

# Cabruca-Cocoa: sustainable production in the South of Bahia (Brazil)

Social and environmental benefits of a  
bioeconomy in the shade of remnants of  
the Atlantic Forest

## Objectives

To present the work of strengthening cocoa supply chain in the South of Bahia (Brazil) through Arapyaú Institute's network action.

## Findings

Concrete results are presented, such as: increased income for producers and greater economic vigor in the region; appreciation of the sociocultural heritage related to cocoa; and environmental benefits arising from Atlantic Forest preservation.

The need to establish payments for environmental services provided by Atlantic Forest conservation is also underlined. Biodiversity, water cycle protection and carbon stocks are some of the services provided.

## Relevance

To expand knowledge on scalable bioeconomy models in tropical regions whether high environmental relevance coexists with socioeconomic vulnerability.

It also highlights the importance of payments for environmental services and of income sources from biodiversity.

## Methodology

Literature review was the main method used. In order to supplement this survey, interviews were also conducted with agents involved in the cocoa production chain.

## **Cabruca-Cocoa sustainable production in the South of Bahia (Brazil)**

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<sup>1</sup> We would like to especially acknowledge all of those who took part in making this project a reality: Pedro Vilares (from the creation of the Arapyau Institute); Estevan Sartoreli (Dengo); Roberto Villela e Gabriel (Tabôa Community Development); Cristiano Santana (Geographical Identification - Cacau Sul Bahia association); Cristiano Villela Dias (Center for Cocoa Innovation); Antonio Augusto Paraíso; Mariana Donatelli, and so many others. Other people who contributed to writing this case: Leonor Assad, Nadia Pontes, Cátia Luz and Patrícia Cansado.

Balancing conservation and economic use of natural resources is a challenge of countless regions in our planet. That balance is relevant the future of mankind and several life species. There are many projects related to the economic use of biodiversity, that intend to keep the forest standing and promote socioeconomic inclusion, but achieving economies of scale is still a common challenge.

The present case, on the strengthening of the cocoa supply chain from a systemic view, dives into the South of the state of Bahia in Brazil and sheds light on scalable bioeconomy solutions. The region has human development indexes (HDI) below the Brazilian average, but also some unique characteristics: it is a biodiversity hotspot; it is the cradle of different history and cultural<sup>2</sup> Brazilian references; and cocoa is grown there for centuries under the shade of its native forests.

## 1. Cocoa history in the South of Bahia

Historical records indicate that cocoa was introduced in the south of Bahia in the mid-18th century, in the then Captaincy of São Jorge dos Ilhéus, with seeds that had supposedly been brought from the Amazon. These seeds were planted in the middle of the forest and close to rivers, natural ways to penetrate the lands of the Atlantic Forest, and subject to frequent flooding. At that point in time, this crop did not develop as an economic activity: rice was the main crop and sugar cane was also more relevant (Rangel et al, 1982).

That scenario began to change in 1783, when the cultivation of cocoa

started to gain importance in the region of Ilhéus (Santos, 1957). This crop was boosted by the decline of sugarcane activities and by an increase in the demand and price of cocoa beans in the international market. This happened because the processing of cocoa into chocolate and the popularization of chocolate houses abroad, especially in Europe and in the United States, required more raw material (Chiapetti, 2009). Cultivation took place through a system called *cabruca*. This is a traditional method in which cocoa is planted in the shade of banana trees, sometimes purposely planted, and of trees native to the Atlantic Forest, such as *jequitibá-rosa*

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<sup>2</sup> Cocoa regionalism in Bahia is arguably the “historical shaping of a region through cocoa”, giving rise to its own literature, especially that related to natural landscapes and human struggles, present in the works of Jorge Amado, Jorge Medauar and Adonias Filho (Lavigne, 1967, p. 163). *Crooked Plow* (2019), from Itamar Vieira Junior, is considered the most important Brazilian novel in the century so far. It has a solid and long history involving the emergence of a people with a close relationship with nature and possessing its own cultural traits.

(*Cariniana legalis*), brazilwood (*Caesalpinia echinata*), vinhático (*Plathymania reticulata*), and ipê (genus *Tabebuia*).

In the early 1950s, cocoa was the third most exported product in the country and the first in Bahia. Over the following decades, there were some fluctuations in the market, but the top national producers were supported by the Brazilian government in critical moments, with access to subsidies and to financing. The growth of that economic activity contributed to the emergence of small towns, villages or even districts, as well as to the presence of most of the related workforce in the region (Rangel, 1982).

A new cycle of crisis intensified from the 1980s onwards. The 1987 and 1992 harvests in particular suffered from the lack of rainfall, which killed

many cocoa trees, compromising production in the following years as well. In addition, the fungus that causes a disease known as witches' broom (*moniliophthora perniciosa*), which rots the cocoa fruit, led to a drop-in production starting in 1989. The latter was considered the most drastic for the region, with profound socioeconomic repercussions.

Thus, starting in the 1990s, the decrease in production in Bahia and the reduction in international prices, given the increased production in other countries, mostly in Africa, was added to climate instabilities. As a consequence, Brazil ranked sixth among the largest world producers, with a 5% share. (Chiapetti, 2009). The table below, from Boto Xavier, Nascimento Jr and Chiapetti (Boto Xavier et al) shows how cocoa production in Bahia was affected and the impacts to date.

**Table 1 - Cocoa production in Brazil in thousand tons from 1940 to 2017**

	1940	1950	1960	1970	1985	1995	2005	2017
<b>Brasil</b>	108,1	146,7	169,1	204,5	472,7	242,1	199,2	159,9
<b>Bahia</b>	103,3	139,4	161,6	195,2	425,0	215,5	155,7	85,2
<b>Pará</b>	2,1	2,6	2,0	1,5	22,3	15,1	28,9	67,0
<b>Espírito Santo</b>	1,0	2,6	3,8	5,9	12,1	6,2	7,0	5,3
<b>Rondônia</b>	0,0	0,0	0,0	0,0	9,8	3,6	6,0	1,9
<b>Amazonas</b>	1,6	2,0	1,4	1,8	2,1	1,0	1,3	0,3
<b>Outros</b>	0,2	0,1	0,3	0,2	1,4	0,8	0,3	0,2

Source: IBGE, 2006; 2017

Brazil is currently the seventh largest producer of cocoa in the world, with approximately 200 thousand tons per year. Still, the country is not self-sufficient: it imports 60,000 tons of cocoa a year, on average (The Brazilian cocoa supply chain, 2021). In 2021, the cocoa supply chain was responsible for creating more than 300,000 direct and indirect jobs (FIESP, 2021).

Bahia accounts for 65% of the Brazilian production. The income of producers, most of them family farmers, is considered low mainly due to: low productivity; low added value of their production; lack of compensation for the environmental services provided; scarce resources allocated to research and development; and little access to credit and to technical support. For the most part, public policies in the country and in Bahia are not suitable for promoting the development of the bioeconomy (Chiapetti et al., 2020).

The State of Bahia has 69,000 producers, 89% of which are family farmers, and less than 20% of the latter had access to some type of credit in recent years and/or received some type of technical assistance on a regular basis.

### **1.1 Current social aspects**

The region of the South of Bahia is highly dependent on income transfers from the federal government, with a prevalence of

informal work and poorly trained professionals. The region's HDI is lower than the Brazilian average. In 2010, for example, the Human Development Index (HDI) of the municipality of Ilhéus, one of the largest cities in the region, was 0.690 – lower than the Brazilian average of 0.759.

In the region, about 80% of producers are small or medium-sized, and many of them are beneficiaries of the local land reform. For the most part, cocoa is no longer a monoculture. A study carried out on the south coast of Bahia, analyzing the period from 2015 to 2019 with annual visits to 3,090 producers in 26 municipalities, found that 79% of farms produce cocoa beans as their sole agricultural activity, with 78% of them using the cabruca system (Chiapetti et al., 2020). Agroforestry systems also combine cocoa with the production of other items for their own subsistence.

A survey carried out with producers who accounted for nearly 70% of the region's production in 2019 pointed out that 63% of respondents did not have any schooling or attended school for up to 4 years. Overall, it was found that 29% of the properties had up to 5 hectares; 29% from 6 ha to 10 ha; 11% from 11 ha to 15 ha; 7% from 16 ha to 20 ha; and 24% over 21 ha. Most properties (52%) rely on family labor (Torquato dos Reis, 2020).

## 1.2 Current environmental aspects

The dominant primary vegetation in the region is the Atlantic Forest, or more specifically, dense tropical rainforest. It is considered one of the priority areas (hotspots) for biodiversity conservation in the world, with a high rate of endemism and one of the richest tree species on the planet (Sambuichi, 2006). According to data issued by the State Prosecution Office of Bahia, that biome, which used to occupy 36% of the state, is currently reduced to 6% of its original area and is quite fragmented in that state. Due to its relevant physical and biological value, the remaining stretch in the South of Bahia was listed as a Natural World Heritage Site by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1999. These data are made available by IPHAN (2014).

One of the reasons given for a significant concentration of native trees in the South of Bahia when compared with other regions of the Atlantic Forest is the use of the cabruca system. According to estimates, 70% of the 6,800 km<sup>2</sup> of cocoa plantations in the region use the cabruca system (Sambuichi, 2006), which also favors the creation of ecological corridors.

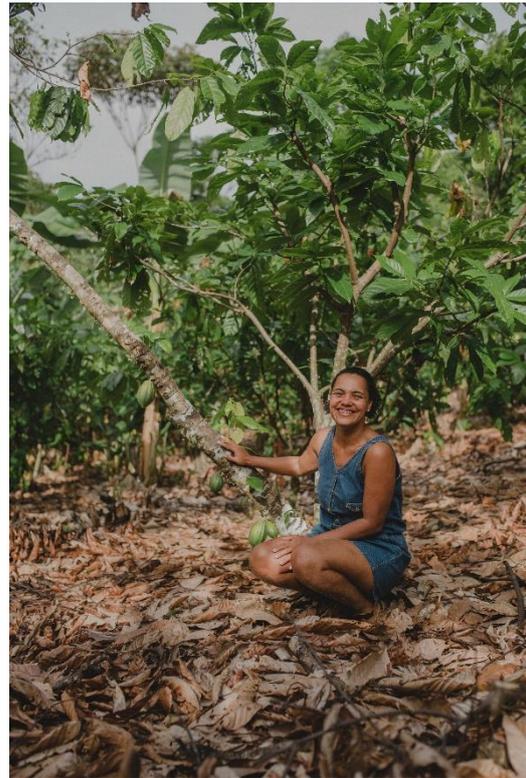


Foto: Ailana, produtora de cacau de qualidade

## 2. Strengthening the cocoa supply chain: Arapyau Institute network

*"At the core of Arapyau's philosophy and of the various initiatives we are involved in, there is one concept: we do not change anything alone. We change with what is different, we learn from the differences, and we change by doing it together. There are numerous players in society: businessmen are important, politicians are important, organized civil society is important, the exercise of citizenship by each and every one of us, consumption as an act of citizenship is important."*  
Guilherme Leal – founder of the Arapyau Institute

The Arapyau Institute began its activities in the south of Bahia in 2008, in the municipality of Serra Grande, when the region was still facing the consequences of the cocoa crisis that hit Brazil during the last decade of the 20th century. Since its creation, the Institute has sought to interact with the community and with local leaders and has been qualifying and expanding its area of influence and its scope.

In 2012, based on diagnoses regarding the development potential of the local economy, the Institute launched a series of articulations and initiatives to strengthen the cocoa supply chain as an important vector for sustainable development in the region. During this process, and jointly with a number of organizations, it devised and supported the creation of several other, new organizations, which together constitute an action support network in key activities for the cocoa supply chain, and whose influence sometimes extended to a national level. The work fronts sought to address different issues, such as the ones presented below:

- How to improve the income and productivity of producers, especially those of family farmers?
- How to add value to a product that is sold at commodity prices?
- Which organizations should be engaged and/or created to support the development of solutions to common problems among producers, so that the value chain is socially inclusive, environmentally responsible and economically prosperous?
- How can research and development transform this context?

For a decade, the Arapyau Institute has developed solutions for each of the issues raised, always acting collectively. Next, four work fronts and their results will be presented. Exhibit 1 presents the organizations created with the support of the Arapyau Institute together with several partners.

## 2.1 Added value in a commodity-dominated market

Considering the context of challenges posed to the cocoa supply chain in the South of Bahia, three elements that add value to cocoa as a product were identified: (i) developing the market for quality cocoa; (ii) finding ways to monetize producers regarding the environmental services they provide; and (iii) strengthening associations and cooperatives as a way to reduce costs and cut out middlemen.

### 2.1.1 Development of quality cocoa

The quality of final products from cocoa, such as fine chocolate, is a result of their manufacturing process and the raw materials used. An opportunity was thus identified to develop that raw material, which until then had only been regarded as a commodity. This way, improvements in processes from harvesting through fermentation, and even in roasting, which result in quality cocoa, began to be considered for the creation of a parallel segment to the commodity market, with greater added value. Additionally, other alternatives for income started to emerge from the development of new markets for high-quality cocoa, cocoa by-products and derivatives, such as chocolate, cocoa butter as healthier fat, cocoa nibs, and inputs for cosmetics and beauty products, among others.

To start promoting such a transformation in the region's cocoa production, technology developments combined with international missions were brought into play to identify premium cocoa beans and to build a good reputation and marketing strategies for them. The Center for Cocoa Innovation (CIC) was created, and it established transparent and measurable quality standards for cocoa beans (for more on CIC, see Exhibit 1).

CIC's quality standards for cocoa beans became a procurement

criterion among new fine chocolate brands that were created to increase demand, thus encouraging producers to make the required investments. The South of Bahia Geographical Indication label and the Brazilian b-company Dengo were created in this context and guaranteed premium price for fine cocoa beans, with bean-to-bar operations (for more on both of them go to Exhibit 1). In addition to raising consumer awareness about the value of the raw material used, these brands help promote the identity of South of Bahia, a tourist and culturally rich region in Brazil.

In 2019, Brazil returned to the list of high quality and fine cocoa producing countries of the International Cocoa Organization (ICCO), and as a result there is increasing interest in Brazilian cocoa, with its environmentally responsible practices due to the cabruca production system. Additionally, a National Cocoa Competition was established as a qualifier for the Salon du Chocolat in Paris (France). Winners from the local qualifiers enjoyed an increase in demand with a price differential, motivating others to invest in their own production. Any producer may send cocoa beans to the Center for Cocoa Innovation (CIC) to have their quality analyzed for an affordable price, and receive a report that, with some technical assistance, can recommend improvements in the field.

Currently, the quality market pays up to twice as much as the commodity market, and the number of brands interested in this market continues to grow. Different working groups have been dedicating their efforts to the internationalization of fine cocoa beans and derivatives.

### **2.1.2 Development of Payment for Environmental Services (PSA)**

As previously discussed, the production of cabruca-cocoa keeps the forest standing and affords several positive environmental impacts. Studies developed as guidelines for valuation of environmental impacts indicate that the carbon stock is, on average, 66 tons per hectare, 40% of which from cocoa trees, whose biomass is favored by their growing in the shade; the conservation of the forest increases the richness of the soil and reduces erosion, especially considering that this is a region with wide variations in the rainfall regime; the microclimate benefits in several ways, for example with an average variation 6.0 °C lower between temperature extremes when compared with full sun cocoa farming; the water regime also reaps the benefits. These data were obtained from the Flora das

Cabucas and Carbon Stock Estimate, the result of a partnership among the Arapyau Institute, Dengo Chocolates, the World Resources Institute (WRI) and the State University of Santa Cruz (UESC); this study sought to understand the correlation between cocoa productivity, shading and the carbon stock in the 17 surveyed properties - all of them suppliers of Dengo Chocolates.

Positive externalities often stem from investments in the recovery of degraded areas, or from the densification of productive tree cover in the system, combined with the management of excess shade in the forest. Yet, so far there is no form of compensation for environmental services provided by producers in a structured and scalable way. The study "Economic viability of productive systems related to cocoa" indicated that an increase in productive trees - currently at an average of 300 cocoa trees per hectare - to around 850 to 1000 per hectare, coupled with cabruca shade management of up to 30% would make the crop economically viable and would guarantee maintenance of the environmental services

provided - and this without considering some form of compensation for these social and environmental services. This is an excerpt from the study "Economic viability of productive systems related to cocoa." Coordinated by the CocoaAction Brasil initiative, Arapyaú Institute and WRI Brasil, with support from the Cocoa Innovation Center (CIC), the Executive Committee for the Cocoa Crop Plan (CEPLAC), the Federation for Agriculture and Livestock of the State of Bahia (FAEB) and from seven other research and development organizations in Bahia (2021).

Overcoming difficulties for due acknowledgement of the value of cabruca is a challenge for both small producers and the financial market. Meanwhile, there are projects under development that, if backed by adequate investments, could become solutions that will support the local bioeconomy. These will be presented further on, under the topic innovation, research and development.

### **2.1.3 Promoting associations and cooperatives**

Some initiatives associated with the quality cocoa movement and

organic production help strengthen associations and cooperatives, fostering social support fabrics and capabilities for actions that require good articulation among producers. With the support of research institutions, trade associations, public authorities and companies, the effort to differentiate cocoa also aims to give producers greater autonomy in the market by adding value to their production through certifications that underline characteristics such as quality, geographical origin, organic production and agroecological management.

Producers' associations have resulted in better trading, sourcing, and production conditions, particularly for smallholder farmers. Some examples are: Dois Riachões Settlement, an association of smallholder farmers with a focus on improving bargaining power, business conditions and access to credit and technical assistance; Povos da Mata Network - the first with participatory Brazilian organic cocoa certification -, which offers technical assistance focused on smallholder farmers and agroecological production systems; and Cacau Sul Bahia Association, a cooperative of smallholder farmers that holds the Geographical Indication of South of Bahia brand and also offers technical assistance to producers.

## 2.2 Credit with technical assistance as a tool for competitiveness

Credit combined with technical assistance is an essential tool for achieving competitiveness. Family producers, however, face difficulties in accessing public policies capable of bringing family farming to another level, making it competitive and contributing to the country's food sovereignty. To close that gap, a financial product was developed in a blended finance model that enabled credit with technical assistance and tested innovations that in 2023 will begin to be replicated in a larger-scale project.

The blended finance product is the first sustainable Agribusiness Receivables Certificate (CRA) in Brazil, launched in late 2020 with the objective of improving the quality of life of family farmers by increasing their income and encouraging the adoption of low-impact, sustainable agriculture. The product merges resources from market investors and from philanthropic organizations, which contribute to the economic feasibility of the technical assistance that comes with the credit. The funds, totaling about BRL 1.37 million or USD 260 thousand, were transferred to 184 producers in the south of Bahia by the NGO Tabôa<sup>3</sup>, which devised the operation together with the Gaia

Group and the Arapyau and Humanize institutes.

After the first year of operations, surprising results were observed for the cocoa value chain, moving the anticipated social and environmental impacts forward by one year. In May 2022, the NGO Tabôa released the following results: a 38.9% improvement in farmers' average gross income, with a 58.6% increase for those who produced quality cocoa, which is sold at a premium over commodity market prices. This result is explained by the increase in productivity - which grew by 36.2% on average - and by their production for the quality cocoa market. During this period, the number of quality cocoa producers jumped from 16 to 44, a 157% growth. The default rate was virtually zero.

*"(The CRA) is an extremely important initiative, as it demonstrates that it is possible and sustainable to use financial market mechanisms to fund family farming and agroecological practices." Roberto Vilela, Executive Director of Tabôa<sup>7</sup>.*

Just as an example, one of the farming families benefiting from the CRA saw the productivity of their cabruca cocoa grow by 162% and the monthly family income jump

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<sup>3</sup>Tabôa is a community development organization created with the support of the Arapyau Institute.

from BRL 1,212.00 to BRL 2,000.00 (from US 230 to USD 379). Production, which used to be 255 kg, increased to 1,140 kg per hectare per year, and is expected to reach 1,500 kg per hectare per year in 2022 (Söğur-Hous, 2022).

In July 2022, the National Bank for Economic and Social Development (BNDES) launched the first public notice for selecting hybrid financial structures to support Blended Finance initiatives. In this approach, for every BRL 1.00 invested by the bank, the projects undertake to raise at least BRL 3.00 from investors. Results of that public notice were released in November, and the Sustainable CRA - with implementation planned to happen partly in the Atlantic Forest and partly in the Amazon - ranked first under the category of Forest Bioeconomy. BNDES was requested to lend BRL 4 million to finance any first losses and provide technical assistance to beneficiaries, and this would make it possible for another BRL 13.5 million to be raised.

### 2.3 Enabling environment for aligning and converging agendas

Arapyáú seeks to expand its action capabilities cross-sectionally by networking with different organizations, which interact to develop common solutions and frame relevant public policies to be implemented for the sustainable development of the South of Bahia. Hence, Arapyáú articulates

organizations from the public and private sectors (competitive and pre-competitive), civil society and academia, joined together in forums and networks to establish agendas for the cocoa supply chain. Some examples of those articulations are: the National and State Cocoa Sector Chambers; and the Credit Technical Group for discussions on how to facilitate access to credit and provide technical assistance. As a result, some benefits of this approach have been:

- Industry mobilization: the CocoaAction Brazil movement was established, and several sustainability initiatives are being rolled out in the country by the grinding and producing industries;
- Presence of relevant organizations and movements: the Scientific and Technological Hub, focused on research and development in the areas of biotechnology and food; agroforestry value chains; information and communication technologies and logistics;
- The Regional Development Agency: focused on political and resource articulation for the implementation of major structural projects for regional development;
- Center for Cocoa Innovation (CIC): A research and innovation organization that

works with the qualification and differentiation of cocoa and offers courses and training for quality production, as well as acts to open markets that pay a premium price.

- Grinding and Chocolate industries, operating through their competitive, pre-competitive and sustainability initiatives;
- Academia: presence of public and private universities and federal and state technical institutes in the region.

## 2.4 The role of transformative innovation played by R&D

With partnerships, an innovative research and development environment is essential for advancing in traceability practices, in monitoring and georeferencing technologies, in research related to ecosystem benefits, in carbon and biodiversity research, and in genetics, among others. Some examples of ongoing projects are:

- Development of business models for cabruca-cocoa in degraded areas (reforestation);
- Collective production plant, with a smallholder chocolate brand;
- Development of a disruptive cocoa traceability system, related to the georeferencing of cabruca-cocoa areas

through a satellite study. Satellites may also be used for georeferencing potential areas for restoration;

- First Brazilian device capable of analyzing cocoa bean quality standards (bean quality grading machine);
- Development of parameters for economic viability of cabruca-cocoa production models.

Regarding Payments for Environmental Services (PES), in 2022 a pilot project for parametric insurance of cocoa backed by carbon credits was launched. Results were satisfactory and based on previous studies on the carbon stock of cabruca-cocoa.

## 3. Conclusion and next steps

Cocoa in Bahia is going through a recovery phase, with a series of initiatives articulated by different players from the public and private sectors, academia and the third sector. This revival is also marked by the search for a higher quality product with greater added value. The cocoa producing areas, which in the past aimed to export beans, with no grinding, no adequate management and no application of technology, “now undergo a process of shifting paradigms, enhancing production methods with technology, paying close attention to

market changes, to sustainability, to the appreciation of work and to the distinctive tastes of direct and indirect consumers of the fruit” (Carvalho et al., 2020).

The Arapyau Institute believes that a systemic view of a production chain, such as that of cocoa, is a fundamental step towards operating within the perspective of sustainability and social justice. Concrete results were achieved, such as: increased income for smallholders and family farmers; gradual recovery of economic dynamism in the south of Bahia, which had been plagued by recurrent crises concerning its main agricultural product; and the appreciation of the region's cultural heritage associated with cocoa.

The present case portrays a bioeconomy supply chain with proven economic viability and positive social and environmental impacts. Nevertheless, the results achieved still do not monetize positive externalities such as biodiversity, carbon stocks and the cycle of water. This is a priority agenda to promote economies of scale and increase the attractiveness of the cabruca production model, with compensation to producers who ensure the preservation of natural capital.

The voluntary carbon market already opens up some opportunities for

the cocoa supply chain. Still, proving there is added carbon stock may become a hurdle for a system that already preserves the Atlantic Forest and has been established for many years. The benefits regarding the conservation of biodiversity and water resources are proven, and turning them into additional payment to the producers would be a powerful incentive to conservation.

Investment in research and development is also of the utmost importance for the cocoa supply chain to improve its productivity and competitiveness. Brazil can once again become a reference in the production of sustainable cocoa, and for that to happen, public policies must be adjusted to the realities of the cocoa supply chain, which comprises smallholder producers who live in a vulnerable situation, facing difficulties related to access to public credit and to technical assistance, for instance.

As to next steps, the Arapyau Institute seeks to further strengthen the network of partners who are willing to implement solutions that would catalyze the desired changes. The innovations proposed by the Institute continue to unfold inside and outside Bahia, always operating in a network format and adding new partners to respond to complex problems.

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## **Exhibit 1: Some of the organizations created in the cocoa supply chain**

### **Center for Cocoa Innovation (CIC)**

The Center for Cocoa Innovation was created in 2017 with the objective of strengthening the cocoa production chain and contributing to the dissemination of that crop in the region. As the first initiative of the Scientific and Technological Hub of the South of Bahia (PCTSul)<sup>4</sup>, the Center has a laboratory that conducts physical, chemical and sensory analysis of cocoa beans and provides training and consulting for producers, small chocolate manufacturers and the grinding industry; it also fosters the quality cocoa market, for instance through national competitions.

Through its analyses of Brazilian cocoa beans, the CIC played a key role in including Brazil in the international list of quality cocoa producing countries of the International Cocoa Organization (ICCO). Its customers, specializing in special cocoa, contribute to increasing the demand for that premium product. The CIC has already carried out more than 12,000 analyses of cocoa samples from around 900 producers in the region.

Among its most recent achievements we can mention the National Quality Competition of Special Brazilian Cocoa, with awards that changed the lives of producers, and partnerships with two Brazilian agribusiness technology companies to develop groundbreaking tools for categorization and traceability in the cocoa supply chain. While traceability is a key issue in supply chains, categorization may represent a leap forward in developing the quality cocoa market, bringing agility, precision and standardization to the process, which still relies mostly on manual work.

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<sup>4</sup> Initiative of the Committee of Public Institutions of Science, Technology and Innovation of the State of Bahia, formed in 2013 by five institutions (Federal University of Southern Bahia - UFSB, State University of Santa Cruz - UESC, Executive Committee for the Cocoa Crop Plan - CEPLAC, Federal Institute of Education, Science and Technology of Bahia – IFBA and IFBaiano).

There are two federal educational institutions in Bahia. The IFBA originated from the reorganization of the former CEFET/BA, and IFBaiano from the former Federal Agrotechnical Schools and the Regional High Schools of Agriculture of CEPLAC (EMARC).

## South of Bahia Chocolates Geographical Indication (GI)<sup>5</sup>

Since 2018, and through a collaboration with CIC, South of Bahia Chocolates GI guarantees the traceability of certified cocoa in all production stages, with nearly 3,500 potential producers in seven identity subregions . There are fifteen cooperatives, six producer associations and two sectoral organizations that form a federation, the Cacau Sul Bahia Association - GI Cocoa. To obtain the indication, the cocoa fruit must come from areas of Cabruca system or from traditional Agroforestry Systems. They must also have a moisture content of no more than 8%, the aroma of the beans must be free of odors and foreign matter, and fermentation must be at least 65%, which means fully brown beans. With geographical indication, cocoa can be marketed with greater added value, and its value may increase twofold vis-à-vis the international market.

In 2021, GI launched the first cocoa traceability system using blockchain technology. Additionally, together with CIC and some associations, it has been producing South of Bahia Chocolate since 2020, with labels customized with the QR code of the cocoa producer or cooperative, linked to the GI. Demand exceeded total production, which amounted to 16 thousand bars in 2021. GI-certified beans are also on the rise, already totaling 70 tons. Much like GI, the market for quality cocoa continues to grow as new brands and micro-producers emerge.

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<sup>5</sup> A common strategy in national and international markets is to characterize products by indicating their geographical origin and not just the brand, as is the case with Champagne sparkling wine. This indication provides the product with a reputation, intrinsic value and its own identity, distinguishing it from other products of the same type available on the market.

## **Povos da Mata Agroecology Network**

The network engenders an articulation among family farmers, land reform settlers, indigenous and quilombola communities, as well as their consumers (co-producers) and technicians. Through the Participatory Organization for Organic Conformity Assessment (OPAC), it certifies the organic agricultural and agro-industrial production unit and the products of its members. OPAC Povos da Mata is accredited by the Ministry of Agriculture, Livestock and Supply (MAPA), and was the first participatory certification body in Bahia that could authorize its members to use the Seal of the Brazilian System of Organic Conformity Assessment. It is supported by the Arapyau Institute, the Mecenass da Vida Movement, Taboá Community Development, Brazilian Micro and Small Business Support Service (SEBRAE), Muká Agroecological Platform, South of Bahia Geographical Indication, and the Center for Agroecology and Education of the Atlantic Forest.

## **Dengo Chocolates**

In addition to investing in quality cocoa, Arapyau realized that ensuring large-scale demand from customers willing to pay premium prices for beans was also essential. In this context, Maraé, the organization in charge of financing all the activities of the Arapyau Institute, found an opportunity to create Dengo, a manufacturer and retailer of fine chocolates, in 2016. Dengo was born as a business with social and environmental impact, with the purpose of increasing farmers' incomes and contributing to the preservation of biodiversity by producing chocolates with cocoa from the cabruca system.

The fruits - banana, cajá, mangaba, jackfruit - that are included in some of the manufacturer's recipes are also produced by small farmers in the shade of Atlantic Forest trees. Dengo chocolates do not contain hydrogenated fat, as cocoa butter preserved during manufacture is used instead, and they include preferably brown or coconut sugar, which are always organic, thus ensuring the quality of products.

As a result, Dengo's experience demonstrates that a cocoa producer-chocolate manufacturer partnership allows for enhanced compensation for small producers and added value to the chocolate produced.