BRAZIL'S CHALLENGE TO CULTIVATE THE FUTURE

— NEW BUSINESS OPPORTUNITIES FOR REGENERATIVE AGRICULTURE, SEEN IN CACAO AGROFORESTRY —

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SUMMARY

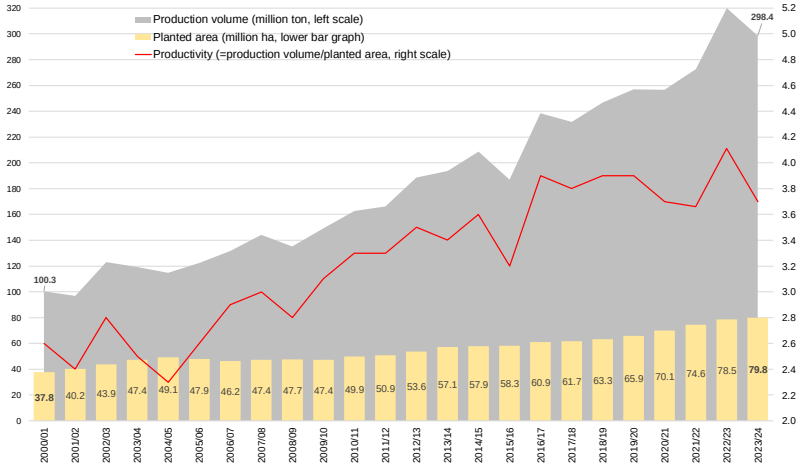
- As a major global food supplier, Brazil is working to expand agricultural production, aiming to achieve economic growth by boosting exports of agricultural products. One solution to expand farmland without clearing forests is the restoration of degraded pasture and cropland through regenerative agriculture.
- Cacao agroforestry, a form of regenerative agriculture, enables both the restoration of degraded farmland and the increase of production. In addition, it offers profits through enhanced value-added benefits related to sustainability.
- Lack of information, technical support, and investment funds are barriers to the introduction of regenerative agriculture in the cultivation of major Brazilian crops such as grain and corn. Japanese companies could find new business opportunities with technologies and businesses that provide solutions to these problems.

1. NECESSITY OF REGENERATIVE AGRICULTURE IN BRAZIL AND ITS CURRENT INITIATIVES

1-1. Regenerative agriculture as a solution for both forest conservation and cropland expansion

In 2023, Brazil was the leading exporter of a number of commodities, including soybeans, poultry, sugar, and beef, with the country's shipments accounting for 57%, 26%, 23%, and 15% of world exports of those products, respectively. With the agriculture and livestock sector accounting for 6.2% of Brazil's GDP, the government aims to achieve economic growth through further expansion of agricultural exports. Leveraging its abundant natural advantages — vast land, a perennial spring-like climate, and plentiful sunshine —, the country is expanding its agricultural production by utilizing biofertilizers, improving crop varieties, and increasing productivity through double and triple cropping systems. The efforts so far have resulted in a 2.1-fold increase in grain planting area from 2000 to 2023, while production volume has grown to approximately 3.0 times (Figure 1).

Figure 1: Grain production volume, planted area, and productivity in Brazil



Note: The Brazilian agricultural year is from September to August of the following year.
Source: Compiled by MGSSI based on data of Brazil's National Supply Company (Conab)

As a global food supplier, Brazil must not only improve productivity but also expand agricultural land to meet the growing global demand for food expected in the coming years. However, in Brazil, deforestation is prohibited in protected areas under the Brazilian Forest Code enacted in 1965. Against this background, regenerative agriculture offers a solution to the challenge of expanding agricultural land without clearing new forests.

In December 2023, the government announced the National Programme for the Conversion of Degraded Pastures into Sustainable Agricultural, Livestock and Forestry Production Systems and its Interministerial Steering Committee (PNCPD). Its objective is focused on converting degraded pastures into sustainable agricultural land. Currently, Brazil has approximately 160 million hectares of cropland and pastureland, of which 90 to 100 million hectares are in a degraded state. The plan aims to rehabilitate and convert up to 40 million hectares of low-productivity pastureland to agricultural land over the next 10 years (Figure 2).

1-2. Reevaluating modern farming: Regenerative agriculture and its implementation in Brazil

Regenerative agriculture refers to farming that restores soil health. Key techniques include crop rotation, the practice of planting different crops sequentially on the same land, such as growing soybeans followed by corn; no-till farming, in which crops are cultivated without plowing the soil and plant residues from previous crops are left in place; and the use of cover crop to protect the soil surface during fallow periods and between crops (Figure 3). In contrast to modern agricultural practices, which often rely on monoculture and heavy applications of chemical fertilizers, regenerative agriculture promotes biodiversity and improves the nutrient balance of the soil. These benefits contribute to reducing the use of chemical fertilizers, preventing soil erosion, and enhancing crops' resistance to diseases[1]. Moreover, regenerative practices enable the restoration of degraded lands and pastures where soils have become infertile and can no longer support crops or livestock forage. In addition, it is possible to rehabilitate degraded cropland and pastureland where the soil quality is too poor to grow crops, grass or livestock feed.

Furthermore, regenerative agriculture is also effective in reducing agricultural greenhouse gas emissions, such as nitrous oxide contained in chemical fertilizers and carbon dioxide and methane from soil tillage. Major companies such as Nestlé are stepping up efforts to support the adaptation of regenerative agriculture throughout their supply chains.

These efforts are also being reinforced in Brazil, where the Brazilian Agricultural Research Corporation (Embrapa) is leading initiatives to make agriculture more resilient and sustainable through the implementation of regenerative practices across various regions. Embrapa advocates SPD[2] no-till farming, in which the soil is not tilled except for the planting area and crop rotation is carried out; the ILPF[3] farming method (Figure 4), which optimizes production by combining cultivation, livestock raising, and forestry; and the SAF[4] (Figure 5) agroforestry system which fosters the coexistence of trees to promote biodiversity, thereby beneficiating agricultural production and livestock raising. Among these methods, cacao agroforestry (hereinafter referred to as SAF) has been practiced for more than 20 years, demonstrating proven results in both increasing production and restoring degraded pastures.

[1] The reasons for this include: 1) compared to single-crop cultivation, where the spread of pathogens and pests is faster due to the dense concentration of crops, cultivating various types of plants in the mix prevents the concentration of pathogens and pests on specific crops and reduces disease outbreaks, and 2) enhanced biodiversity increases the number of beneficial insects that serve as natural enemies to harmful ones.

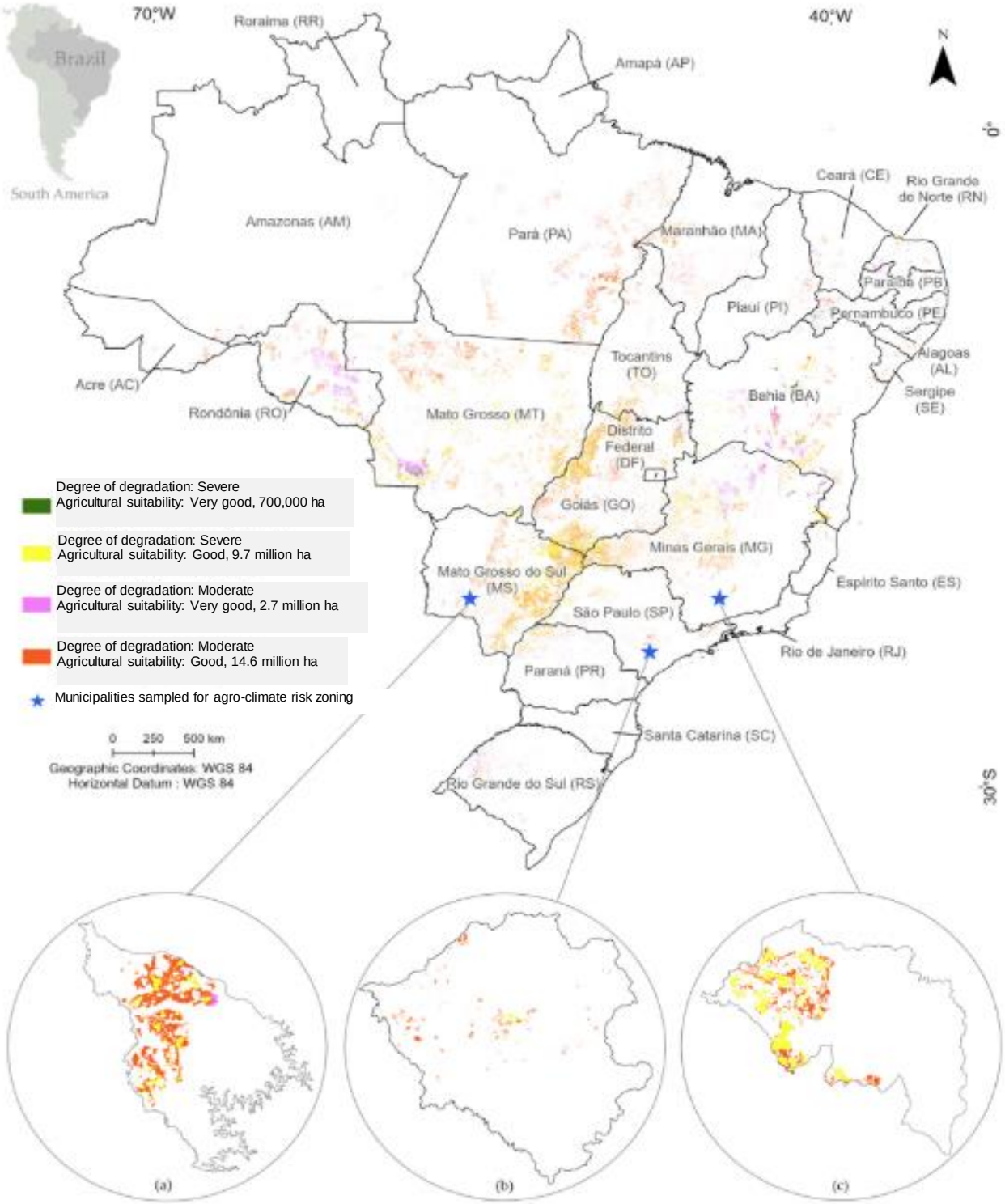
[2] Abbreviation of Sistema Plantio Direto

[3] Abbreviation of Integração-lavoura-pecuária-floresta

[4] Abbreviation of Sistemas Agroflorestais

Figure 2: Distribution of degraded pasturelands suitable for agriculture

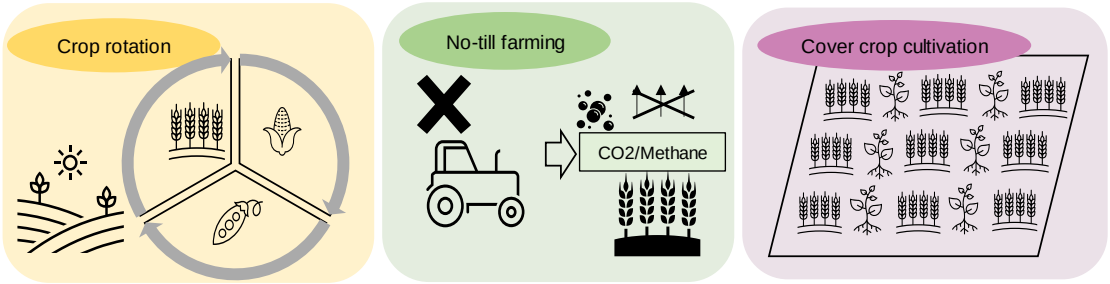
(Study by Embrapa published in February 2024)



Note: ★ indicate the three municipalities selected by Embrapa as samples for agro-climatic risk zoning, which identifies cropping periods with low risk of harvest failure attributable to climate disaster. (a) Municipality of Gialopes da Laguna, Mato Grosso do Sul; (b) Municipality of São Miguel Arcanjo, São Paulo; and (c) Inagay, Minas Gerais.

Source: Reproduced and translated from Embrapa's website "Brazil has 28 million hectares of degraded pastures with potential for agricultural expansion"

Figure 3: Examples of regenerative agriculture farming methods



Source: Compiled by MGSSI

Figure 4: ILPF farming method

Source: A report by Embrapa "ICLF: a portrait of sustainable production in Brazil"

Figure 5: SAF farming method

Source: Embrapa Image Bank "SAF andiroba limão cacau"

2. A CASE OF REGENERATIVE AGRICULTURE: CACAO PRODUCTION THROUGH AGROFORESTRY (SAF)

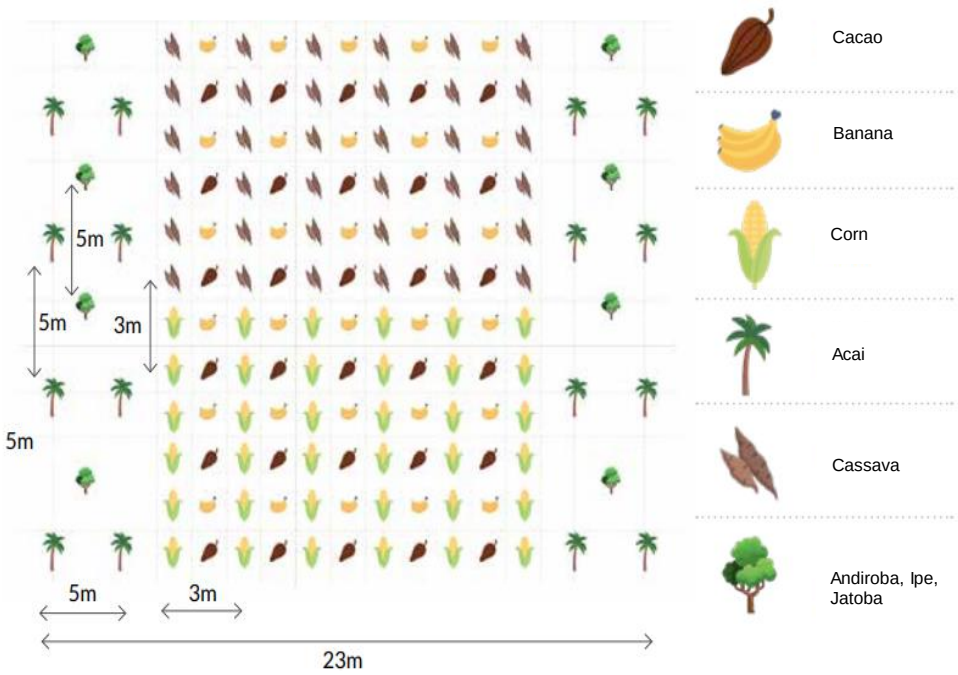
2-1. Achievements of cacao production through SAF and the “Cabruca” method

SAF is a method of cultivating fruit trees and crops of different heights (high, medium, and low) together in the same area, and planting cover crops and having livestock grazing in some cases, thus enabling rehabilitation of degraded farmland and increased production.

In the northeastern states of Pará and Bahia, which are Brazil’s main cacao-producing regions, farmers have been increasingly adopting the SAF farming method, cultivating cacao under the shade of toll trees such as pepper, banana, and acai (Figure 6). In Pará, degraded land has been gradually restored as cacao SAF areas, and the planted area doubled in the 10-15 years since the 2000s. This system offers various environmental benefits, including protection against soil erosion, prevention of fires, and forest restoration. As a result, cacao production in the state has increased from approximately 30,000 tons in 2000 to approximately 138,000 tons in 2023.

Also, in Bahia and Espirito Santo, an ancient agricultural practice for growing cacao within the native forests of the Atlantic Forest biome, known as the "Cabruca" system, is experiencing a revival. The practice is being reappraised as a way to protect rare native vegetation, including endangered species, while promoting both agricultural production and biodiversity protection.

Figure 6: Example of cacao agroforestry planting method
Note: m indicates the distance between plantings



Source: Adapted and translated from CocoaAction Brasil's report "Viabilidade econômica de sistemas produtivos com cacau"

2-2. Challenges in cacao production and public-private initiatives

While Brazil produced more than 400,000 tons of cacao annually in the mid-1980s, production fell to half that volume in the 1990s due to pests and diseases. The production in 2023 was approximately 296,000 tons, ranking Brazil sixth in the world. At the same time, the country is the world's fifth largest chocolate consumer with a domestic crushing capacity of approximately 300,000 tons. To meet this domestic demand, Brazil has become a "cacao producing country that imports cacao," importing cacao from African countries.

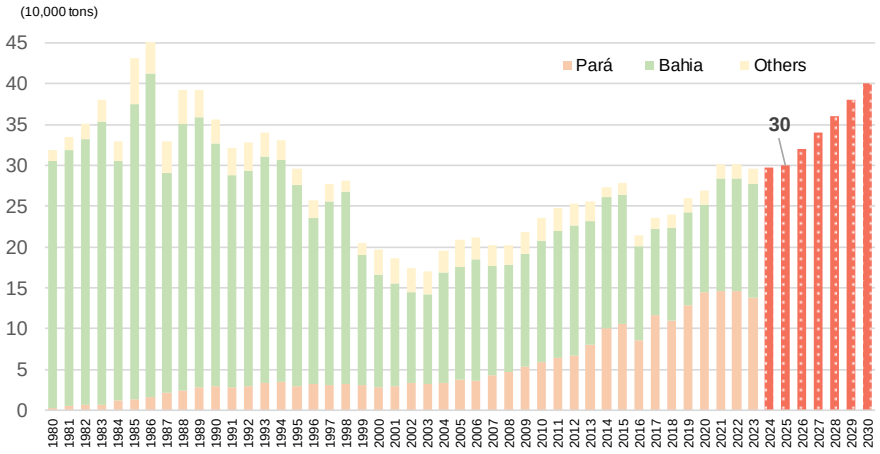
In 2018, Nestlé, Cargill, and other major companies launched CocoaAction Brasil, a public-private initiative to propagate SAF technologies, support policy development, and expand access to financing for producers, for forest conservation and an increase in productivity. Then in 2021, Brazil's Ministry of Agriculture, Livestock, and Food Supply (MAPA) announced a plan to invest BRL 15 million[5] over two years in partnership with the private sector, with the goal of achieving 100% cacao self-sufficiency by 2025. In 2023, the ministry formulated the "Inova Cacau 2030 Plan[6]" with the strategic target of producing more than 400,000 tons of cacao per year by 2030 by promoting cacao farming thorough SAF. As a result of these initiatives, production volume, which was approximately 239,000 tons in 2018, is expected to meet the level of domestic demand of 300,000 tons in 2025 (Figure 7).

[5] Approximately 383 million yen at an exchange rate of BRL 1.0 = JPY 25.55

[6] It sets guidelines on four pillars for sustainable development in cacao-producing regions: 1) economic and productivity (improving cacao farming productivity and farmers' incomes), 2) social (improving the working environment and organizational capacity of cacao producers), 3) environment (rehabilitation and conservation of degraded croplands, promoting cacao farming as an alternative model to reduce illegal deforestation), and 4) governance (managing and monitoring the plan, engaging various stakeholders in the production chain, and maximizing achievement of targets).

Figure 7: Cacao production volume by state

Note: Figures for 2024 and later are estimated national totals.



Source: Compiled by MGSSI based on the database of the Institution of Brasilian Geographical Statistics (IBGE)

2-3. Enhancing added value for sustainable agricultural practices

Brazil is re-evaluating the value of sustainable agriculture. With the growing international trend seeking sustainability in luxury goods, as exemplified by Japanese chocolate company Meiji's “Agroforestry Milk Chocolate”, the Brazilian premium chocolate brand Dengo's business policy is to pay fair compensation for sustainable, high-quality cacao production. Dengo has set a standard to pay producers 70-245% above the market price, depending on the quality of the cacao, whether it is organically grown or not, and based on the production farm's compliance with ESG standards (Figure 8).

Figure 8: Examples of sustainable chocolate products

Source: Compiled by MGSSI

A green certification called “Cacau Cabruca” for cacao grown with the aforementioned Cabruca cultivation method was established in June 2024 (Law No.14,877) and it is also expected to contribute to enhancing the added value to sustainability.

3. CHALLENGES AND NEW BUSINESS OPPORTUNITIES FOR REGENERATIVE AGRICULTURE IN BRAZIL

3-1. Challenges of regenerative agriculture

Regenerative agriculture initiatives in cacao production have resulted in the rehabilitation of degraded farmland and increased production. The efforts are expected to be extended to the production of Brazil's main crops, such as grains and sugarcane, but there are challenges to overcome.

The first is the lack of information and technical assistance. For example, when the price of a particular crop rises, producers may shortsightedly switch to the single higher-priced crop, and the crop rotation cycle may not be followed. Of the agricultural production facilities in Brazil, 77% are owned by family farmers. The challenge is how to disseminate proper agricultural practices to these producers to maximize yields.

The second challenge is securing funding to introduce regenerative agriculture. It typically takes 2-5 years to recover the investment by planting new crops on degraded cropland. Therefore, policy support such as low-interest loans and tax incentives is essential to facilitate financing for such initiatives.

3-2. Potential of regenerative agriculture in Brazil and business opportunities

As demonstrated in this report, regenerative agriculture in the cultivation of specialty crops such as cacao tends to generate added value related to sustainability, making it relatively easier to secure profits. In addition, it is possible to build a business model that generates diverse income sources from a single plot of agricultural land, such as (1) cultivating energy crops as cover crops that can be used as raw materials for biofuels, and (2) generating carbon credits through forest conservation projects as part of payments for ecosystem services.

The Japan-Brazil Green Partnership Initiative, launched at the Japan-Brazil summit meeting in May 2024, concluded an agreement to cooperate in the improvement of degraded agricultural land and the promotion of agroforestry (Figure 9). This opens up possibilities for Japanese companies to participate in related businesses that help address the challenges of promoting regenerative agriculture, including the development of technologies for measuring carbon in soil and climate forecasting, as well as financial services specialized for regenerative agriculture.

Figure 9: Overview of the Japan-Brazil Green Partnership Initiative (GPI)

Environment & Climate	
1	Conservation and sustainable development of Amazonian forests (donations to the Amazon Fund, technical cooperation by JICA, etc.)
2	Participation in the G20 meeting on Payments for Ecosystem Services (PES) in Brazil
3	Promotion of quality greenhouse gas reduction initiatives
4	Disaster risk mitigation (landslide capacity building project to create a disaster resilient city)
5	Cooperation in forest management projects serving third countries
6	Use of overseas investments and loans (investment in climate change-related startups, including the “Climate Change Investment Promotion Project” and the Tsubasa Program)
Sustainable development	
7	**Strengthen cooperation in ensuring food security, forest conservation, and sustainable development through the restoration of degraded agricultural lands and the promotion of sustainable agricultural and forestry production systems in these areas**
8	**Bilateral cooperation in the field of agroforestry in the Amazon region**
9	Promotion of joint development projects for precision and digital agriculture (e.g., development of an IT-based agricultural data platform)
10	Strengthen investment and cooperation to promote the combination of biofuels and flexible fuel/hybrid vehicles in the development of the next- generation automotive industry, and to decarbonize the entire value chain
11	Cooperation in research and market development for sustainable aviation fuels (SAF)
12	R&D and innovation in the clean energy supply chain, including critical minerals, SAF, low emission hydrogen, ammonia and other derivatives, and e-fuels
13	Cooperation on strategic mineral resources for energy transition

Source: Compiled by MGSSI based on announcements by the Brazilian Ministry of Foreign Affairs