the challenge to clearly separate the wheat from the chaff to show our true work.

As a major economic force, we have a role to play in protecting the environment. Brazil's agricultural sector makes up 24% of the nation's GDP, employs some 19 million workers, and is the main driver of Brazil's trade surplus.

Brazil's transformation into the world's leader in tropical agriculture began to be noticed in the 1970s, after the creation of the research institute Embrapa. In the 1980s, the practice of the no-till farming method allowed us to reduce production costs and mitigate environmental impacts, drastically reducing soil erosion. Later, in the 1990s, new developments in biotechnology allowed us to harvest crops twice a year. In the 2000s, integration of cattle ranches and farming led to the recovery of thousands of acres of degraded pastures, allowing multiple productive systems to flourish on the same property.

Still, despite the agricultural sector's successes, challenges lie ahead. As a producer who is fortunate enough to travel regularly throughout rural Brazil, I can attest to this. Transportation infrastructure and logistics remain a major bottleneck, and distribution of our crops and products still leaves much to be desired. At the same time, the reality of 21st-century connectivity has yet to reach all corners of Brazil, while many rural areas lack even the most basic infrastructure. Just as urgent is the approval of a broad program of land regularization for the whole country, and the Amazon in particular. Such a measure would benefit thousands of small rural producers and improve the effectiveness of the Forest Code in the region. Finally, we must highlight the economic value of keeping the forest standing, the need to develop a clear carbon credit scheme and the framework for the new national policy of payment for environmental services. The sheer creation of such a plan is a sign of progress, but it remains plagued by uncertainty. While producers look to abide by the law, the question remains: Who pays for the environmental services provided by preserved land?