

Shocks and solutions: South American agriculture in a year of change



Image: Foto Arena LTDA



Cattle feed is unloaded at a 'hotel' opened in Uruguay to help animals recover from drought in summer 2021-22.
Image: Pablo Bielli / Diálogo Chino



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Foreword from our guest editor:

Can soy and beef producers go green? Not without stopping deforestation.

It has been a tumultuous year for South America's agricultural powerhouses.

The war in Ukraine has caused energy prices to spike, and pushed up the costs of fertilisers and pesticides imported from Russia, Belarus and China, on which the region's producers are highly dependent. Meanwhile, extreme weather due to climate change has become a material financial risk. Not for the first time, South American countries have experienced prolonged droughts that have reduced the productivity of agricultural commodities such as soy, while forest fires threaten livestock farmers.

As several articles in this special report show, some soy and beef producers are responding by investing in operations with a lower climate impact – and potentially lower cost. For example, one Argentine beef producer is using manure and organic wastes from its slaughterhouse near Buenos Aires to produce renewable electricity. Initiatives such as this could help reduce emissions of greenhouse gases such as methane that contribute to global warming.

There is also nascent interest in the region in “regenerative” agriculture, which aims to protect soil quality, improve biodiversity and reduce carbon emissions by avoiding tillage and costly chemical inputs, in favour of diverse planting and crop rotation. Meanwhile, researchers in Uruguay are looking at less harmful biological alternatives to pesticides.

As welcome as these initiatives are, the elephant in the room is deforestation. The Intergovernmental Panel on Climate Change says that between 2007 and 2016, 23% of global greenhouse gas emissions came from agriculture and land-use change – approximately half of which was due to deforestation.

The Brazilian cattle sector alone is estimated to account for a fifth of all commodity-related tropical deforestation. It is estimated that just in 2018, deforestation for pasture in the Brazilian Amazon and the Cerrado was 1.1 million hectares – almost 10 times larger than the city of Rio de Janeiro.

Brazil's soy exports have doubled over the past decade in response to international demand, particularly from China. The soy exported by Brazil in 2018 was associated with a deforestation risk of almost 50,000 hectares, equating to emissions of 8.3 million tonnes of CO₂ from land conversion.

Other countries face similar challenges in tackling commodity-driven deforestation. For example, none of Paraguay's beef exports in 2019 were covered by a zero-deforestation commitment, despite high deforestation risk in the Dry Chaco region.

In Argentina, soy production was responsible for 25–33% of total land clearance between 2015 and 2019, accounting for almost 240,000 hectares of land conversion – an area nearly 12 times larger than Buenos Aires.

The positive news is that, as our research at Trase consistently shows, deforestation is concentrated in a handful of production hotspots. In the case of Brazilian soy, for instance, less than 1% of over 2,300 soy-producing municipalities accounted for more than half of the soy deforestation risk associated with exports in 2018. This means that the problem of deforestation is much more tractable than many presume.

Governments and companies in consumer countries can take a leadership role by identifying and addressing deforestation hotspots in their supply chains. The EU has introduced regulations to prohibit imports of commodities linked to deforestation, while the UK and US are considering similar proposals.

China has also signalled its support for action on deforestation by signing the COP26 Glasgow Leaders' Declaration on Forests and Land Use, to halt and reverse forest loss and land degradation by 2030. And back in South America, the potential victory of Luiz Inácio Lula da Silva in Brazil's presidential elections would bring a welcome return to environmental protection, helping to turnaround recent rises in deforestation and forest degradation, and facilitate a shift towards sustainable agriculture.

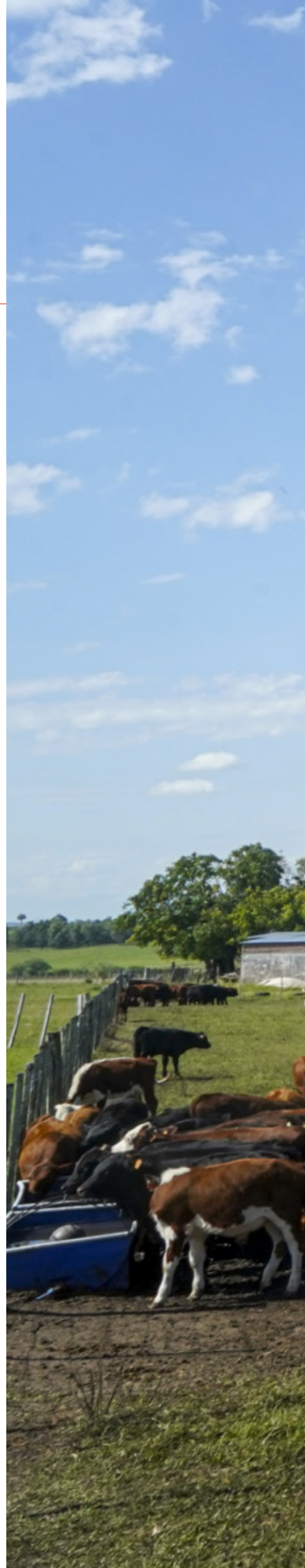
As several articles in this report demonstrate, multi-stakeholder partnerships with producer countries are critical to strengthen land-use governance and invest in sustainable rural development. Ultimately deforestation cannot be tackled – including via demand-side measures – without placing stronger territorial governance as the core policy objective.

While soy and beef producers continue to clear land of its native vegetation to expand pasture for cattle and create new soy plantations, there can be little meaningful progress towards sustainability. Confronting the powerful forces and incentives behind deforestation is a tall task – but one in which the tides may be beginning to turn.

André Vasconcelos, engagement lead, Trase



Trase (trase.earth) is a supply chain transparency initiative, led by the Stockholm Environment Institute and Global Canopy





A drought-hit soy plantation in the Brazilian state of Rio Grande do Sul
Image: Reuters / Alamy

[Jorgelina Hiba](#)

Heatwave and drought hit South America's crops and economy

In late 2021 and early 2022, southern Brazil, Paraguay and Argentina experienced a severe drought that affected soybean and maize production

Last summer, Brazil, Argentina and Paraguay, the three major agricultural producers in South America, experienced a prolonged period of drought and low water levels in their main rivers. This severely impacted harvests, as well as river transport of important summer crops, with maize and soybeans the main casualties.

Experts said at the time that although conditions

may later improve, the grain harvests of 2021 and 2022 could result in losses that will impact the economies of the three countries, though the potential magnitude was difficult to foresee.

For soy, South America's

20 million tonnes

of soy will be lost in the 2021–22 harvest across Brazil, Argentina and Paraguay, according to Brazilian agency AgRural.

star grain, projections for possible losses caused by adverse weather in the countries vary. The most conservative forecasts come from the United States Department of Agriculture, which anticipates a 9.5 million tonne shortfall, while others forecast more acute losses, such as the Brazilian agency AgRural, which estimates a 20 million tonne reduction in production across the three countries.

As for maize, it will be difficult for Argentina and Brazil to reach the output that they expected, according to a report by agribusiness consultant Marianela de Emilio. “The weather continues to put South America’s production projections on a tightrope, with planting area adjustments and potential yields down,” she explained.

Weather projections, at least until the end of March or early April, were not too encouraging for the entire region, as the La Niña climate pattern continued to impact South American weather, and contributed to drought in the three countries.

“As long as La Niña remains active, these patterns will continue, and projections are not optimistic for the short term, as we are still under the influence of a circulation pattern that inhibits rainfall in the Paraná basin area,” said Cindy Fernández of Argentina’s National

Meteorological Service (SMN).

A TRIO IN TROUBLE

Brazil is the world’s leading producer and exporter of soybeans and the world’s third largest producer of maize. Both grain crops are suffering this season due to the lack of rain in the country’s southern states, and will see smaller harvests than were projected in December.

Forecasts already show what has been lost. Due to the drought, Brazil’s state-owned National Supply Company (Conab), which oversees agricultural planning, cut crop estimates for coarse grains that it had made in December. For soybeans, these were reduced from 142.8 million to 140.5 million tonnes, while for maize, the authority expects an output of 112.9 million instead of 117.2 million tonnes.

In Argentina, a lack of rainfall in the central-eastern region during the crop cycle forced estimates for the maize harvest to be cut by 8 million tonnes, from 56 million to 48 million tonnes, and soybeans from 45 million to 40 million tonnes. A heat wave hit the most fertile part of the country in the first weeks of January.

Meanwhile in Paraguay, the situation is no better, according to the country’s agriculture minister, Moisés Bertoni. “We were doing well until the last

weeks of November, but December was very dry and in January very high temperatures arrived, which had an impact on soya, which is Paraguay’s main export crop,” he said.

The Rosario Stock Exchange (BCR) estimates that the drought will cut Paraguay’s expected soya production by 30%, which, along with a projected 5 million tonne shortfall in the maize harvest, could mean a loss of income of around US\$4.5 billion for the nation. “Many producers have opted to feed the [damaged] maize to cattle, although we are still waiting for conditions to improve,” Bertoni added.

AN UNUSUAL CLIMATE

This season’s difficulties aren’t entirely new, however. Paraguay, southern Brazil and northeastern Argentina cover a vast region of South America crossed by rivers that make up the Río de La Plata Basin, and have been experiencing a severe water deficit for almost three years, with two consecutive summers under the influence of La Niña.

According to Fernández of the SMN, it has been more than 20 years since normal or above-normal rainfall has been recorded in southern Brazil, with some exceptions. This means that the region has been suffering from a long-standing water deficit. In Argentina, the northeastern Litoral region has recorded

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This above-average intensity and duration is partly attributable to climate change, and the likelihood for the future is that these events will recur more frequently

below-normal rainfall for the last two years, particularly during the summer.

According to Paraguayan agronomist Luis Recalde, while this year's event is not a completely unknown or new phenomenon, it is unusual in its magnitude and duration. "This above-average intensity and duration is partly attributable to climate change, and the likelihood for the future is that these events will recur more frequently," he said.

For Recalde, the problems of the drought go beyond production and are socio-environmental. These range from losses in agricultural and livestock productivity "that will have lasting effects on the prices of basic food basket products" to the amplification of forest fires, which generate "great loss of biodiversity and

damage to health in terms of air quality".

RIVER LEVELS REMAIN LOW

The rivers that make up the Río de La Plata basin, which covers an area of over 3 million km², are experiencing extraordinarily low water levels, which began in the southern winter of 2019 and are still persisting. This phenomenon has various consequences for the human use of the rivers and their productive functions.

"The impacts of the lack of flow in the rivers are enormous and very diverse, but the most obvious for people are the shortage of water for consumption, and the rise in the prices of electricity, goods and fuels that are moved through the rivers or the energy generated in dams," said Recalde.

For Paraguay, which transports part of its grain production by barge to the agro-export port of Rosario in Argentina, the river's low water level has become a problem for the state. "The barges go without a full load and that means a double cost for exports," said Bertoni, the agriculture minister.

Argentina's agro-industrial sector is also suffering millions of dollars in losses due to the Paraná river's low water level. According to the Rosario Stock Exchange, in 2021 alone, some US\$620 million were lost as ships were unable to fill their cargo to capacity due to drought-related production problems.

ECONOMIC IMPACTS

The drought has and will have severe economic impacts. The impact on the Argentine economy was projected to be at least US\$4.8 billion – equivalent to 1% of the country's GDP – according to a January report from the Rosario Stock Exchange.

"Even with the recovery of prices, the loss of net income for the producing sector already amounts to US\$2.93 billion, which will result in less freight, less financial and intermediary services and less consumption," the exchange's report explains.

But the weather does not affect everyone equally. The stock exchange argued that the drought had affected small and

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A bad harvest leaves many in a situation of bankruptcy, and this could force more producers out of the production circuit if help does not come from the state

medium-sized producers in particular, many of them tenant farmers who no longer have their own fields. As of January, in rented fields, the result of the current agricultural cycle was already negative.

“There is a good chance that with the current costs, the producers who continue to pursue these activities will go back to making more soybeans and return to monoculture,” warned the BCR.

Carlos Achetoni, the president of the Federación Agraria Argentina, which represents medium and small producers across the country, said many were already in debt. “A bad harvest leaves many in a situation of bankruptcy, and this could force more producers out of the production circuit if help does not come from the state,” he said.

In Paraguay, according to Bertoni, agriculture accounts for 25% of GDP directly, a percentage that rises to 50% if one considers the activity it generates indirectly through services such as transport or agricultural machinery. “The impact of the drought in Paraguay is brutal, and even more so if we talk about soya, which accounts for 40% of our total exports,” he explained.

In Brazil, last year alone, the drought and the energy crisis it generated caused losses of some US\$1.464 billion, according to the

National Confederation of Industry (CNI).

FORECASTS OFFER NO RELIEF

The outlook for weather across South America’s agricultural region did not look promising, according to the January–March 2022 quarterly forecast from Argentina’s meteorological service.

“There is an increased likelihood of warmer than usual average temperatures across much of the country. The regions with the highest probabilities in this category are the south of the Litoral, centre-south of [the provinces of] Santa Fe, Córdoba, Buenos Aires and La Pampa,” the report states. It was not good reading for these provinces, which are Argentina’s agricultural heartlands.

As for rainfall, the forecast showed that the Litoral was almost 50% more likely to see below-normal rainfall for this quarter of the year.

These conditions, said meteorological expert Cindy Fernández, would extend across the whole of southern South America, including the large agricultural production area shared by southern Brazil, Paraguay and northeastern Argentina: “The area shares weather patterns, and is under the influence of La Niña for the second consecutive summer. The projections are not good, at least until the end of the summer.” 

War in Ukraine impacts global fertiliser crisis and food prices

Energy crisis in China and sanctions on Belarus already limited supplies of key fertilisers and elevated prices. In March, Brazil's farmers feared worse was to come.

Farmer Claudio Zeni's attention is divided between global geopolitics and tending to his 15-hectare property in Capitão Leônidas Marques, in the west of the Brazilian state of Paraná. Here he plants soybeans, corn and wheat and raises 25 oxen.

"We keep one eye on the crop and the other on the

global scenario. After all, those in agriculture depend on the import of fertilisers. We know there is a shortage of these products on the international market," he says.

Although Brazil is one of the largest agricultural producers in the world, the supply chain is truly a global one, with the nation

importing almost 84% of its fertilisers in 2021.

However, global supplies, which already began to dwindle at the end of last year due to multiple international factors, could become scarce in the event of a protracted war between Ukraine and Russia – the top fertiliser supplier to Brazil and other Latin American countries.

Shortages caused the prices of chemicals used in fertilisers to surge in Brazil last year.

*A farm worker loads fertiliser onto a tractor in the state of Goiás, Brazil. War in Ukraine has deepened the global fertiliser crisis that was already impacting farmers in Brazil, with some fearing this may hit productivity, harvests and prices.
Image: Mateus Bonomi / Sipa US / Alamy*





Claudio Zeni, a Brazilian farmer, on his 15-hectare property in Paraná: 'Those in agriculture depend on the import of fertilisers'
Image: Claudio Zeni

Potassium chloride rose 185%, urea increased 138% and monoammonium phosphate increased 103%, according to the Brazilian Confederation of Agriculture and Livestock (CNA).

“Brazil is already being hit hard. The products available, in many cases, have doubled in price,” says Zeni.

One of the main risks of the crisis is food price inflation. “The impacts here are the increase in production costs, the reduction in the farmer’s profit margin and passing on these increases to the consumer’s table,” said Máisa Romanello, a fertiliser specialist with Safras & Mercado, a Brazilian agribusiness consultancy. As of March, the federal government had also already predicted higher domestic food prices.

RESTRICTED RUSSIAN SUPPLY

Russia, the main global fertiliser supplier, accounted for 22% of Brazil’s imports of the product in 2021, a total of 9.27 million tonnes, according to the Ministry of Industry, Foreign Trade and Services (MDIC). But last November, Russia imposed nitrogen export quotas to safeguard domestic supplies.

Coal, natural gas and oil are essential resources in fertiliser production.

Many fertilisers are made by gasifying coal and combining it with nitrogen at high temperatures to form chemical compounds such as ammonia and urea that are the basis of many fertilisers, or by burning natural gas directly. Fossil fuels also power numerous manufacturing plants.

These fuels reached price peaks between early and mid-2021, causing a significant cost increase for fertiliser producers and manufacturers of the inputs. The dollar also appreciated 7.47% against the Brazilian real in 2021, hitting the country’s buyers.

“The producer does not have many alternatives and is hostage to international pricing, the dollar, logistical issues and international policies,” said Romanello.

At the end of 2021, Tereza Cristina Dias, the then Minister of Agriculture, travelled to Russia to try to secure supplies for Brazil. She received guarantees from the Russian government and fertiliser companies. “We will have no problems with delivery,” she claimed at the time.

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The producer does not have many alternatives and is hostage to international pricing, logistical issues and international policies



Fertiliser is prepared for application at a farm in Paraná
Image: Evandro Ghellere

Yet, prices remained volatile, and the situation looked likely to worsen due to the outbreak of war after Russia’s invasion of Ukraine. Beyond the devastating human cost, the war has interrupted the flow of goods through Black Sea ports and many have feared it could lead to the total suspension of fertiliser exports.

In a recent press conference, Dias said she feared the impacts of this in the coming months: “The summer harvest, which will be at the end of September or October, is a concern.”

Market analysts also said sanctions imposed on Russia by Europe and the US were expected to further destabilise supplies. “With retaliation from the west, the supply of fertilisers will become even more complicated. The price of food may increase a lot,” said César Castro, a specialist at Itaú BBA’s Agro consultancy.

CHINA’S ENERGY CRISIS AND CLIMATE TARGETS

China is Brazil’s second top supplier of fertiliser, accounting for 15% of imports in 2021, according to MDIC data. Yet, China

also tightened its export policy in the third quarter of last year, driven by its energy crisis.

In the context of global shortages and high international prices, Chinese fertiliser producers began to favour the international market over the domestic one. However, to avert a domestic supply crisis, China limited fertiliser exports at the end of last year.

“China has opted to meet the domestic market. We need to wait until April to know if it will return to

exporting [as before],” says Castro.

For now, Brazil has managed to maintain imports, possibly because the country is the largest consumer of Chinese inputs and is sourcing increasing amounts from the Asian country. Brazil bought 450,000 tonnes from China in January 2022, compared to 413,000 in the same month last year.

China’s promises to reduce its carbon footprint in the coming years could also affect the international fertiliser market. The country’s production still relies heavily on coal, which is highly polluting and energy intensive.

Last year, China’s energy crisis led to an increase in coal production. But the country has pledged to reach peak carbon emissions by 2030, a climate target reaffirmed during COP26 last November. According to China’s 14th Five-Year Plan, its quinquennial blueprint for development launched in March 2021, the country is expected to reduce coal use and impose restrictions on high emitting and consuming industries in the coming years.

BELARUS SANCTIONS

Belarus is another important supplier of fertilisers, particularly potash, to Brazil. However, Belarus has been feeling a series of sanctions imposed by the US and

Europe since August 2020, following the contested return to power of Aleksander Lukashenko and, more recently, because of his support for Russia’s invasion of Ukraine.

The Eastern European country accounts for 20% of global exports, ranking as the third largest potash producer in the world. However, following sanctions, it faced major difficulties in shipping the product due to the closure of European ports.

“Potash had already been experiencing low availability due to plant maintenance and the closure of two important mines of Mosaic [the Canadian mining company]. The sanctions aggravated the situation, generating lower availability and high prices,” explained Romanello. Potassium chloride, the most common chemical base of potash, leapt from US\$250 a tonne in early 2021 to \$800 in 2022 – record highs.

BRAZIL MINING ON INDIGENOUS LANDS

Brazil was once less dependent on fertiliser imports but these have grown substantially since 2015, according to MDIC data. This was due to state company Petrobras’ disinvestment in the sector after sprawling corruption scandals increased its debt and forced asset sell-offs. Several of its nitrogen production units closed in recent years.

“We are left hoping that multinational companies buy these plants to produce in Brazil, as happened at the beginning of February, with the acquisition by the Russian group Acron of the Petrobras Nitrogenated Fertiliser Unit (UFN3) in Três Lagoas [Minas Gerais state],” said Romanello.

The federal government was also planning to launch the National Fertiliser Plan. It expects to reduce imports from 84% to 60% in three decades, which is unlikely to resolve its dependence on the foreign trade. Among the proposed measures, it intends to seek new mineral deposits within Brazilian territory.

The situation has given President Jair Bolsonaro another opportunity to defend mining on indigenous lands. He called for the approval of Bill 191, which would open these protected areas to mineral exploration. The proposed law faced criticism from environmental groups for its potential impacts on indigenous peoples and biodiversity.

“In 2016, as a deputy, I spoke about our dependence on potash from Russia. I cited three problems [to greater Brazilian self-sufficiency]: environmental, indigenous and those that own the exploration rights at the mouth of the Madeira River,” the president tweeted on 2 March. “Once [the bill] is approved, one of these

problems will be solved.”

Minister Dias was also in favour of mining on indigenous lands to minimise the fertiliser crisis, but she was primarily keen on diversifying international suppliers.

For Romanello, the most viable way out is to seek more external partnerships, such as Canada for potash and Morocco and Saudi Arabia for phosphates. “For nitrogenous [fertilisers], the situation is more delicate, especially for ammonium nitrate, practically the entire volume of which Brazil imports from Russia,” she said.

REDUCTION OF INPUTS AND PRODUCTIVITY

Global fertiliser supply bottlenecks have further exposed the dependence on chemical inputs for Brazilian crops. The use of fertilisers is one technological advance that serves to increase productivity, especially of grain crops such as soy, whose planted area expands year by year in the country, driven by domestic and global demand. Soy farming also leads to soil degradation that is compensated for by increasing fertiliser use.

Today, reducing the amount of agricultural inputs inevitably leads to reduced production. In the face of price and foreign supply uncertainty, this is exactly what analysts and farmers expect to happen.

“The indications are that



Evandro Ghellere, a farmer in Paraná, says there is “no way” he can use the same amount of fertiliser as in past harvests
Image: Evandro Ghellere

producers should reduce the amount applied in the 2022–23 harvest,” said Ana Paula Kowalski, an agronomist at the Agriculture Federation of the State of Paraná, one of Brazil’s largest grain-producing states. “And many will reduce fertilisation without technical knowledge, potentially affecting even more crops’ productivity.”

Castro, from Itaú BBA Agro, agrees. For him, producers will “hold back” on the use of fertilisers, putting productivity at risk. “We have never seen this before, because it is not common to use the minimum [amount of fertilisers],” he said.

Evandro Ghellere, a farmer, intends to reduce the amount of inputs

in growing crops on his 40-hectare property in São Miguel do Iguazu, Paraná, despite knowing that this could compromise productivity.

“There’s no way I can use the same amount as in past harvests,” he says, still trying to comprehend the rising production costs. “If before I used to use 15 bags [of fertiliser] per bushel, now I’ll put ten. A 50-kilo bag, for which I paid R\$80 (US\$1.58) in the 2019–20 season and R\$140 (\$27.50) for the 2020–21 crop, now costs R\$220 (\$43.32).”

“We don’t know what will happen in 40 days, what the price will be, and if there will be [fertiliser] available,” says Zeni, summing up the deep uncertainty among Brazilian farmers. 📍

Soy traders failing to monitor indirect suppliers in Brazil's Cerrado

Middlemen and complexities in the supply chain are hampering traceability efforts, contributing to deforestation in the biome



Soybean harvesting in Luís Eduardo Magalhães, Bahia state, Brazil.
Image: imageBROKER / Alamy

Brazil is the world's largest producer of soybeans, but production and supply chains in the country fall some way short of being environmentally responsible. Today, soybean monoculture is spreading primarily across the Cerrado, the vast savanna biome whose deforestation has reached record levels in recent years, driven by

the advancing agricultural frontier of Matopiba – an acronym for the states of Maranhão, Tocantins, Piauí and Bahia.

Experts explain that, together with extensive livestock operations, land speculation and weak environmental enforcement, soy has put pressure on a biome

that is essential for the distribution of water in the country, housing springs that feed eight of Brazil's 12 hydrographic regions.

This pressure comes primarily from failures in the tracking of indirect suppliers in the supply chain. This is the vast network of intermediary operators, such as

Did you know?

Ten trading companies were together responsible for 77% of soybean exports from Brazil in 2019, which went mainly to China and the European Union.

cooperatives, warehouses and resale warehouses, located between the farmers and the large buyers – the trading companies.

With the exception of Amaggi, a Brazilian group which cultivates 5% of the volume traded in the country, these companies do not plant soy, but operate in partnership with farms by financing seeds, inputs and pesticides, and then buying and exporting their production. Together, ten trading companies were responsible for

77% of Brazilian soybean exports in 2019, which went mainly to China and the European Union.

Among the major companies operating in the Cerrado, Cargill, ADM, Louis Dreyfus Company (LDC), COFCO and Viterro do not disclose information on tracking indirect suppliers down to the farm level, according to Diálogo Chino's analysis of their sustainability reports. Amaggi claims to track 22% of its indirect suppliers, and the US giant Bunge, 30%.

Though currently limited, the tracking of indirect suppliers is crucial for trading companies to achieve their goals of zero deforestation in their supply chains: LDC, Bunge and Amaggi plan to reach this by 2025, while Cargill, ADM and COFCO are aiming for 2030.

UNREGULATED SOY MIXTURES

In the Brazilian soybean market, the grain may pass through several intermediaries before reaching the processing stage or the port. As one worker in the sector recounts, volumes of soy from “regularised” farms – those where land use and production has been permitted – sometimes get mixed in the silos with those from “irregular” areas.



Silos in Luís Eduardo Magalhães, Bahia state
Image: Lilian Caramel

“Most of the soybean around here gets mixed. In the dryers, for example, one load is thrown on top of another,” Aldenir Almeida, a truck driver who transports grains and cereals between the main producing municipalities in Mato Grosso state, told Diálogo Chino.

Ludmila Rattis, a scientist at the Woodwell Climate Research Center, in the US, who follows the Amazon and Cerrado production chains, confirms that soybean mixing does happen. She says a truck can load grains from different producers, and that there are gaps for fraud to occur in warehouses. “In direct supply, it is more difficult for this to be frauded,” she explains.

Lisandro Inakake, project coordinator at Imaflora, an environmental certification organisation, says that “companies have difficulties seeing the journeys of grain” because it “circulates like money”. That is, it is common for soybean to be used as payment for inputs, seeds, loans and financing.

In Luís Eduardo Magalhães, a municipality in Bahia state and one of Brazil’s largest agribusiness hubs, producer cooperatives mediate sales both for members and non-members. To close the deal, they only require the Rural Environmental Registry (CAR), a public register of rural properties in the country, as proof of environmental authorisation.

“In general, the cooperatives ask the producer for the CAR only because that’s what the trading company requires. It’s common practice in the market. On the part of cooperatives here, there is no environmental rigour, such as visits to farms or separation of cargoes at warehouses,” says Paulo Santos, a grain broker working in the Matopiba towns of São Desidério and Correntina, some of the country’s major soybean producers.

Although compulsory, the CAR is self-declaratory – and that’s where the problem lies. “The CAR is flawed. The analysis is very slow. Self-declaration gives producers freedom to circumvent violations of environmental legislation,” says Prudente Pereira de Almeida Neto, professor at the Federal University of Western Bahia, in Barreiras, a town also on the agricultural frontier.

For him, loopholes allow soybean contaminated with deforestation to enter the chain: “The CAR may mask a fraudulent reality, since there is almost no inspection. How can one trust a process like that?”

In fact, only 538 of the 959,000 rural properties in Bahia declared in the system have undergone some type of inspection by the state government so far, according to the Brazilian Forest Service bulletin released this year. Furthermore, in 2020, 67.6% of deforestation alerts in the Cerrado were registered in areas declared in the CAR, according to a report from MapBiomias.

TRADERS’ ZERO-DEFORESTATION TARGETS

In the country that produces and exports more soybean than any other in the world, there is no public system to track the commodity, so the work is left to the sector itself.

The Soft Commodities Forum (SCF), a consortium of six agricultural trading companies, announced at the end of 2021 that it had achieved 100% traceability for its direct soybean suppliers in the Brazilian Cerrado. However, information such as the name, size and location of the farms is not publicly disclosed. Such a lack of transparency is one of the main complaints of international observers who follow the chain closely.

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Releasing commercial information is a sensitive issue, which sometimes makes monitoring unfeasible

“The same traders that dominate soy processing and export are much more transparent in the palm oil chain in Indonesia. Why not say where they buy soy from and who they buy it from in Brazil?” asks Barbara Kuepper, a researcher at the Dutch sustainability organisation Profundo. “I would advocate for more openness, allowing us to track the progress of the commitments [to combat deforestation] made to the Cerrado.”



Marcos Beltrão says the Cerrado has been neglected by the federal government and exploited
Image: Lilian Caramel

But the mission is seen as challenging even by researchers in the sector. “It is a complex process because releasing commercial information is a sensitive issue, which sometimes makes [monitoring] unfeasible,” says Imaflora’s Inakake. “The sector is still in the early stages of developing its tracking capacity. The problem of indirect supply is far from having a solution, but there has to be one.”

CERRADO MORATORIUM STALLED

Launched in 2006, the Soy Moratorium works as a voluntary pact between the productive sector, environmental organisations and the federal government, and forbids the purchase of soybean cultivated in deforested areas of the Amazon. Studies have shown that this has contributed to the conservation of the forest.

The pact, however, does not cover the Cerrado,

where deforestation is advancing. Data from MapBiomas shows that between 2010 and 2020, soybean took over 1.14 million hectares of native vegetation in Matopiba.

“The Cerrado is a strategic biome, but it is being neglected,” warns Julia Shimbo, scientific coordinator of MapBiomas. “We need to maintain the remaining vegetation as a matter of national water and energy security.

“Ironically, we need to balance production and conservation for the sake of the very survival of agriculture, which depends on rainfall.”

Marcos Beltrão is a documentarist who has been recording the disappearance of streams in Correntina, where he lives, and the lowering of the Urucuia aquifer. He warns that, with the moratorium aimed at the Amazon, the devastation

has only been moved: “Unfortunately, saving the Amazon has cost the Cerrado. The federal government threw agribusiness here.”

Imaflora’s Inakake describes how, although extremely important, the discussion around inter-sectoral pacts has stalled. He says soybean producing and exporting sectors are still against extending the moratorium to the Cerrado and the Gran Chaco, another threatened biome.

Bernardo Pires, sustainability manager at the Brazilian Association of Vegetable Oil Industries (Abiove), which represents 13 soybean trading companies, explains that instead of a moratorium, the sector has proposed a payment for environmental services to producers: “[It would be] something around US\$200 per hectare a year, in which whoever conserves, wins.

That would be easier and more efficient than a new moratorium.”

In 2017, 60 environmental organisations launched the Cerrado Manifesto, calling for the involvement of trading companies to end deforestation in the biome, which was already held to be serious by environmentalists. In 2020, 163 multinationals, including Tesco, Walmart, Unilever and McDonald’s, came out in support of the manifesto and demanded a ban on purchases associated with devastation. However, no progress was made.

Abiove said at the time that the demand was “unfeasible” and did not grant the request. But Pires says that the association checks public databases on a daily basis, such as lists of environmental embargoes by the Brazilian Institute of the Environment and Renewable Natural Resources (Ibama), and state secretaries, in addition to deforestation information from the federal government’s Prodes Cerrado. “The check involves 90,000 farms... If any of them shows environmental non-compliance, the farmer is blocked,” Pires says.

Abiove does not disclose, however, which farms these are or who they supply. Without information, Brazilian consumers can only check, through the label, which company manufactured their cooking oil. From there on, nothing else is

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We need to balance production and conservation for the sake of the very survival of agriculture

clear. Elsewhere, Imaflora’s Soy on Track platform allows the monitoring of the progress of agreements related only to the Amazon.

The reporter requested an interview with seven trading companies with operations in the country, but received no response; Abiove spoke on behalf of its members.

PRODUCTIVITY VERSUS PROBLEMS


Cocos, in the extreme west of Bahia, is not on the list of 61 municipalities that SCF considers to be at high risk of deforestation; the consortium’s trading companies also focus their monitoring on those locations. Even so, since agribusiness arrived here in the 1980s, it has seen 71,300 hectares of deforestation.

“The devastation in Cocos is high. The forests are disappearing because of colossal agricultural and cattle ranching enterprises. Everything is going to become desert,” says

Albanir Souza, a priest from the region who, between 2011 and 2015, worked with the country’s Public Prosecutor’s Office for the recognition of the local Xakriabá ethnic group.

The municipality helps ensure high soybean productivity in the state, but also has various environmental, land tenure and human rights problems. Now a parish priest in Correntina, Albanir Souza has even been prevented from celebrating mass in the municipality and threatened by gunmen, who he claims were hired by farmers who wanted to appropriate the lands occupied by indigenous people.

Xakriabá communities have lived in Cocos since 1933, when they migrated from their home village in São João das Missões in Minas Gerais state, fleeing conflicts with cattle ranchers. In the 1980s, they began to suffer pressure from farmers who coveted their land to plant eucalyptus, which did not work out well in these areas.

Today, irrigated soybeans, corn and coffee, as well as projects for small hydroelectric plants on the nearby Carinhanha river, are making life less peaceful for these indigenous people. To this day, their territories have not been officially demarcated, as the majority of indigenous lands in Bahia have, even though this is a right provided for in the Brazilian constitution. 



Cows graze on a farm in Chascomús, Buenos Aires province. Livestock farming accounts for a significant proportion of methane emissions in Argentina and its neighbours Brazil and Uruguay
Image: Marcos Brindicci

[Juan Chiummiento](#)

Can South America reduce its methane emissions from livestock farming?

At COP26, Brazil, Argentina and Uruguay committed to reduce their methane emissions, but there are still no substantive policies to achieve this

Despite commitments made at COP26 last November, the adoption of measures to reduce methane emissions from livestock farming do not yet appear to be a central objective for South America. It is, at best, a nascent goal, involving short-range government plans, some field studies and research that is still in its early stages.

While there is a prevalent and persistent perception

32%

Releases from livestock manure and belches are estimated to account for 32% of human-driven methane emissions, according to the UN Environment Programme

in some quarters of the industry that the activity can be environmentally neutral, there is a broad scientific consensus that livestock farming is one of the world's leading sources of methane emissions. Livestock emissions from manure and gastroenteric releases are estimated to produce approximately 32% of human-driven methane emissions. In countries where the sector is more dominant, this percentage can be much higher.

Brazil, Argentina and Uruguay – all among the world's top 15 beef producers – have a significant role to play in

meeting the targets set at the last United Nations Climate Change Conference (COP26), where over 100 nations pledged to reduce methane emissions by 30% by 2030. Although all three countries are signatories to the pact, the outlook is complex, and there is still a long way to go.

“The reduction of methane is a global commitment, which does not have specific goals for each country,” cautioned Kelly Witkowski, manager of the Climate Change and Natural Resources Programme of the Inter-American Institute for Cooperation on Agriculture (IICA). She reported that the agricultural sector is responsible for 48% of the region’s methane emissions, but explained that the reality of the sector is “very diverse” and that there is no “silver bullet that will solve the methane problem on its own”.

WHAT IS BEING DONE?

Though up to 80 times more potent than carbon dioxide, methane has a significantly shorter life in the atmosphere – around 12 years – so the elimination of the gas can achieve rapid gains in the goal of limiting global warming. Despite resistance from some political leaders and the private sector, Brazil, Argentina and Uruguay are beginning to take action to reduce their methane emissions.

Signs of a shift were seen at a recent forum entitled “Methane in Livestock: The

Road to Climate Neutrality”, which took place in São Paulo at the beginning of May, organised by the Brazilian food company JBS, the world’s largest meat processor. Among the 23 experts who spoke at the event was Fabiana Villa Alves, director of the Department of Sustainable Production and Irrigation at Brazil’s Ministry of Agriculture, Livestock and Supply. She told *Diálogo Chino* that three types of technology are currently being applied in the country: those that work on the soil, those that improve the genetics of livestock, and those involved in animal nutrition.

The official is one of those responsible for the national ABC Plan for adaptation and low-carbon agriculture, launched in 2010 and updated in 2020, which encourages the adoption of new approaches by livestock producers. One of them was recently highlighted by the *Financial Times*, which consists of increasing the stocking rate and breeding animals at an earlier age, a process that results in the same amount of meat but with lower methane emissions.

Another recent development in Brazil was the commercial approval of a methane-reducing feed additive manufactured by European chemicals firm DSM. As officially reported by the company, a trial conducted at the Paulista State University between 2016 and 2017 recorded a reduction of up to 55% in gastroenteric methane

emissions with its use in cattle.

Any of these options requires an investment that is not easy for a small- or medium-sized producer – the dominant profile in the region. “Therefore, for methane reductions to be sustainable, they have to provide additional benefits in terms of resilience, lower costs or higher productivity,” said Kelly Witkowski of IICA.

Rather than reducing total emissions, the main focus in these countries is on decoupling production levels from environmental impacts. This was stated by Guillermo García, environmental lead for the Regional Consortium for Agricultural Experimentation (CREA), a movement which brings together 2,000 agricultural companies in Argentina.

“The aim is to improve efficiency and thus reduce the intensity of emissions – to reduce the tonnes of greenhouse gases per kilo of meat produced,” said García, who shared his own research, in which he demonstrated how certain herd management approaches (for example, increasing the percentage of early weaned calves), could reduce emissions intensity by up to 10%.

Recently, another study, carried out by the National Institute of Agricultural Technology and a national university, found a 25% reduction in methane emissions per kilo for a group of animals fed a winter supplement of maize.

According to Víctor Tonelli, an Argentine livestock analyst and consultant, these innovations “are still in the development stage, and are still not being transferred directly to the producer”. Part of the problem, he believes, is that the Argentine leadership itself promotes the idea that local production methods are a solution rather than a problem. This is done not only by the political authorities, but also by representatives of the meat industry. Furthermore, a plan was recently launched in Argentina which, despite including a chapter on sustainability, emphasises among its main objectives the need to increase livestock stocks.

On the other side of the La Plata River something similar is happening: the Uruguayan government supports research projects to increase the efficiency of the herd, with one recently presented whose results suggested greenhouse gas emissions per kilo of meat could be reduced by 16%. At the same time, it is working on a study that will include 13 indicators to measure the footprint of livestock farming, one which “will place the country at the forefront in environmental matters”, as senator Sebastian Da Silva, president of the Committee on Livestock, Agriculture and Fisheries, told *Diálogo Chino*.

Around efforts to reduce methane and broader emissions, many in the industry have been keen to

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For methane reductions to be sustainable, they have to provide additional benefits in terms of resilience, lower costs or higher productivity

position livestock farming as a potentially emission-neutral activity, one in which emissions are offset by carbon storage in the soils of pastures. This argument has been heard particularly in Argentina and Uruguay, where livestock farming-driven deforestation has been comparatively lower than in neighbouring Brazil.


DIFFERENT CHALLENGES

Rafael Terra, a lecturer at the University of the Republic of Uruguay who specialises in climate risk management, argues that the characteristics of the countries in the region should be differentiated when thinking about methane solutions for the sector.

“I think that this is part of the clumsiness of certain discussions, which does not distinguish between production systems. We must improve the

digestibility of the natural pastures [as grass-fed cows have been shown to emit more methane], without losing the structure of the natural pastures, adjusting the load to work with more grass, so that the pastures’ matrix does not deteriorate and so that emissions are lower,” said Terra.

Terra, like others consulted, is keen to highlight differing circumstances in respect to countries’ methane emissions and the global objective of a 30% reduction over the next decade. Brazil – which also faces difficulties due to the high rates of deforestation in the Amazon – is the fifth largest emitter of methane in the world, but still produces three times less than the leading country, China. Argentina, meanwhile, emits three times less than Brazil; and Uruguay six times less than Argentina.

A relatively smaller impact at the global level should not be an excuse to prevent the development of more sustainable production alternatives, however. Nor should one simply rely on global dietary changes in shifts towards plant-based diets, when the overall level of meat consumption is projected to increase. As Marcelo Mena, executive director of the Global Methane Hub, previously told *Diálogo Chino*, dietary shifts for environmental reasons, seen mainly in the global north, are “not enough”. Mitigation actions must be deepened across the world, across sectors, and Latin America must play a leading role in this process. 

Explainer: What is regenerative agriculture?

From policymakers to farmers and food companies, regenerative agriculture is being hailed as an alternative for food production with lower environmental impacts



A herd of cows graze at the foothills of the Pyrenees mountains, Catalunya
Image: Alamy

“Regeneration” is a buzzword in the agriculture sector and beyond. It’s the subject of a Netflix documentary, *Kiss the Ground*, which centres on the UN’s projection that we may only have 60 years left of farming unless we can repair our degraded soil. And it’s the focus of a popular TED talk by Allan Savory, a farmer from Zimbabwe, which has attracted over 7.8 million views.

There is, however, no agreed definition for “regenerative agriculture”. In fact, one study of the term’s usage in academic articles found that half of

15 million

hectares of land are currently farmed using regenerative methods, according to Savory Institute estimates

the papers reviewed failed to supply a definition. But, in short, regenerative agriculture encompasses a set of farming and grazing practices that, among other benefits, can help tackle climate change by restoring degraded soil biodiversity and rebuilding soil organic matter.

Globally, industrial agriculture is a key driver of land use change – especially in biodiversity hotspots such as the Amazon basin – and its intensive practices increase soil degradation, with around a third of the world’s soil considered moderately to highly

degraded. Food production is also associated with 37% of global greenhouse gas emissions.

Regenerative farmers typically disturb the soil as little as possible. They forgo tillage – the turning and preparation of soil – as it alters the complex network of soil biodiversity, and also avoid using large doses of pesticides. They look to grow a diversity of crops, instead of just monocultures, and believe that grazing animals are vital to the improvement of soil health.

Interest in regenerative agriculture spans different sectors, from public to private as well as NGOs. The Savory Institute, created by Allan Savory, works to disseminate knowledge on its practices and promote their adoption, with branches all across Latin America. There are even certification programmes offered by the Savory Institute and the Regenerative Organic Alliance.

Top-level acknowledgement of regeneration's potential benefits has also increased. In its recent Special Report on Climate Change and Land, the UN's Intergovernmental Panel on Climate Change (IPCC), described regenerative agriculture as a "sustainable land management practice" focused on ecological functions that "can be effective in building resilience of agro-ecosystems".

HOW DOES REGENERATIVE AGRICULTURE WORK?

Regenerative agriculture is a method of farming that "improves the resources it uses, rather than destroying or depleting them," according to the Rodale Institute, one of the growing number of organisations advocating this approach. A great deal of emphasis is placed on looking holistically at the agro-ecosystem, with a variety of techniques being employed.

In conventional farming, soil is often dug up and left bare after harvest. Tilling and ploughing erodes the soil, depriving it of its nutrients and releasing large amounts of carbon dioxide (CO₂). By adopting no-till practices, farmers can reduce physical disturbance to the soil, maintaining its overall structure and also preventing erosion.

Regenerative systems also increase the fertility of the soil by planting cover crops between seasons (such as wheat), employing crop rotations,

and applying compost and animal manures, all of which restore the soil's microbiome to promote nutrients. Synthetic fertilisers used in conventional farming have created imbalances in the structure and function of these microbial communities in the soil.

Then, there is the role of livestock. The way we have traditionally used cows on farms is not regenerative: animals kept in only one field over a long period of time will likely overgraze, eventually leaving soil bare and compacted. Instead, a regenerative approach focuses on moving animals through land to mimic traditional grazing patterns, leaving animals free to roam on much larger spaces before overgrazing can occur.

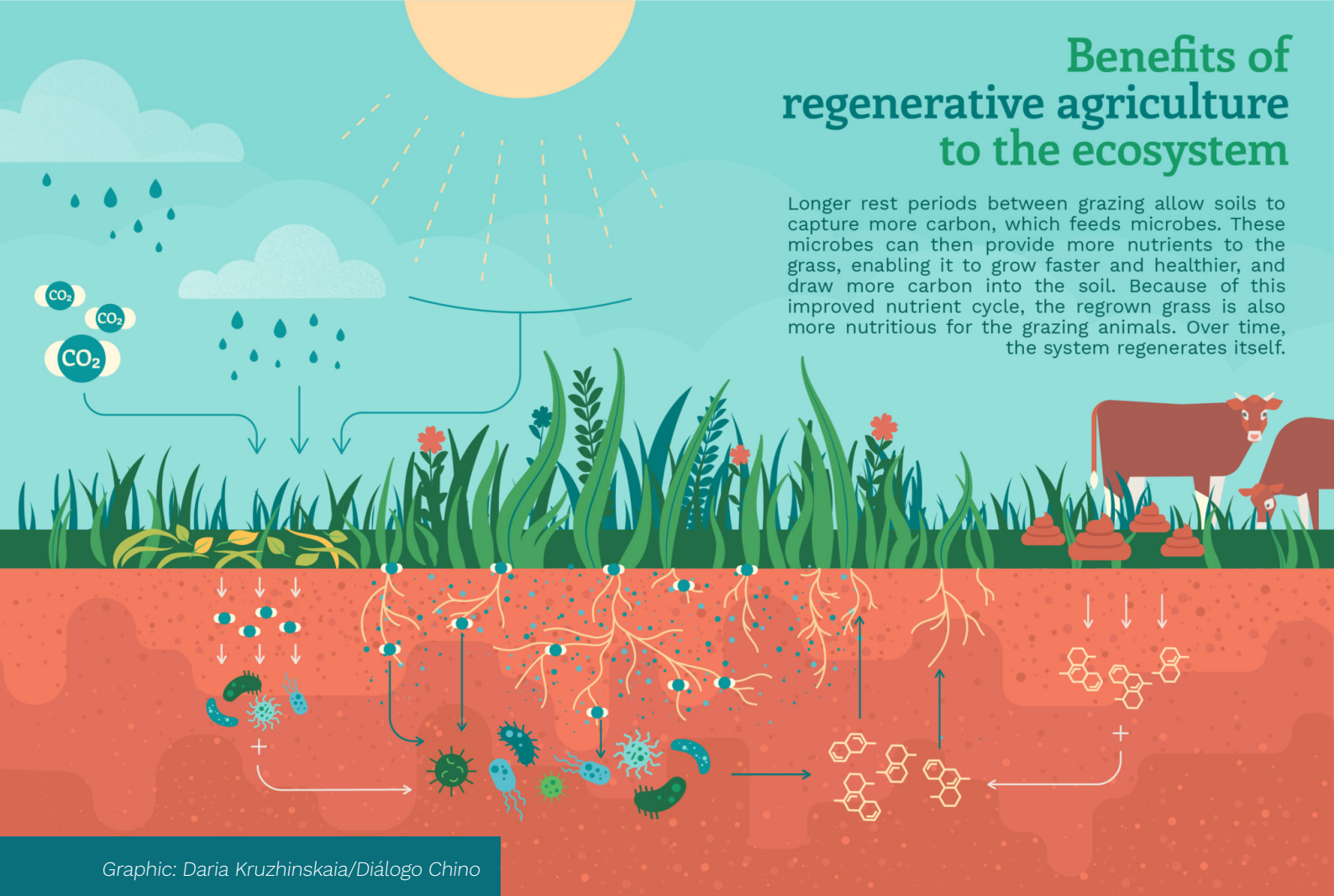
This technique, known as adaptive multi-paddock (AMP) grazing, uses high densities of livestock for short durations on a given area, before rotating the animals onto a different enclosure and repeating. This allows each paddock an extended period free from grazing, in order to

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By adopting no-till practices, farmers can reduce physical disturbance to the soil, maintaining its overall structure and also preventing erosion

Benefits of regenerative agriculture to the ecosystem

Longer rest periods between grazing allow soils to capture more carbon, which feeds microbes. These microbes can then provide more nutrients to the grass, enabling it to grow faster and healthier, and draw more carbon into the soil. Because of this improved nutrient cycle, the regrown grass is also more nutritious for the grazing animals. Over time, the system regenerates itself.



Graphic: Daria Kruzhinskaia/Diálogo Chino

induce accelerated grass growth.

Furthermore, cows break up the soil as they move their hooves, creating a natural mulch that can help retain moisture in the soil, though an AMP approach also helps to manage this, ensuring this does not cause excessive disturbance, and allowing soils periods of rest. Their excrement also adds nutrients to the ground, further increasing soil health.

THE CLIMATE ARGUMENT

A healthier soil means more CO₂ is taken out, or sequestered, from the air, which is good news in terms of the climate

crisis. Soil – or at least a healthy soil – contains a vast number of diverse microbes, which work in exchange with plants growing in the soil. Plants pull in carbon through photosynthesis, which they use to grow, and the excess carbon is transported to the soil, where it becomes organic matter.

This carbon feeds the fungi and various microbes in the soil, which in return supply the plants with the nutrients they need. It's a perfect balance, but one which is disrupted by the methods of intensive conventional farming. By moving towards a regenerative approach, some of its

proponents argue, the sector wouldn't need to cut as many emissions as the soil would be capturing more CO₂.

Project Drawdown, a climate NGO exploring and promoting solutions to climate change, argues that “regenerative agriculture enhances and sustains the health of the soil by restoring its carbon content, which in turn improves productivity – just the opposite of conventional agriculture.” They estimate that regenerative agriculture could sequester up to 22 gigatons of CO₂ by 2050.

Nevertheless, estimates of the amount of CO₂ that could actually be

captured by soil carbon sequestration vary between experts. The World Resources Institute (WRI) claims that the feasibility of scaling regenerative agriculture over large areas to increase climate change mitigation is still not clear, due to limited scientific understanding.

Instead, they propose a set of 22 solutions for agriculture to tackle its emissions, categorised and focused in a “five-course menu”: reduce growth in demand for agricultural products; increase food production without expanding agricultural land; protect and restore ecosystems; increase fish supply; and reduce greenhouse gas emissions from agricultural production.

OTHER ENVIRONMENTAL BENEFITS

Numerous factors can directly or indirectly affect the nutritional quality of crops and their safety, such as the available nutrients and organic matter in the soil, the weather, post-harvest storage, fertiliser use and other management practices. For its proponents, regenerative agriculture potentially leads to healthier crops with more nutrients.

Producers in the United States who identify their practices as “regenerative” have been shown to have increased nutrient density in their produce compared to those who

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Regenerative agriculture improves the resources it uses, rather than destroying or depleting them

15 million hectares

around the world are currently farmed with regenerative agriculture – not much, considering that the scale of global agricultural land area is approximately 5 billion hectares.

do not, according to a study on wheat and oat crops by environmental health organisation the Bionutrient Institute. Still, researchers believe there are too few datasets available to confirm whether regenerative agriculture increases food nutritional quality.

Regeneration can also reduce the need for chemical inputs, saving money for farmers. A study by the Ecdysis Foundation found that crop yields decreased in regenerative farming by 29%. But that figure doesn't tell the whole story, as those farms also had a 78% increase in productivity thanks to lower input costs and higher premiums for their crops.

This is partly thanks to the growing number of certifications for

regenerative farmers. The list includes: the Regenerative Organic Certification, which assesses soil health, animal welfare and social fairness; the Soil Carbon Initiative, which measures soil carbon outcomes; and the Ecological Outcome Verification by the Savory Institute.

The Savory Institute argues that over 15 million hectares around the world are currently farmed with regenerative agriculture – not much, considering that the scale of global agricultural land area is approximately 5 billion hectares. Still, they and other supporters are hopeful that the regenerative agriculture movement will expand, with the organisation already present in 50 countries with local hubs. 🌱

Biological alternatives to chemical pesticides expand in Uruguay

Researchers are developing pesticides derived from natural substances, or ‘bio-inputs’, which are already being used on farms across Uruguay

All living things have their natural enemies, and in the case of crop pests and diseases, the key is to find them, isolate them, and mass-produce them for application. Chemical pesticides have long been the most widespread solution to these problems, but as concerns around their often negative side effects grows, biological options – or “bio-inputs” – are increasingly being explored as more sustainable and ecologically responsible alternatives.

In Uruguay, such options are also being made available, some of them more advanced than others, and with much of their development supported

by the state or local and international organisations.

Uruguay currently has 14 registered biological control agents (bio-inputs) and 18 more in the pipeline, according to data from the Ministry of Livestock, Agriculture and Fisheries (MGAP) from December 2021 provided to Diálogo Chino. These are natural organisms or elements that allow the control of pests and diseases in crops, including parasites, bacteria, harmful fungi and viruses.

Bio-inputs are “a line towards the future that is developing at an increasingly rapid pace,” says Sebastián Viroga, National Coordinator of



Video: María Paz Sartori / Diálogo Chino



Scan the QR code to watch on your phone or click the screenshot to watch on computer



A tractor sprays a soybean plantation in Uruguay. Chemical pesticides have long been the mainstream solution to pest control in agriculture, but now a growing number of organisations in the country are working on biological alternatives. Image: Picardo Photography / Alamy

the Pesticides Project, an initiative of the Food and Agriculture Organization of the United Nations (FAO). “And Uruguay, with these actions and others, is trying to be at the forefront and be proactive in [their] development.”

The country’s Minister of Livestock, Agriculture and Fisheries, Fernando Mattos, also holds this to be true. “There is a whole trend and a greater use of biological pest control techniques, and this is growing and increasing. It is a path that many people are taking as an alternative and because there is also greater awareness of issues related to sustainability and environmental protection,” he said.

LEAFCUTTER ANTS

Leafcutter ants are a frequent problem for agricultural producers, fruit growers, horticulturalists, foresters and even livestock farmers, due to the amount of grass they can consume on land where ant nests form. They are considered the main insect pest in South America, targeting over 13 species of grass.

In recent centuries, the mainstream solution has increasingly been the use of chemicals. But now, a Uruguayan project has proven that two soil-dwelling fungi (*Beauveria bassiana* and *Trichoderma harzianum*) can work together to eliminate leafcutter ants. The product, which contains the two fungi and an essential oil derived from oranges that attracts



Video: María Paz Sartori / Diálogo Chino



Scan the QR code to watch on your phone or click the screenshot to watch on computer

the ants, was developed by BIO Uruguay, a research centre based in Tacuarembó in the country’s north, and a pesticides project supported by the FAO and several ministries.

Their ant pesticide is currently in the final stages of licensing with MGAP. Alda Rodríguez, BIO Uruguay’s technical-scientific coordinator, told Diálogo Chino that both horticultural and larger forestry clients are waiting for their product to be launched on the local market.

Rodríguez and BIO are not alone in their research. Both the FAO, through its Pesticides Project, and the Uruguayan government, through a funding programme, have been promoting a number of bio-input initiatives, most of which are in the experimental phase. One such trial is currently being completed involving 100 producers, analysing the effectiveness of the use of a mite on tomato and sweet pepper crops.

For Natalia Martínez, technical director of the

MGAP’s General Directorate of Farming, the trend towards bio-inputs is “a cultural change” from the traditional application of insecticides and fungicides. She highlights that, especially in closed spaces, chemical use has entailed risks for the health and safety of workers.

Although the use of bio-inputs is already an alternative that producers are aware of, more support is needed to increase their uptake at scale, says BIO’s Rodríguez. “Public institutions must be strengthened so that they have more knowledge and equipment, and can give more support to the issue and achieve greater agility in the registration of these products,” she adds. MGAP’s minister Mattos agrees, adding that their scale is still small and investment costs for their development are significant.

CHANGES IN REGISTRATION

The licensing of bio-inputs is not a mere formality, and to achieve it, they must undergo stringent efficacy studies and toxicity analyses, among other requirements. Uruguay exempts researchers and developers from paying the registration fee as a sign of support for their development. Although this is a welcome concession, most of the costs for researchers are for laboratory analysis and agronomic testing.

“We are making an effort to get everything licensed. [The government]



Fungi developed as a biopesticide kills whitefly, a common pest, especially in greenhouses. Image: Nigel Cattlin / Alamy

supporting more registrations is the way to cooperate so that there is more supply of these types of products,” Martínez says.

The registration of pesticides has traditionally been an area of work exclusive to the MGAP and, within it, the General Directorate of Agricultural Services. But in 2021, the ministry signed an agreement with the Ministry of Environment to review the current registration requirements and adapt them to the demands of different countries and markets, with a view to future exports.

Evaluating bio-inputs “is much more complex than a chemical,” explains Leonardo Olivera, general director of agricultural services at MGAP. The process not only includes tests to see if the micro-organism, fungus or insect really does what it promises, but also studies on transport conditions, concentrations and how it acts over time, among other issues. Uruguay, the director

says, needs more expert staff to work on these registrations, given the increase in current demand and the prospect of further increases in future.

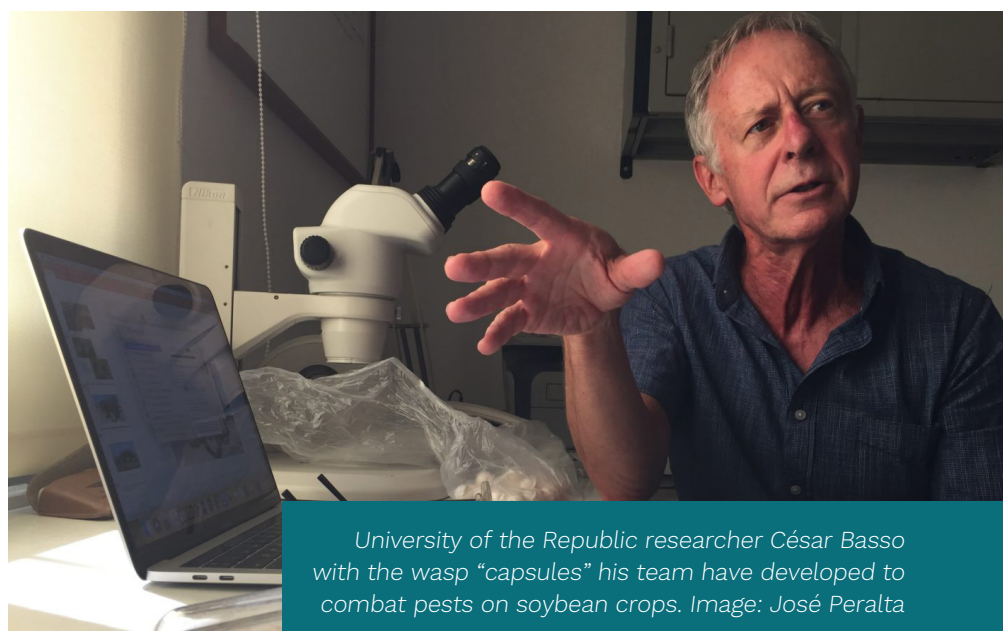
Olivera says that the ministry has been in dialogue with other countries in the region, such as Brazil and Chile, as well as with those working on these issues in Europe. He adds that they face common challenges that need to be resolved quickly by regulatory

bodies, as “agribusiness is an innovative sector that is moving very fast.”

A GREENER OPTION

Daniel Bentancur is one of the founders of the organic producers’ cooperative Punto Verde, in the Uruguayan department of Canelones. He was among those who were treated as almost “crazy”, he says, when he started production of organic inputs 25 years ago. Punto Verde set up its own laboratory to produce bio-inputs to combat pests, and now, in partnership with BIO Uruguay, they breed a fungus (*Isaria javanica*) to combat whitefly, a common agricultural pest.

“This tool [the fungus], when used properly, is not like a chemical product that you apply one year and the next year you apply more doses, and the next year it’s no longer useful, and you change to another chemical product,” Bentancur says. Thanks to the wider use



University of the Republic researcher César Basso with the wasp “capsules” his team have developed to combat pests on soybean crops. Image: José Peralta

of this fungus, he tells *Diálogo Chino*, the whitefly is no longer considered a problem for Punto Verde producers.

Elsewhere in the country, fungi are not the only natural alternatives being explored. César Basso, a researcher at the University of the Republic in Montevideo, has also been working on the issue for decades. One of his latest lines of work has been the use of wasps to combat pests in soybean crops, which was supported by the FAO Pesticides Project.

Basso is reserved about the economic convenience of bio-inputs, despite being an advocate of them. When asked about this issue, he states that there are biological alternatives that are less expensive than chemical synthesis, but not all of them. In addition, biological options tend to take more work for the farmer – it is not a matter of simply applying a certain amount and letting it work. These are living organisms, with many more variables at play that can have a role in their success or failure.

“In Uruguay, one of the problems we have is that chemical insecticides are very cheap, generic products imported mostly from China. This [cost difference] is a first limitation for any biological control project, which is difficult to overcome,” Basso says.

Those who are embarking on this change are still in the minority, but they have a big element in their



*On his farm in Tacuarembó, Fernando Gallo has experimented with biopesticides, including those developed by BIO Uruguay
Image: María Paz Sartori*

favour. “Producers who get involved don’t want to go back because they feel more confident. There is a different atmosphere inside the greenhouses,” Basso says. “It is also a tool to enhance the value of their production.”

NEW FOLLOWERS

In June 2021, a project to use fungi to control ticks in cattle, in which BIO Uruguay is involved with the support of the MGAP, was presented. MGAP’s then-minister, Carlos María Uriarte, spoke to an audience of almost 100 people, including large-scale livestock producers. He talked of the use of alternatives to chemical pesticides in Uruguay and described them as successful.

BIO Uruguay’s Rodríguez was pleased and welcomed the speech. She says that, much like any novel trend, there is a lot of expectation around bio-inputs, although it is becoming easier and easier to attract followers to these alternatives.

Fernando Gallo is one of those who has begun

experimenting with bio-inputs in his horticultural production, after years of using chemical pesticides. He says he will not turn back. On his farm in Tacuarembó, he has tested different options. “Once you start to clean up the soil from chemicals, there is a big difference, you don’t go back to chemicals,” Gallo says.

For Rodríguez, Gallo’s experience is logical: “When a farmer starts using a bio-input for a pest or disease, it’s a trigger from another world. They start to ask what products it is compatible with and select less toxic options. It not only influences that particular problem but also the production system, and they switch to more sustainable management.”

Overcoming the dominance of chemical pesticides will take time, investment and multi-level support, but with a growing cast of researchers and advocates exploring natural alternatives, and a growing reputation for enriching impacts on soil, the uptake of bio-inputs looks set to continue to spread in Uruguay. 🌱



Forest is cleared in Chaco province, Argentina. An estimated 25% of the Gran Chaco in the country's territory has been deforested for agriculture.
Image: Martin Katz / Greenpeace

[Fermín Koop](#)

Can the Gran Chaco halt deforestation and provide food?

The Tropical Forest Alliance's new programme works with farmers in South America's vast dry forest region to incorporate sustainability criteria into soy and beef production

Spanning Argentina, Bolivia and Paraguay, the Gran Chaco is the second largest forest in South America after the Amazon. It is a region rich in biodiversity and also

accommodates soy and beef production. Yet, the expansion of commercial agriculture has driven increasing levels of deforestation in recent decades.

14
million
hectares

The area of the Gran Chaco that has been deforested since 1985

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We have political, technological and social capital in Latin America on how to do agriculture and conservation. We know how to do it. What is missing is who pays.

The Tropical Forest Alliance (TFA), a group of governments, companies and civil society organisations, has presented a new plan, specifically for the Gran Chaco, seeking to promote greater traceability and sustainability along the entire soy and beef production chain.

The scheme has already kicked off in Argentina and Paraguay by identifying the main actors and sectoral programmes involved in the production chain, such as through the sustainable meat roundtables. Now, the challenge is to create and deliver comprehensive short- and long-term strategies.

“We are working with the common objective of improving sustainability conditions and reducing or eradicating the deforestation associated with production,” said Fabiola Zerbini, TFA’s director for Latin America,

adding that this must be executed in a way that is not onerous, does not have a social cost and does not inhibit economic development.

For Zerbini, improving standards in soy and beef production is not only an environmental concern but also a commercial choice. Increasingly stringent environmental criteria in major global export markets are a challenge for producers. These producers, she said, need support to make the transition.

For this reason, TFA will seek to leverage the finance that producers desperately need, as it has with its other programmes in Latin America. For Zerbini, the approach to sustainability in the sector has to be “progressive and intelligent”, as well as properly planned and funded. “The cost has to be shared. A traceability

programme costs money,” she added.

GRAN CHACO: NEW REGION, SAME VISION

TFA arrived in Latin America five years ago. It took its first steps in the region in Brazil, before expanding to Colombia and Peru.

In Colombia, TFA designed and coordinated two public–private agreements between national and global actors in the palm oil and cocoa chains. Meanwhile in Brazil, it developed plans to curb deforestation in the states of Pará and Mato Grosso. In Peru, a coalition of partners is currently working on coffee and cocoa.

Colombia, Peru and Brazil hosted the so-called Cocoa Dialogues between actors from the public and private sectors, with the aim of building a sustainable cocoa brand that rewards producers by paying them a higher price.

“We are at a time of discussing a new paradigm of global relations where the environmental issue is central. This demands changes in production. We have political, technological and social capital in Latin America on how to do agriculture and conservation. We know how to do it. What is missing is who pays,” said Zerbini.

In Paraguay and Argentina, Zerbini met dozens of farmers, whom she described as “politically and economically empowered”. While a top-down approach

may have worked years ago, with policies imposed and not agreed upon by governments, it does not make sense today, she said.

“Livestock farmers need to know about sustainability. We are not just livestock breeders, we are also food producers. And this has to be created in a sustainable way,” said Carlos Pedretti, owner of the Ganadera Alborada beef company in Paraguay. “I am interested in understanding all this and helping with my efforts and those of my company.”

Gustavo Idigoras, president of the Oil Industry Chamber of the Argentine Republic (CIARA), argued that the Covid-19 pandemic has brought about a disruptive change in the way we think about food production – for the better: “We are seeing a transformation of the sector, based on environmental criteria and the circular economy.”

THE GRAN CHACO’S PEOPLE AND BIODIVERSITY

Nearly 4 million people live in the Gran Chaco, 8% of whom belong to indigenous communities that depend on the region’s biodiversity. According to the World Wildlife Fund, more than 3,400 plant species, 500 bird species, 150 mammal species and 220 reptile and amphibian species live throughout the forest’s one million square kilometres.

An estimated 25% of the Gran Chaco in Argentina’s territory has been

deforested for agriculture, the majority in the last 20 years. The situation is as critical as that experienced by the Amazon rainforest. Environmental organisations fear that growing global food demand will put pressure to expand the agricultural frontier even further.


“The Argentinean producer has to see the Chaco as an opportunity and not as a problem. We have to have numbers, baselines, and that is a long way off. We need a common vision and with that we need to create something new or support what already exists,” says Daniel Kazimierski, TFA’s advisor for the Chaco programme in Argentina.

Like TFA, other international environmental organisations have also focused on the Gran Chaco in recent years, such as The Nature Conservancy and WWF. Meanwhile, the agriculture sector itself has promoted its own commitments, such as

Argentina’s Carbon Neutral Programme (PACN).

Last year’s COP26 climate conference also recognised the importance of the Gran Chaco for forest-friendly food production. A group of financial institutions and agri-food companies such as Syngenta announced a US\$3 billion commitment to support deforestation-free soy and beef production in the region, along with Brazil’s Cerrado savannah and the Amazon.

“We are encouraged to see how producers and institutions in the Chaco region are committing to innovate and design locally based solutions that contribute to adopting sustainability in their production systems,” said Felipe Carazo, head of public sector engagement at TFA, adding that he hopes the organisation can play a leading role in the change.

“TFA is ready to contribute by serving as a catalytic platform,” he said. 

“

We need to have numbers and baselines, but that is a long way off. We need a common vision.

Poop to power: Meat producers in Argentina turn livestock waste to energy

A meat processing firm is using biodigestion to deal with animal wastes, striving to reduce the sector's emissions and create electricity for the national grid

“This project is based on the principles of the circular economy where nothing is lost and everything is transformed. We are taking the word ‘waste’ out of the dictionary here,” Mauricio Accietto tells us, under the relentless summer sun.

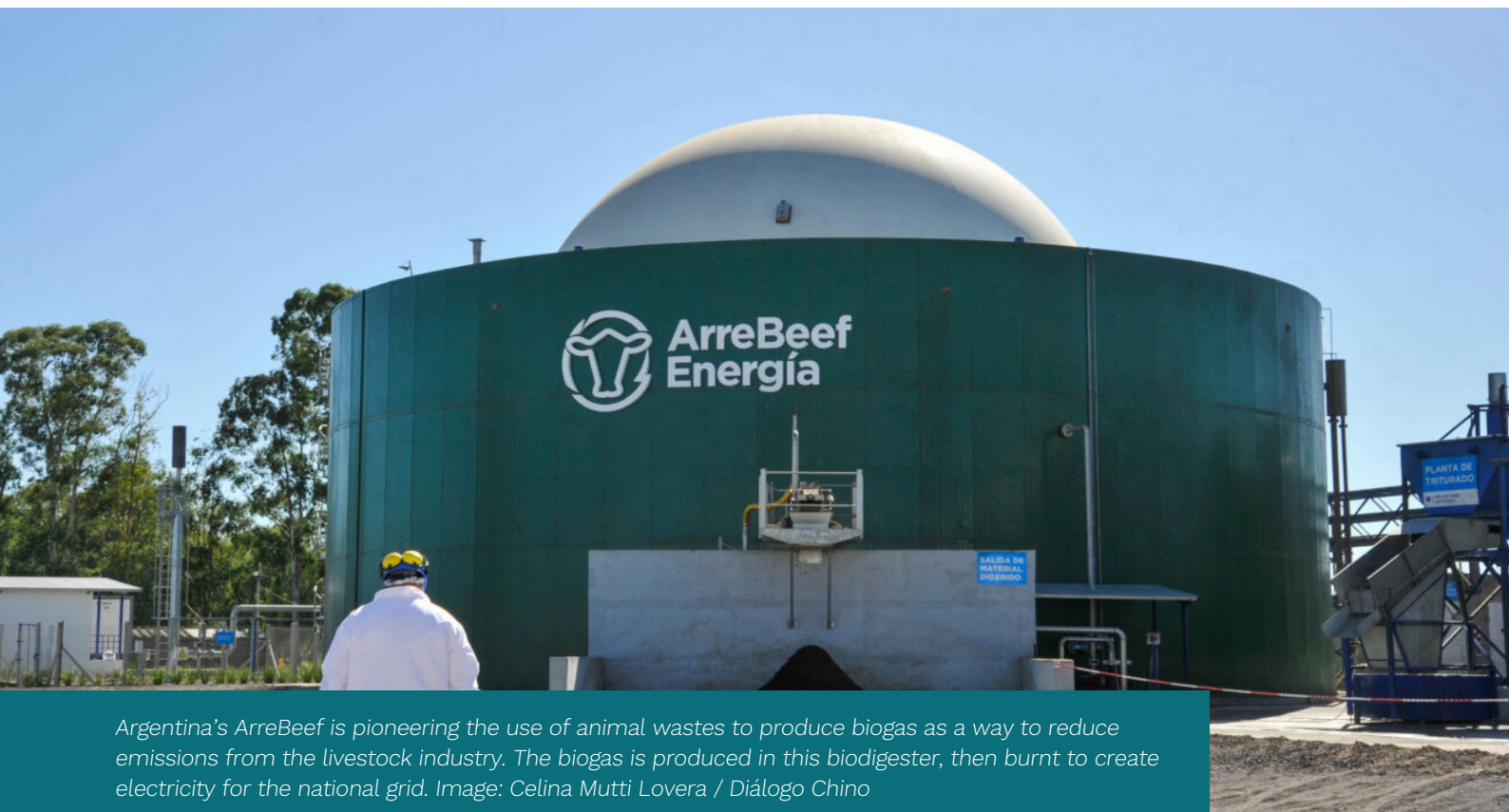
Accietto is a plant manager for ArreBeef

Energía, a division of the ArreBeef meat processing firm, whose mission is to transform waste into electricity using a biodigester, a tank that breaks down organic materials. At ArreBeef's facilities in Pérez Millán, a quiet rural town in the north of Buenos Aires province, the company uses manure and organic wastes

from the slaughter of more than 1,000 head of cattle a day to produce biogas, and from that, electricity.

According to Accietto, this is a “unique experience of its kind” not only in Argentina, but also at a regional level. “We have not found biogas generation projects like ours. There are around 40 biogas plants in the country, but none with cattle waste,” he says.

With this approach, ArreBeef aims to reduce the environmental impact



Argentina's ArreBeef is pioneering the use of animal wastes to produce biogas as a way to reduce emissions from the livestock industry. The biogas is produced in this biodigester, then burnt to create electricity for the national grid. Image: Celina Mutti Lovera / Diálogo Chino



Cattle at ArreBeef's plant in Pérez Millán, Buenos Aires province. Hundreds of animals are slaughtered a day here, with the company's new energy operation hoping to close the loop on waste and reduce emissions related to the process. Image: Celina Mutti Lovera / Diálogo Chino

of livestock farming, which, according to the latest inventory of greenhouse gases in Argentina, is the country's most polluting sector, accounting for 21.6% of emissions, far above the next biggest emitter, transport, with 13.8%.

Though the company's innovation cannot address many inevitable life-cycle emissions of livestock – such as those from cow's belches – by capturing and repurposing many organic waste products, it can help to reduce emissions by “closing the loop” in a form of circular economy. However, whether or not biogas can be considered “renewable” is a divisive issue.

In any case, between the start of the biodigester's commercial operations in July 2021 and the end of January, almost 4,000 megawatts (MW) of energy has been fed into the grid, avoiding the emission of some 1,519 tonnes of carbon dioxide, according

to figures provided by ArreBeef. “It is equivalent to the work that 1,257,108 trees would have to do for a year to mitigate these emissions,” Accietto claims.

The meatpacking plant, which employs around 1,000 people and exports to China and Chile, among other destinations, is committed to improving sustainability and

efficiency, in an industry in which customers are increasingly looking for green labels to guarantee their consumption.

“Our markets are becoming more and more demanding with regard to the environmental commitment of companies. Our new consumers are looking more at product traceability, carbon footprint, water footprint and environmental commitment. We want to be ready for that,” Accietto adds.

LESS WASTE, FEWER EMISSIONS

Livestock farming generates emissions in different ways: firstly, through the digestive processes of cattle, which emit methane – a gas that is over 80 times more potent than carbon dioxide in its effect on global warming over a period of 20 years. Added to this are emissions from the meat processing industry's



Plant manager Mauricio Accietto explains how bacteria inside the biodigester decompose organic waste to create biogas, which is then fed into the facility's generator. In 2021, only 13% of Argentina's energy came from renewable sources, with bioenergy accounting for just 6% of this renewable generation. Image: Celina Mutti Lovera / Diálogo Chino

waste and, indirectly, from deforestation linked to the expansion of agricultural land.

Argentina has around 52 million head of cattle, according to data from the Instituto de la Promoción de la Carne Vacuna Argentina (IPCVA). There are some 130,800 farms dedicated to cattle production, according to the latest National Agricultural Census.

Globally, livestock farming is responsible for 14.5% of human-driven greenhouse gas emissions. In Argentina, this percentage is considerably higher. However, livestock's overall contribution to emissions is contested by some analysts.

For Argentina's livestock sector, the main argument is that most of the country's production is done on natural pastures rather than on deforested, converted land. As carbon accumulates in their soils – and can remain there for up to hundreds of years – pastures can contribute to removing carbon from the atmosphere. Figures within the industry argue that this sequestration potential is ignored, and that the sector's net emissions be considered in calculations.

Beyond the ongoing debate on how to measure emissions, there are other ways to alleviate the environmental footprint of livestock both during production and commercialisation. This is where the biogas operation

at ArreBeef, a pioneer in the region, comes in.

TIMELINE

ArreBeef Energía began to design its project in 2018 under RenovAr, a national programme launched in 2016. The scheme has offered regular public tenders in which different companies present their investment projects and the price at which they are willing to sell their generation capacity.

“At that time we started to study the potential of our organic waste because we knew we could be more efficient in its use,” Accietto recalls. The company set up a project to generate biogas and then transform it into electricity to be fed onto the national grid.

The contract that ArreBeef signed with the national government establishes a commitment to contribute a minimum of 7,200 MW

annually to the grid, to be distributed on either of the two medium-voltage lines that reach Pérez Millán, the town where the plant is located.

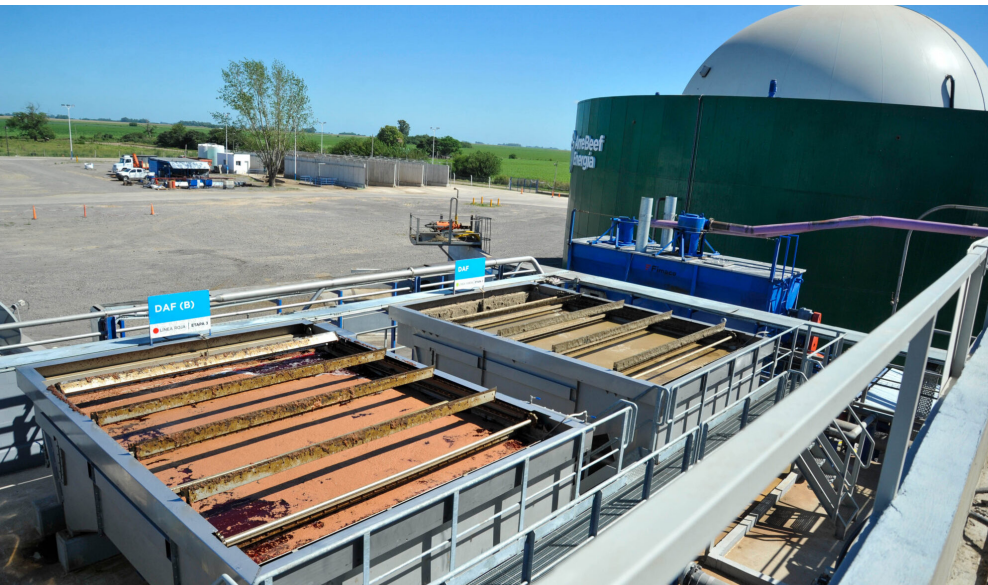
To this end, the company built a biodigester, a large tank that is filled with organic waste and is hermetically sealed. As the organic matter decomposes inside the tank, it produces biogas, a fuel that can be captured and used to generate electricity by combustion.

A MODEL BIODIGESTER

The biodigester at ArreBeef Energía is fed with organic waste from different sources. Two come from industrial drains, which the company calls the “red” and the “green” lines. The red line is the blood and remains of the animals, while the green line contains manure from the trucks used to transport the animals, their pens and the contents left in the



*Biogas produced at ArreBeef Energía is used on-site to generate electricity that is then fed onto the national grid
Image: Celina Mutti Lovera / Diálogo Chino*



The two “lines” of waste, ready to be fed into the biodigester. The red line, left, contains blood and remains from animal slaughter, while the green line, right, is for manure. Image: Celina Mutti Lovera / Diálogo Chino

animal’s stomach at the time of slaughter.

There are two other lines of waste that feed the biodigester: the remains of animals that arrive dead at the slaughterhouse and those that are likely to have a disease; and tallow from slaughter.

Inside the biodigester, two types of bacteria – anaerobic, those that require no oxygen, and mesophilic, which grow in moderate temperatures – get to work on decomposing the waste. “We need an absence of oxygen, ensuring that it is 100% airtight, and on the other hand the bacteria need a temperature of around 40 degrees,” Accietto says.

The bacteria transform the organic matter into a biogas that has a methane content of around 70%, while the rest is carbon

dioxide. The biogas is captured and burned as fuel for a generator that then feeds onto the grid. The plant has a maximum power output of 1.5 MW per hour.

NEAR FUTURE

ArreBeef Energía explained that the electricity generated by the

biodigester is supplied in its entirety into the national electricity system, with none of it used for self-consumption. “The value of the sale of energy from renewable sources versus the [cheaper] price of the energy we take from the non-renewable grid makes a differential that explains it,” says Accietto.

For the company, the investment in a biogenerator is a bet on the future. “Although we do not yet have eco-labelling, we are already communicating to our suppliers and our customers what we do with organic materials so that, in the future, we can be on our way to achieving a carbon-neutral product,” Accietto says.

Fernando Vilella, director of the bioeconomy programme at the University of Buenos Aires, said sooner rather than later, the markets that pay the most for Argentine meat will



A worker at ArreBeef Energía inspects the “red” line of the company’s waste-to-energy facilities, which processes remains from slaughter that may otherwise be incinerated. Image: Celina Mutti Lovera / Diálogo Chino

ask for this type of certification. “Consumers will increasingly ask for more information on the environmental footprint of food, and this information is still very limited in Argentina,” he says. “We have to make an additional effort and generate strategies to associate a characteristic of reduced environmental footprint with the product.”

“The productive base is already in place and it is good, the problem we have ahead of us is that we have to certify and trace,” the UBA researcher adds. “There is work to be done and there are only a few years left, because without that we won’t be able to sell to China, Europe, Russia or the United States – the markets that pay the best.”

A SLOW TRANSITION

ArreBeef’s experience seems, for now, more the exception than the rule in Argentina, where the transition to a green economy faces many difficulties due to macroeconomic problems, as well as political discontinuities and a lack of coordination between the public and private sectors.

“In agriculture and livestock, Argentina has good parameters to compete, but everything is poorly measured and poorly mapped out. The state and the private sector must make an additional effort and generate strategies for this,

because this is what the world is going to demand,” Vilella said.

In 2021, according to official data, renewable energy sources covered 13% of the country’s electricity demand. While wind (74%) and solar (13%) accounted for the largest shares of renewables, 6% came from bioenergy. At this rate, the country will fail to meet the goal of 20% green energy by 2025, as set out in national law 27.191, according to Carlos Villalonga, a former member of the Chamber of Deputies and former director of Greenpeace Argentina.

“Argentina will suffer from this low percentage of renewables,” Villalonga says. “This will begin to

affect exports because our companies will compete with others that will be able to show a lower carbon footprint, either through less deforestation associated with livestock, or through lower consumption of fossil fuels”.

For the Fundación Ambiente y Recursos Naturales (FARN), an Argentine NGO, the state’s continued promotion of hydrocarbon activities “goes against a clean and fair energy transition, and against international commitments”. According to a report from the organisation, in 2021, for every peso budgeted for renewable energy and efficiency, 184 pesos were allocated to the generation of dirty energy. 🇦🇷



Antonella Di Nardo, laboratory lead at ArreBeef Energía, inspects a pile of “digestate” that has been discharged from the biodigester. A byproduct of the anaerobic digestion process, digestate is used as a fertiliser. Image: Celina Mutti Lovera / Diálogo Chino

A ruminant with a view: A ‘cow hotel’ in Uruguay helps calves recover from fire and drought

More than 800 calves affected by last year’s extreme weather are being rehabilitated at a ‘cow hotel’, an innovative approach for Latin America

It hadn’t rained for three months. Not a single drop had fallen on the nine hectares of parched fields where Carmen Portela and her family raise cattle, near Cuchilla del Fuego. The town, in the northwestern department of Paysandú, was one of the worst hit areas in Uruguay during the drought of spring 2021.

The water deficit, caused by the second consecutive year of the La Niña weather pattern, was cause for concern in almost every corner of the country, and wider South America. But it was the biggest fires in Uruguay’s history, which burned through 37,000 hectares of forest in Río Negro and Paysandú, that generated widespread public alarm, and saw a state of emergency formally



Calves feed at the Liga del Trabajo’s “cow hotel” near Guichón, Uruguay. The temporary facility opened to take in weak and injured animals after a severe drought and some of the country’s worst forest fires impacted livestock farms. Image: Pablo Bielli / Diálogo Chino

declared in the last days of December.

The parching of the country’s pastures has particularly affected cows, and the suckling of calves born during last year’s winter. Before the forests burned, thousands of cattle grazed within them, in agricultural systems integrated with forestry. Some calves died, some suffered burns, others were left scattered and stranded at the edges of burning land.

Following the fires, the Liga del Trabajo, a social organisation in the Paysandú town of Guichón, moved to lend a helping hand to small farmers and their calves affected by the devastation. On land near the town, they turned grounds that usually host fairs, auctions and other livestock services over to housing and rehabilitating the young animals. It’s not the first time they’ve done so: during the 1999–2000 and 2007–08 seasons, two other periods of



A young calf with a leg injury recovers at the Liga del Trabajo de Guichón's cow hotel. Fires and drought in Uruguay in 2021 caused injuries and burns, scattered herds and affected animals' ability to feed. Image: Pablo Bielli / Diálogo Chino

extreme drought, the Liga had opened its gates to vulnerable and injured calves.

“When the possibility of coming here arose, we decided to go for it, to look out for the future of our production,” Carmen tells us, as she tries to pick out some of her 60 Braford and red Angus calves among the hundreds grazing in the paddock of this cow “hotel”.

A HOTEL FOR COWS

The Liga's vast premises are equipped to house and handle large numbers of cattle, with several paddocks, pens, vaccination corrals, traps, animal baths and sheds. At the centre of the complex is a large arena for horse riding, and a smaller one for auctions. It's somewhat reminiscent of the rural architecture of a century ago.

To set up the hotel, it was necessary to install three

different feeders to carry up to 400 kg of feed, as well as adding new water troughs and guaranteeing the water supply. Canopies were needed to provide shade for the animals, and personnel had to be recruited to staff the facility.

Financial assistance was also a necessity. Nelson Moncalvo and Héctor Daniel Martini, president and secretary of the Liga,

approached Fernando Mattos, Uruguay's Minister of Livestock, Agriculture and Fisheries (MGAP) about the project, and were asked to devise a budget for rehabilitating 1,000 calves. The minister, who already knew the Liga facilities first hand, was immediately supportive of the project.

The MGAP's Emergency Agricultural Fund allocated US\$59 per cattle head to keep them for 100 days, at the end of which – by 30 May – they should have gained about 70 kg each. Producers who send their animals contribute a further US\$25 per head.

On 23 February, Carmen Portela shipped her 60 calves over 70 km to the hotel. Twenty other small family operations – cattle farmers on less than 500 hectares, who owe no debts to the MGAP and whose papers are all up to date – did the same. Some sent 100 animals. Others only five.

1,065 calves are currently



The Liga del Trabajo de Guichón's president, Nelson Moncalvo. He spoke of the agriculture ministry's support for the cow hotel, after its successful operation during two previous periods of drought. Image: Pablo Bielli / Diálogo Chino

registered at the facility, 862 of which entered following the drought, including Herefords, black and red Angus, Brafordts and cross breeds. Some animals were not permitted to enter, as they tested positive for brucellosis, a contagious disease that impacts fertility. Others did not need to go: some owners saw their pastures recover ahead of their animals' planned stays and were able to keep them in their fields, with as much as 600 mm of rain falling in two months after the prolonged drought.

On arrival, calves are first taught to eat and use the water troughs, Moncalvo explains, casually leaning against a wooden fence. Separated from their mothers when they drink only milk, at less than two months old and weighing 60–70kg, they have to adjust to eating grain rations – a mixture of corn, sorghum, barley, wheat and mineral supplements – a diet of 21% protein, as well as alfalfa in bales.

Early weaning, the premature separation of calves from their mothers, is a practice used in emergency situations, such as the drought in Uruguay. It can speed up the recovery of young cows' bodies and encourages earlier breeding to keep pregnancy rates up. But it is seen as a last resort, because of the health risks and logistical complications involved.

Alejandro Saravia from Plan Agropecuario, a Uruguayan agricultural support institute, told the



Many calves arrive undernourished, having been separated from their mothers, or due to weakened cows' inability to sufficiently feed them. Calves are prematurely weaned and moved onto a grain diet that helps them recover body mass. Image: Pablo Bielli / Diálogo Chino

“
Weaning calves
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newspaper El Telégrafo how, in 1999, a group of technicians including himself went to Argentina to see how they applied the weaning technique and brought back guidelines for handling underweight calves. “At that time there was not much experience,” he recalls. That year, six calf hotels operated in Uruguay, but the approach was only recreated in Guichón seven years later.

Minister Mattos is clear that, in a crisis situation, the weaning approach provides quality feed to the calf, ensuring its development and relieving the nursing mother: “It helps her to conceive again and increases the reproduction rate, which is the most important objective we set ourselves.”

“Weaning calves helps restore the mother's body condition and allows pregnancies to happen again, which is what, thank God, we have achieved,” Carmen tells us with relief. She describes it as “useless” to keep a calf at its mother's feet for a further six or seven months when it is in a delicate condition, explaining that the animal loses a year of productivity.

Other owners, and animals, were less fortunate at the facility. In the first few days, “six or seven calves died because they arrived malnourished

and did not adapt to the ration,” Moncalvo says. Once calves have gained weight, they are moved to another paddock where they receive feed with less fibre, a diet of 18% protein, and natural grass.

The Liga facility requires over 3,000 kg of feed per week, which is donated by barns and veterinaries from all over the country. Four students from a local agricultural school are in charge of filling the troughs twice a day. John Cáceres, Segundo Pereyra, Lorenzo Panizza and Joaquín Henderson all signed up for an internship at the hotel to prepare their thesis on calf management and early weaning.

The students load feed into a pick-up truck hitched to a tractor and drive slowly from paddock to paddock. They use the holsters on their belts to cut the nylon from the 40 kg bags before dumping them into the troughs, from which a dozen calves can eat, each consuming up to 4 kg a day.

In surveys conducted after the first hotel experiences more than 20 years ago, nine out of ten beneficiaries said they were happy with the treatment, 82% would have left the animals longer, but only 38% said they would send calves back to the hotel.

LIVESTOCK'S IMPORTANCE TO URUGUAY

2021 was, in a number of different ways, a year to

500,000

The impact of extreme weather on reproduction could see Uruguay's cattle stock reduced by as many as half a million head this year. The country will struggle to match its historic slaughter of 2.6 million in 2021.

remember for those working in the Uruguayan meat industry. Historic records were set for slaughter (2,638,252 cattle, 630,000 more than in 2020), meat exports and the price per tonne exported (close to US\$5,000). The Chinese market was the driving force behind these increases, with the Asian nation now importing 61% of the meat produced by Uruguay.

The price of cattle is also at unprecedented levels. Calves have never exceeded US\$3 per kg, but did so for the first time at the end of March, and are worth 50% more than a year ago.

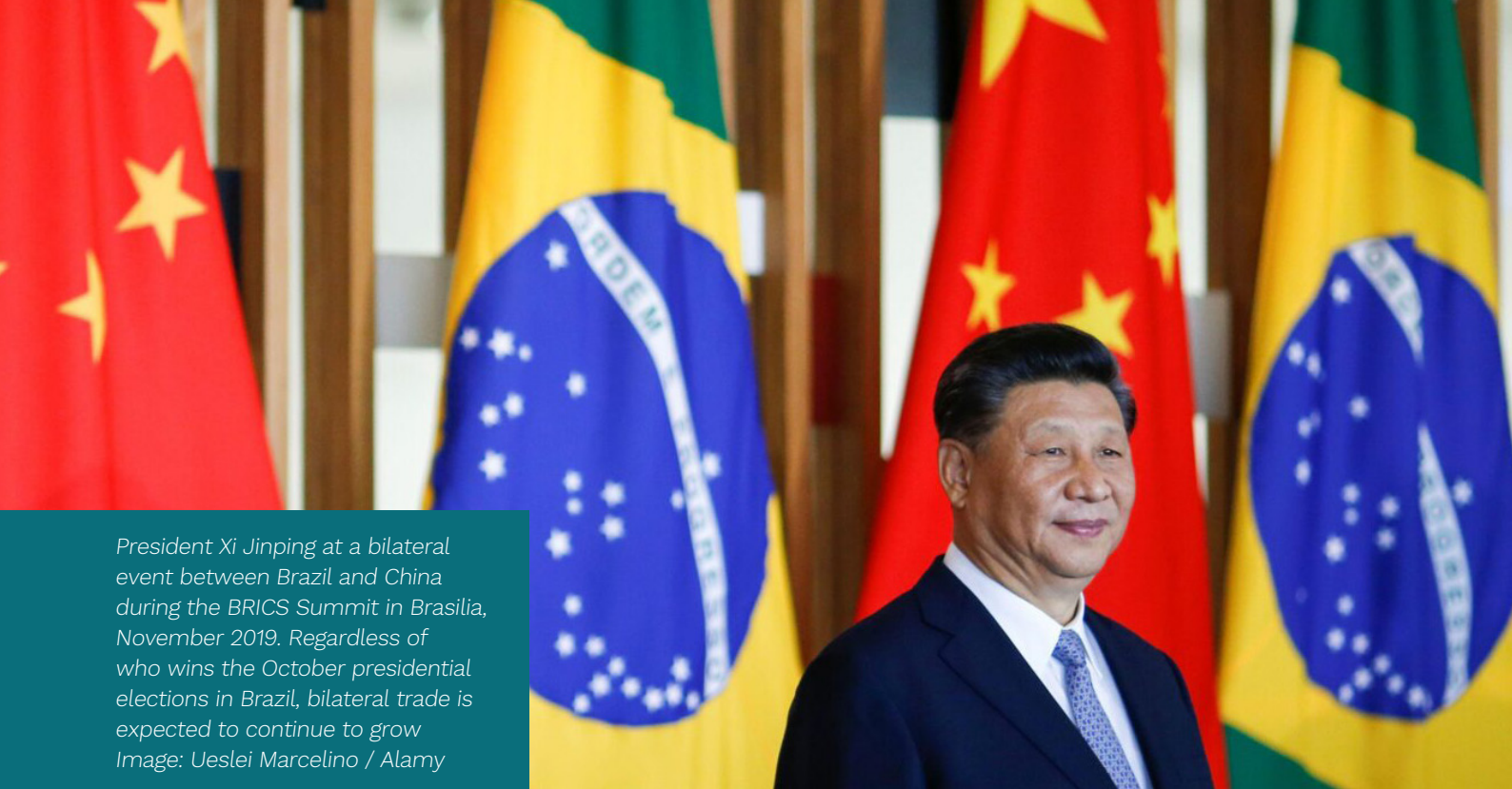
However, any chance of sustaining these highs is likely to be compromised by this year's stock, which is expected to be reduced by 400,000 to 500,000 head, if breeding does not pick up pace. This requires as many cows and heifers as possible to be in a condition to successfully conceive and sustain pregnancy. It also means efforts must be made to guarantee the healthy development of calves born under risky

conditions, underlining the importance of facilities such as that of the Liga's facility in Guichón.

As the day draws to a close on our visit, the students share a bit of banter as they divide up the final tasks. They calculate which way the wind is coming from before tipping the last bag into the trough, so that the dust from the ration, dry and sawdust-like, doesn't get into their eyes.

Based on the signs she detects in the behaviour of the bees and hives already in early autumn, Carmen says another dry spring may occur this year. While a third straight year of La Niña would be unusual, meteorologist Mario Bidegain recently tweeted that models are indicating that it could happen.

“If the Liga opens the calf hotel again next year, many people who did not yet try it will do so. It has been very good for us,” says Carmen before returning to her gaze to the field. Moncalvo hears this, and gives a nod that seems to say “let's see”. 🇺🇲



President Xi Jinping at a bilateral event between Brazil and China during the BRICS Summit in Brasilia, November 2019. Regardless of who wins the October presidential elections in Brazil, bilateral trade is expected to continue to grow
Image: Ueslei Marcelino / Alamy

[Talita Fernandes](#)

What Brazil's elections could mean for relations with China

Analysts say agribusiness links are likely to continue to advance, but diplomacy may follow different paths depending on the winner of October's presidential vote

Since 2009, China has been Brazil's main trading partner, and year after year since, there have been record-breaking figures, especially in agribusiness – a strengthening relationship that analysts believe will continue in the coming years, whatever the outcome of presidential elections in the South American nation this October.

“Our export agenda [mainly commodities] is very focused on very basic

products,” says Larissa Wachholz, a partner at political consultancy Vallya and a special advisor on China affairs to Brazil's Ministry of Agriculture from 2019 to 2021. “This ultimately means that the electoral scenario is less important for these sectors, which are quite resilient.”

This does not mean, however, that relations will remain unchanged. Experts consulted by Diálogo Chino see an eventual win

for former president Luiz Inácio Lula da Silva, who gained 48% of votes in the 2 October first round, as a route to strengthening ties between the two countries. If current incumbent Jair Bolsonaro, who took 43% of first round votes, is re-elected, the signs are that the government will likely continue to distance itself from China – at least rhetorically.

Business between Brazil and China has continued to boom in recent years, even during the pandemic. The total value of trade between the two countries reached US\$135 billion in 2021, a record number, according to foreign trade data.



From left to right, former presidents Dmitri Medvedev (Russia), Lula (Brazil), Hu Jintao (China) and former Indian Prime Minister Manmohan Singh at the second BRIC Summit in 2010. The Lula government's foreign policy favoured South-South cooperation
 Image: José Cruz/ABr, CC BY 3.0 BR, via Wikimedia Commons

“We have huge potential, but to win the trust of the Chinese, this needs to be done on a government-to-government basis. As much as the private sector has a key role in communicating with the consumer, the government has a key role in negotiating,” Wachholz adds.

LULA CLOSER TO CHINA

Based on his previous time in office, Lula has shown himself to be more inclined to dialogue with Beijing. It was during his government, in 2009, that China became Brazil's main trading partner, benefiting from the broader international context of the commodities boom.

Years before, in 2004, Lula made his first visit to the Asian country with an entourage of business figures, a gesture seen as a driver of trade. In the same year, during the visit of former Chinese president

“
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 relations up where
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Hu Jintao to Brasília, Brazil recognised China as a market economy, a move seen as a vote of confidence in the nation.

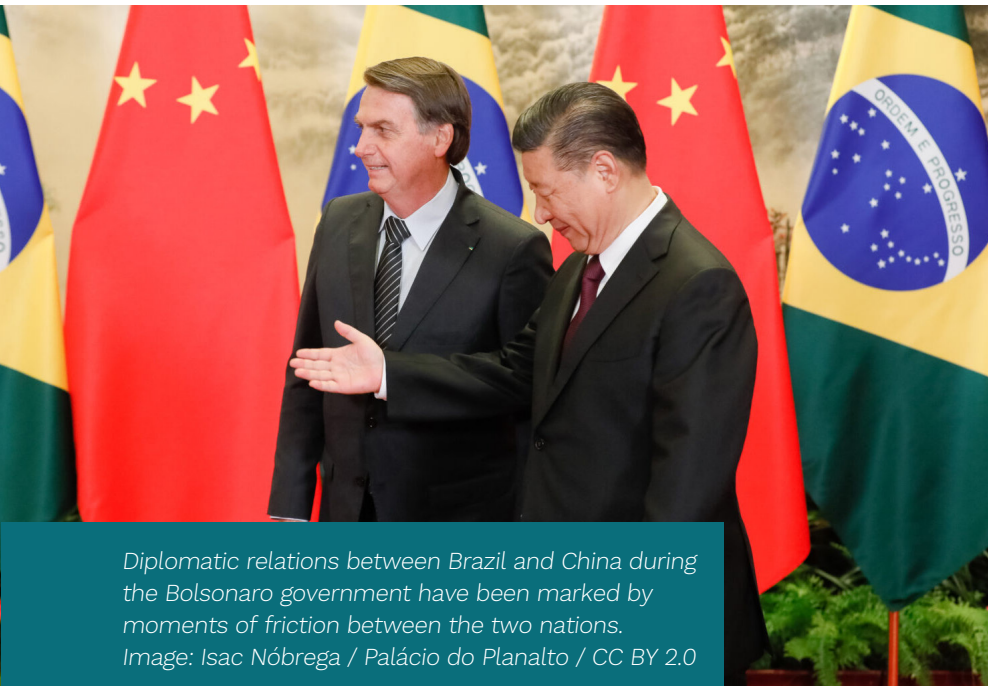
“China, in general, has better dialogue with governments of a similar political tendency to the one it has at home,” says Marcos Caramuru, who

was Brazil's ambassador in Beijing between 2016 and 2018 and its consul-general in Shanghai between 2008 and 2011.

Diálogo Chino contacted the campaign teams of the two candidates for information on their plans for relations with China if elected. No response was received from President Jair Bolsonaro's team.

As for Lula, Celso Amorim, former foreign minister during his government and today his main advisor on international affairs, told Diálogo Chino that if the former president is elected, China will have an important place in his international policy. “We will pick relations up where we left them in the Lula and Dilma governments, with very good partnerships, with very good coordination,” he said.

However, Professor Kelly Ferreira, director of



Diplomatic relations between Brazil and China during the Bolsonaro government have been marked by moments of friction between the two nations. Image: Isac Nóbrega / Palácio do Planalto / CC BY 2.0

“

It is difficult to interpret the Bolsonaro government. Many have difficulty understanding this dichotomy.

international relations at the Pontifical Catholic University of Campinas, São Paulo, warns that Lula would have to rebuild the ties burnt due to the friction-laden relationship of the Bolsonaro administration. “If we look at Brazilian foreign policy, it has always had some pillars, even during the military regime [1964–1985]. Brazil has always sought to follow international norms, of juridicism, pacifism. We do not make threats, we try to mediate, but there was this rupture during the Bolsonaro government.”

BOLSONARO EXPECTED TO STAY AWAY

Asked about the possibility of re-election for Bolsonaro, experts generally predict a continuity on the business side, but with a colder diplomatic relationship, or a complete institutional estrangement. Since the 2018 election campaign, the current president has adopted an aggressive discourse with regard to China, with statements, for example, that the Asian country and its businesses would be “buying Brazil”.

This rhetoric has continued during his government. One of the tensest moments occurred when congressman Eduardo Bolsonaro, the president’s son, blamed China for the Covid-19 pandemic in a March 2020 tweet, to which the Chinese Embassy in Brazil issued an official response. Other conflicts were driven by former foreign minister Ernesto Araújo and former education minister Abraham Weintraub.

According to Caramuru, the Bolsonaro government’s arrival caused surprise among Chinese figures, with its ambiguous messages. While, on the one hand, the rhetoric was aggressive, on the other there was progress, the diplomat says, pointing to the cooperative stance of vice-president Hamilton Mourão at the helm of the Sino-Brazilian High-Level Commission for Coordination and Cooperation (COSBAN), and the continuous functioning of Brazilian diplomacy.

“It is difficult to interpret the Bolsonaro government. Many have difficulty understanding this dichotomy. It gets much easier if you have an administration [in Brazil] that is ideologically closer [to China]. Business people would be more encouraged,” said Caramuru.

BEYOND AGRIBUSINESS

In arguing for closer dialogue between Brazil and China with a view

to expanding business, Wachholz said that the current global turbulence could present a good time for the countries to find new trade areas.

“China is in need of more diverse partnerships,” the former agriculture ministry advisor says. For her, chances for discussion and strengthening ties with the Chinese have been spurned in recent years: “Opportunities have been missed in the area of health [and] vaccines.”

Amorim, the advisor to Lula, signalled that a new government under the former president would open new fronts for partnerships and investments with Chinese actors. “Investments in energy will be very welcome. China has developed a lot of equipment for solar energy,” the former foreign minister said as an example. “The cooperation of Brazil, Mercosur or South America with China in the area of combatting global warming is absolutely fundamental.”

However, the former minister reflects on his experience of negotiating with the Chinese, adding that this is often a difficult task: “I think that negotiating with China is not easy, breaking this paradigm of us being only an exporter of commodities is also not an easy task, even on relatively simple issues, like soybean oil. I am not talking about rocket science, I am talking about soybean oil. It is difficult

US\$135 billion

The total value of imports and exports between Brazil and China in 2021. The Asian country has been Brazil’s largest trading partner since 2009.

because the Chinese, quite frankly speaking, they tend to be a little protectionist of their industries,” he explains.

Even so, he stresses that this does not mean there would be conflict in the relationship: “It is better to have a tough and honest negotiator than a soft and dishonest one.”

ENVIRONMENT ON THE AGENDA

Eduardo Viola, international relations professor at the Getúlio Vargas Foundation and a researcher at the University of São Paulo, recalls that the previous Lula government effectively controlled deforestation in the Amazon, amid the advance of the agricultural frontier, driven mainly by soy and beef. He believes, therefore, that this more sensitive vision of environmental issues would return under the Lula administration. “This is almost certain because it [deforestation control] was successfully done in Lula’s previous government,” he says.

Asked if the increase in deforestation in Brazil for

agricultural and livestock production could harm sales to China, Viola said that, at least for now, the Asian nation sees food security as its priority. China, he adds, “is far from being in a European scenario”, where the pressure for environmental control is greater. “The trend is that China will be increasingly in favour of controlling deforestation, but the degree to which this will affect Brazilian exports is difficult to assess.”

The professor adds, however, that a segment of agribusiness has already internationalised the need for transition to a low-carbon economy, even if this is not well represented in the ruralist benches of Brazil’s congress: “This transformation of agribusiness, in which the incorporation of environmental protection implies higher quality in the food produced, is of increasing interest to China.”

The first round of voting saw a better performance for Bolsonaro than polls had projected, but Lula remains the favourite for the second round runoff, to be held on 30 October. 🇧🇷



Diálogo Chino

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