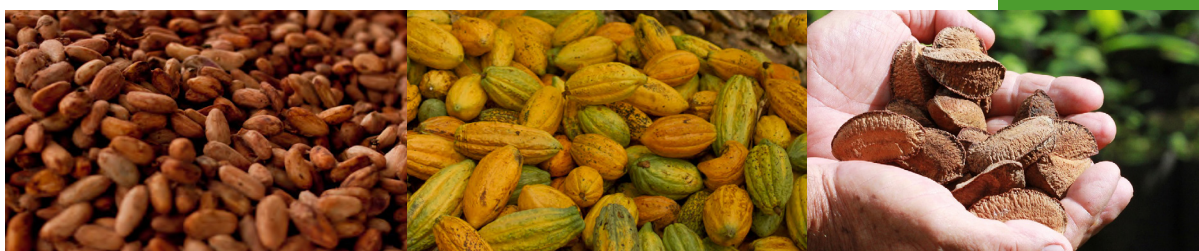




The bioeconomy of Pará state's socio-biodiversity

Results and public policy recommendations

2022



Summary

The state of Pará is one of the leaders in the production and exporting of Brazil's socio-biodiversity products. Based on cultural and ancestral knowledge, the local community —Indigenous, Quilombola, and other peoples in the region — uses and manages the Amazon Forest, reproducing the biome to ensure its biodiversity conservation.

The socio-biodiversity production structure is based on biological and social diversity and forest conservation and has a variety of products (over 40 types). It has access to the local biodiversity and natural resources, which bring production diversification, income generation, and native vegetation conservation. Additionally, the capacity for providing ecosystem services — is a combination that places Brazil and the states that are part of the Amazon biome in a unique position globally.

Although traditional communities and peoples in the most diverse biomes make such products, there is an important gap in value-chain data concerning their commercialization, which makes knowing about income generation for the different agents in the chain difficult.

With this in mind, The Nature Conservancy (TNC), in partnership with the Inter-American Development Bank (IDB) and Natura, developed the study 'The Bioeconomy of Pará State's Socio-biodiversity (EcoSocioBio-PA).' The paper analyzes the value chains of the 30 most relevant products in the state, from production to commercialization, highlighting the state's public policies to strengthen the socio-biodiversity production chains in Pará.

The study's results made it possible to compare the economic importance of livestock and socio-biodiversity, two sectors in Pará with different land-use characteristics. They showed that both produce an added value of nearly equal proportion. While livestock generated BRL 4.25 billion¹ in income, socio-biodiversity generated BRL 4.24 billion² in local income in the state in 2019 .

¹ According to data from IBGE Regional Accounts for livestock.

² As per added value generated only in the local economy of the state of Pará, based on the study 'Socio-biodiversity Bioeconomy in Pará', available at: <https://www.tnc.org.br/conecte-se/comunicacao/noticias/estudo-de-bioeconomia/>

Even though the income generated in both sectors is almost the same, the socio-bioeconomy has a greater capacity to generate ecosystem services, such as climate regulation for society. Thus, the state's public policies should prioritize it.

These numbers are revealed among increasing deforestation in the Amazon, highlighting a dangerous path of no return. As the causes of deforestation are complex, only a systemic approach with actions that give scale to sustainable and equitable production in the socio-biodiversity chain can help reverse the trend and the global climate and biodiversity crisis, creating opportunities to promote the collaborative efforts needed.

Strengthening the standing forest's socio-bioeconomy can potentially change the traditional economic model into a low-carbon and socially fair economy. To make that type of economy possible, we identified public policy and market levers necessary to promote changes at national, regional, and global levels. The results and recommendations presented here aim to shed light on the economic importance of value chains to outline development strategies for a bioeconomy that combines production, socio-biodiversity conservation, income generation, and ecosystem services.

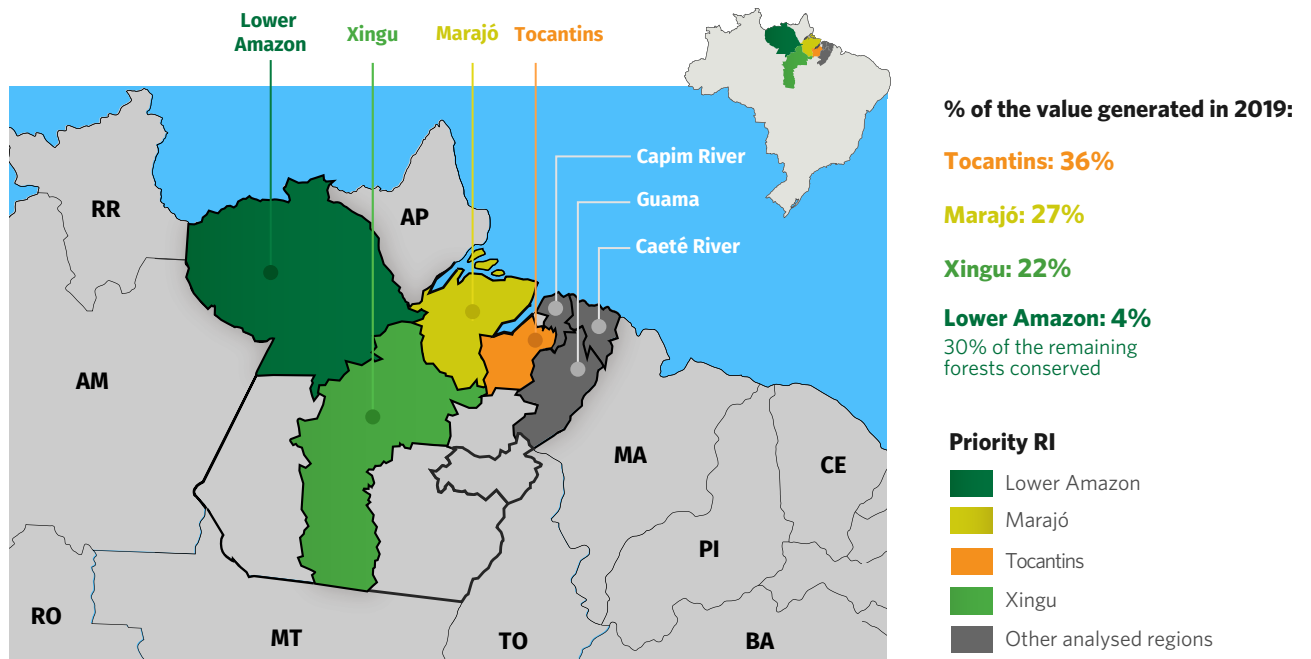
Agents that drive socio-biodiversity's bioeconomy

To put the work developed into context, the scope in which the agents find themselves and the factors that characterize them need to be understood first. The study was conducted in the state of Pará, where 76.6% of the forests are preserved, 31.8% of which are on Indigenous Lands; 23.3% and 12.8% in sustainable-use and fully protected conservation units, respectively; 5.4% in family farming settlements; and 1% in Quilombola territories.

The study analyzed seven of the 12 Integration Regions of Pará (RI), defined by the state as regions representing spaces with similarities in occupation, social level, and economic dynamism and whose municipalities are integrated among themselves. Out of those seven, we selected four priority regions and their production structures to analyze in the study.



Among the four highlighted regions, three are more relevant in generating value for Pará's socio-bioeconomy: Tocantins, Marajó, and Xingu, which concentrate 85% of the added value. And the Lower Amazon region was selected due to its role in conserving 30% of the state's remaining forests, which contributes 4% of the added value.



In these regions, socio-biodiversity production occurs mainly in family farms based on Agroforestry Systems (AFS) – which are essential in this production model. That is the case in the Marajó and Tocantins regions, where AFS represents 99% and 90% of the production value, respectively.

In addition to the regions, the study included the 30 main products that make up the rural base in Pará's socio-biodiversity bioeconomy. These are:

30 main products of EcoSocioBio-PA's socio-biodiversity



1. Açaí	11. Cocoa-fruit	21. Brazil nut oil
2. Açaí seed	12. Brazil nut	22. Piquiá oil
3. Andiroba	13. Copaíba	23. Heart of Palm
4. Handicraft	14. Cumarú	24. Piquiá
5. Bacaba	15. Cupuaçu	25. Medicinal plants
6. Bacuri	16. Cupuaçu-almond	26. Peach palm
7. Rubber	17. Vegetable milk	27. Hog plum
8. Breu-branco	18. Honey	28. Tucumã
9. Buriti	19. Murici	29. Achiote
10. Cocoa-almond	20. Murumuru	30. Uxi

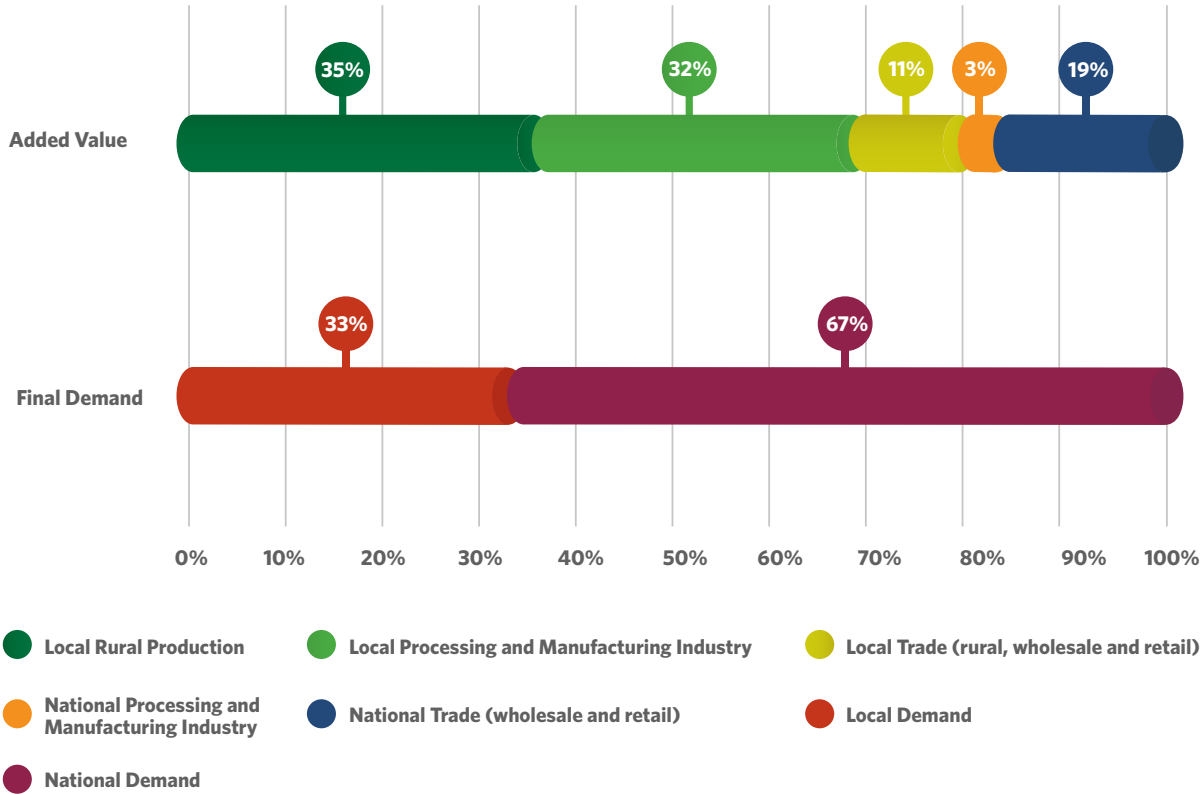
Income generation, employment, and add value to the EcoSocioBio-PA

Knowledge about aggregation value throughout these products' chains and income distribution is fundamental to drafting specific public policies.

The study data showed that between 2006 and 2019, the income generated by the top 30 products grew approximately 8% per year, going from BRL 1 billion in 2006 to BRL 1.9 billion in 2019. In the same year, the Pará's socio-biodiversity bioeconomy value chain generated an income of BRL 5.4 billion, almost three times the value of rural production in the same period.

Of the total amount of BRL 5.4 billion in generated income, 78% remained within Pará's economic chain sectors, and 22% was generated outside the state. The income distribution shows that 35% remained with farmers, 32% in the processing and manufacturing industry, 11% in local trade, 3% in national processing, and 19% in national trade, as described below. Total employment associated with this production reached 224,600 workers, 90% in Pará and 10% outside the state.

Distribution of EcoSocioBio-PA added value and final demand





The Tocantins region was the most important in generating value for the chain: in 2019, it generated an income of BRL 1.7 billion. The production of açaí stands out (95%), followed by Brazil nuts (3%) and cocoa (1%). The Marajó region generated a total income of BRL 1.5 billion, with açaí as the main product, representing 86%, followed by the heart of palm (13%) and Brazil nuts (1%). The Xingu region generated BRL 1.3 billion in income, with emphasis on the production of cocoa-almond (93%), açaí (5%), Brazil nut (1%), and achiote (1%). And the Lower Amazon contributed by generating an income of BRL 220 million, with emphasis on Brazil nuts (82%), açaí (14%), and cupuaçu (1%).

The socio-biodiversity product chains can be long or short. Long chains supply urban and regional areas involving interstate and international transport, thus, having a higher level of regulation and may contribute to income generation beyond the local territory. On the other hand, short chains operate independently, including small and medium production communities and cooperatives, have fewer intermediaries until the final consumer, and are essential to local health and food security.

EcoSocioBio-PA products differ between those with an external demand greater than 50%, predominantly long-chain products, and those with a local demand greater than 50%, characterized as short chains. Below are the characteristics of these two chains and information on the main products analyzed.

External-sales high demand products: long chains

From the 30 products analyzed, ten have a higher external demand than local demand: açaí, cocoa-almond, Brazil nut, the heart of palm, rubber, tucumã, cupuaçu-almond, cumaru, murumuru, and Brazil nut oil. Those products, which make up the long chains and cross Pará state borders, generated an income of BRL 5.2 billion in 2019, equivalent to 96% of the EcoSocioBio-PA.

Among the products with the greatest added value is the heart of palm, followed by Brazil nut, cupuaçu-almond, açaí, cocoa-almond, and rubber. We highlighted below the most relevant products in income generation in 2019.

Most relevant long-chain products in terms of income generation and added value in 2019 

Heart of palm



It generated a total income of **BRL 89.1 million**, 10.6 times the original rural production market value. It has the most important aggregation value (965%) among the products analyzed. Demand distribution was 90% in the external market and only 10% in the internal market. The rural production sector absorbs only 9% of the total income generated.

Açaí



It generated an income of **BRL 3.7 million**, 2.8 times the original rural production market value. Demand distribution was 54% in the external market and 46% in the internal market. Value is added (191%) at different links in the chain but with greater importance in pulp processing companies that supply local markets (27.3% of the total income generated).

Cocoa-almond



It generated an income of **BRL 1.3 billion**, 2.4 times the original rural production market value, 61% of the income generated was absorbed in Pará and 39% in the national market, 9% by national industry, and 30% by national trade. Demand is entirely external.

Brazil nut



It generated an income of **BRL 140.2 million**, 8.7 times the original rural production market value. Demand is almost entirely from the external consumer market. The rural production sector absorbs 11% of the income generated, and the local processing and manufacturing sectors reach 79%.

Rubber

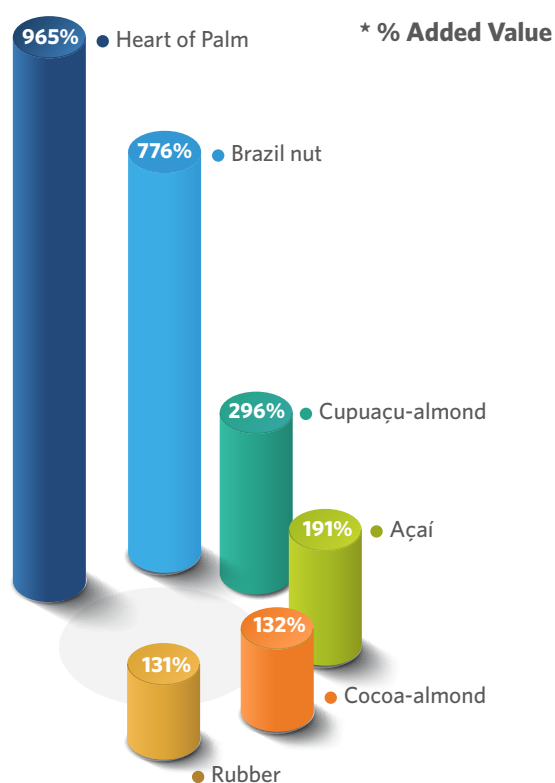


It generated a total of **BRL 4.9 million**, 2.3 times the original rural production market value. The rural production sector absorbs 43% of that income, and the local processing and manufacturing sectors reach 57%. Demand is 100% from the external consumer market.

Cupuaçu-almond



It generated an income of **BRL 1.2 million**, four times the original rural production market value. Demand is 100% from the external market. The rural production sector absorbs only 25% of the total income generated, and the local processing and manufacturing sectors reach 55%.



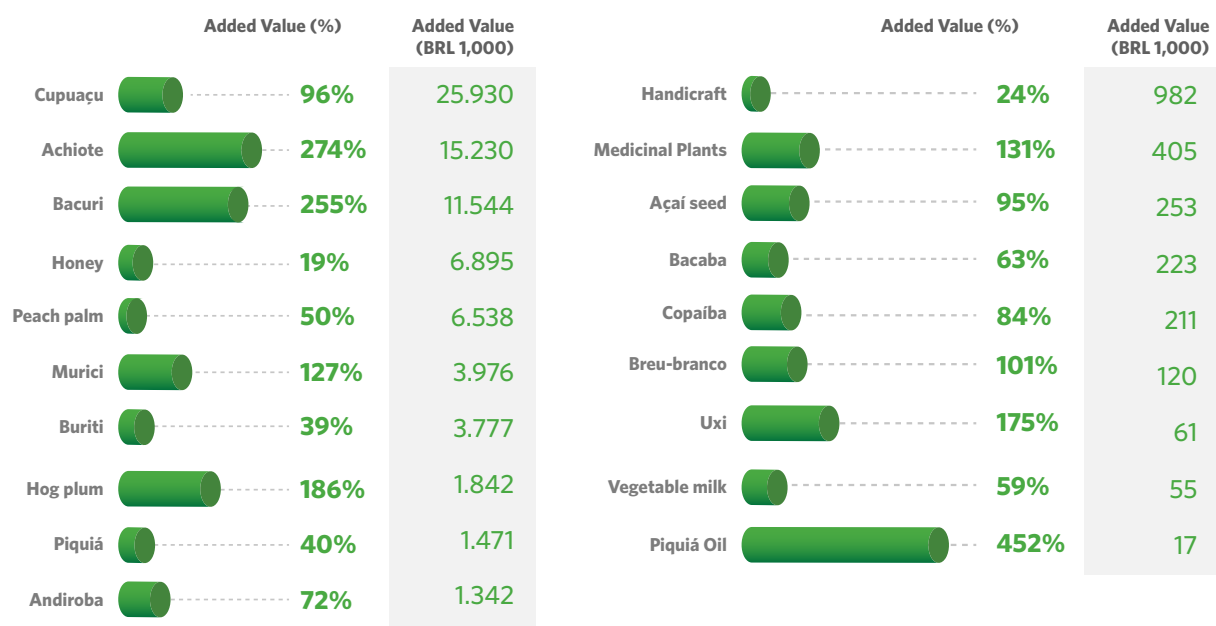
Based on the results analyzed, we recommend that policies should aim at structuring cooperation markets and investments in science, technology, and innovation. Those actions will help develop the local processing and manufacturing industry and create specific tax policies for high-demand products (see Recommendation Axis 1, Recommendation Axis 2, and Recommendation Axis 6).

Products with high local demand: short chains

From the 30 products analyzed, the study showed that the 20 most consumed within the state generated an income of BRL 81.9 million in 2019.

Cupuaçu leads this group of products' income generation, followed by achiote and bacuri, which generated BRL 25.9 million, BRL 15.2 million, and BRL 11.5 million, respectively, as shown below:

Added value (BRL thousand) and added value percentage (%) of short-chain products



Compared to long-chain products, short-chain ones have an important share of the income generated locally, with greater absorption by rural producers. With an emphasis on honey, handicrafts, buriti, piquiá, and peach palm, whose total income from the chain is absorbed by rural producers in 84%, 81%, 72%, 71%, and 67%, respectively.

Therefore, we observe that short-chain products are important to strengthening the local economy. The continuous development of a database system for those chains is necessary so that stakeholders can quantify the income generation in the local economy to assist in designing appropriate public policies (see Recommendation Axis 1, Recommendation Axis 2, and Recommendation Axis 3).

Climate regulation of production territories: carbon stock

Since carbon is an important indicator to tackle climate change, the study also addressed climate regulation services, such as average carbon stock per hectare, associated with EcoSocioBio-PA production structures and priority regions. The goal is to show the importance of the areas in forest conservation and the paramount role of traditional communities, Quilombolas, and Indigenous Peoples in conserving native vegetation.

The figure below shows that Indigenous Lands, Agro-extractivist settlements, and Quilombola territories have a higher average carbon stock per hectare than private rural properties.

Carbon Stock per Hectare (ton C/ha)

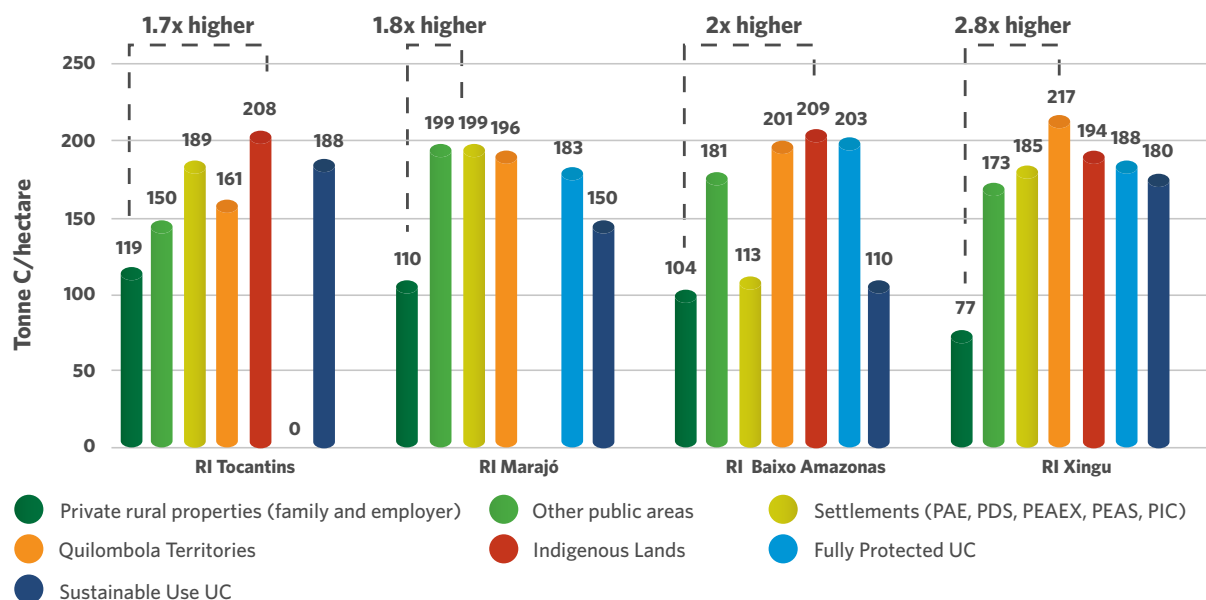


Tocantins: With a stock of 208 tons C/ha, Indigenous Lands conserve 1.7 times more carbon stock than private rural properties, with 119 tons C/ha.

Marajó: With a stock of 199 tons C/ha, Agro-extractivist settlements conserve 1.8 times more carbon stock than private rural properties, with 110 tons C/ha.

Lower Amazon: With a stock of 209 tons C/ha, Indigenous Lands conserve two times more carbon stock than private rural properties, with 104 tons C/ha.

Xingu: With a stock of 217 tons C/ha, Quilombola territories conserve 2.8 times more carbon stock than private rural properties, with 77 tons C/ha.




Given the important role played by traditional peoples in conserving the standing forest and the high average carbon stock per area, it is essential to implement land policies that bring legal security rights to indigenous peoples, quilombolas and to the local communities, from the demarcation and titling of their lands, stimulating the bioeconomy of sociobiodiversity, based on conservation principles.


In addition, compensation mechanisms for ecosystem services need to be developed, implementing financial instruments such as Payment for Environmental Services (PES) - (see Recommendation Axis 3, Recommendation Axis 4, and Recommendation Axis 5).

Future scenarios with the implementation of carbon pricing policies and cost reduction in processing and manufacturing


We know that socio-biodiversity's bioeconomy has enormous potential for growth and wealth generation in Brazil. Hence, the study developed three scenarios to predict potential future economic revenue of socio-biodiversity product chains by 2040. It is important to point out that scenario 1 applies the trend evolution of product quantity and price. In contrast, scenarios 2 and 3 aim to complement scenario 1, based on incorporating public policies, as described below.



► **Scenario 1:** Trend evolution of price and quantity index, considering historical time series from 2006 to 2019.



► **Scenario 2:** Cost reduction policy between the rural-production sector and local processing and manufacturing links and redistribution of the added value from the national to the local economy.



► **Scenario 3:** Carbon pricing policy, implementing a payment instrument for the social benefit of the carbon stored in production areas of socio-biodiversity products.

We applied economic projection to 10 products value chains: açaí, brazil nuts, heart of palm, honey, cupuaçu, buriti, cocoa, copaiba, andiroba, and cumaru. Below are the results for the two products considered strategic by EcoSocioBio-PA: Açaí and cocoa-almond.

Projected scenarios for the açaí chain

► **Scenario 1:**

With the trend evolution of price and quantity produced, the estimated added value in 2040 is **BRL 109.3 billion**, and the estimated quantity produced is **1.2 million tons**, with average **production** growth of **3% a year**.

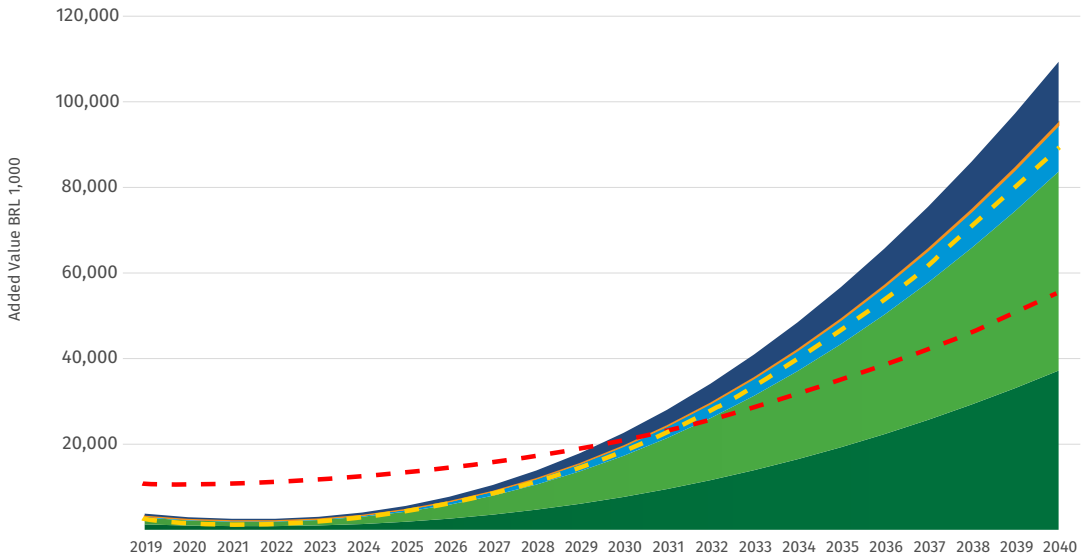
► **Scenario 2:**

With the cost reduction and added value redistribution policy, the total income absorbed by the local rural processing sector increases from **13% to 20%** and from **15% to 28%** by the industrial sector in urban centers. Due to the added value redistribution, the national sector share **drops from 13% to 9%**.

► **Scenario 3:**

The estimated added value of the carbon pricing policy is **BRL 55.5 billion** in 2040. On the other hand, the share of the value generated in the local rural production sector increases from **31% to 43%**, with greater income absorption in the first link of the chain.

Projection of the added value in the açaí chain by scenario by 2040



- National Trade (Scenario 1)
- National Processing and Manufacturing Industry (Scenario 1)
- Local Trade (Scenario 1)
- Local Processing and Manufacturing Industry (Scenario 1)
- Local Rural Production (Scenario 1)
- Local Processing and Manufacturing Industry with Cost Reduction and Added Value Redistribution (Scenario 2)
- Local Rural Production with Carbon Pricing (Scenario 3)

Projected scenarios for the cocoa-almond chain

► Scenario 1:

With the trend evolution of price and quantity produced, the estimated added value in 2040 is of **BRL 59.8 billion**, and the estimated quantity produced is **524.4** thousands of **tons with average production growth of 20% a year.**

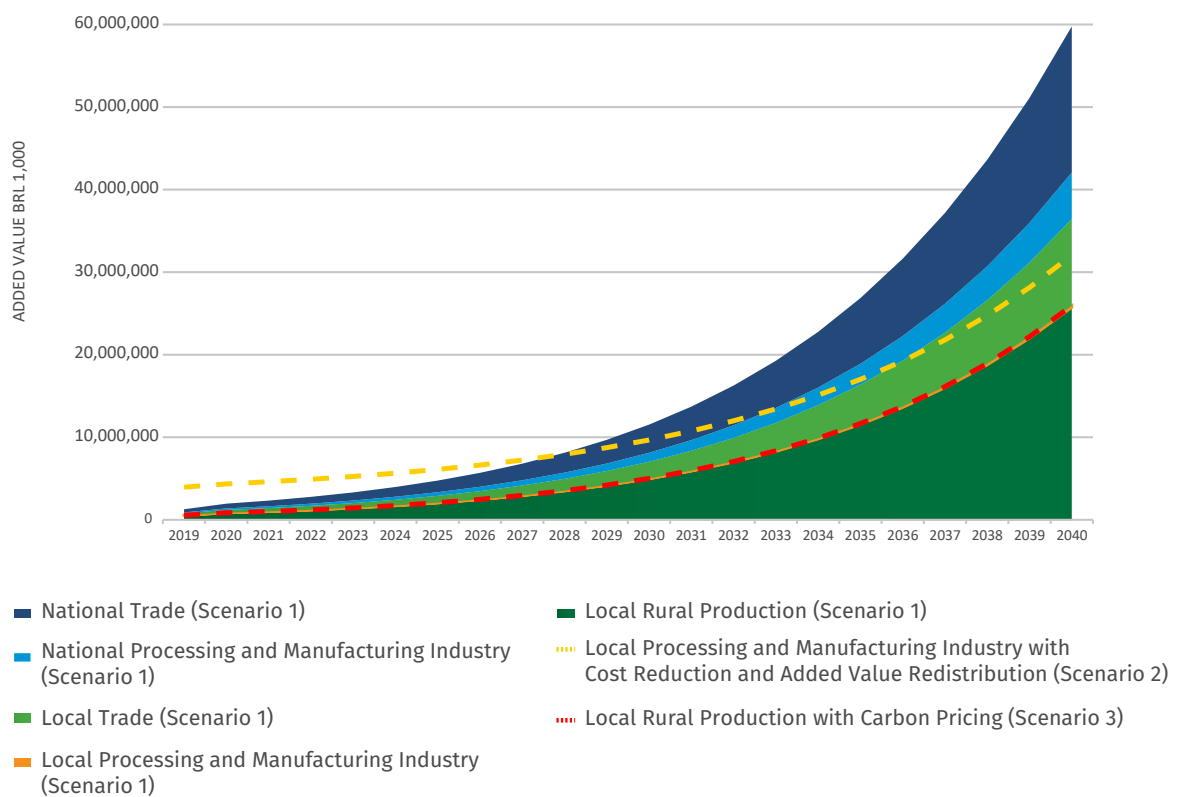
► Scenario 2:

With the cost reduction and added-value redistribution policy, the income share in national retail falls from **29.6% to 24.3%**, while the processing sectors grow little, **only 0.4%**. Therefore, measures adopted in this proportion are of low magnitude.

► Scenario 3:

The estimated added value of the carbon pricing policy is **BRL 32 billion in 2040**. The share of the value generated in the local rural production sector increases from **43% to 48%**, with greater income absorption in the first link of the chain.

Projection of the added value in the cocoa-almond chain by scenario by 2040



The projected scenarios estimated a potential income of up to BRL 170 billion in 2040, that is, 30 times higher than the current revenue.

Public policy gaps of the socio-biodiversity product chains

The study's results show that strengthening socio-biodiversity's bioeconomy is not just an extremely profitable investment for the local economy but also important for the conservation of the Amazon Forest. Developing chains like socio-biodiversity, which value the standing forest, is the main driver of reducing deforestation and social inequalities and generating revenue in the Amazon region.

However, we identified gaps and institutional asymmetries that weaken the organization of the agents in the EcoSocioBio-PA product value chain, highlighted below.



Lack of a continuous **database** on agents and production territories of the entire socio-biodiversity product value chain linked to the production territory;



Lack of a pricing and **payment policy for carbon stock and avoided emissions**, which would add value to socio-biodiversity products generated in common-use territories;



Lack of **investment and tax incentives in the different links in the chains**, especially between the production link and the local processing and manufacturing sector;



Insufficient and unequal **access to credit**, with employer agriculture getting 22% of production's gross value, while family agriculture gets only 5%;



Insufficient **technical assistance**, reaching only 4% of family farms, while 13% of employer farms received assistance;



Lack of **land security** right in common-use territories; recognition, protection, and issuance of legal deeds for those lands are needed;



Lack of **financial mechanisms** to remunerate environmental services that would make it possible to add value to socio-biodiversity products.

Public policy recommendations for socio-biodiversity's bioeconomy

The study's results and the identified gaps provided information for recommendations to strengthen the socio-biodiversity product chains in Pará. The recommendations are presented in six major state public policy axis. They are:



- › **Axis 1: Rural development policies:** Science, Technology and Innovation (CT&I), credit and technical assistance. Such policies must address the demands of traditional communities, Indigenous Peoples, and family agriculture based on Agroforestry Systems, targeting broader and more integrated ecological processes, even if they require longer deadlines for obtaining results. Income generation throughout the development of socio-biodiversity chains produces longer-lasting and more sustainable results.
- › **Axis 2: Development of a continuous and integrated database system of products value chains.** Given the gap in official statistics on the different links of the socio-biodiversity value chain and the relevance of those sectors for creating jobs and generating income in the local economy (rural and urban centers), we suggest developing a continuous database system. The platform should provide information on the different socio-biodiversity product value chain links based on production territories. properly.
- › **Axis 3: Land policies for regularization of common use territories.** Traditional peoples and areas with the potential to develop socio-biodiversity product chains should be favored. Priority should be given to land security right and territorial planning by recognizing the rights of Indigenous Peoples, Quilombola, and traditional communities.
- › **Axis 4: Development of financial mechanisms, such as Payment for Environmental Services (PES).** Institutionalization of environmental services pricing via product-producer PES, linking the environmental service provided by forest conservation to the product and the producer in the value chain.
- › **Axis 5: Traceability and certification system for environmental services.** We recommend establishing certification seals for environmental services to complement the PES economic instrument. That would verify the origin of products and their sustainability, adding value to the chain.
- › **Axis 6: Tax policy for redistributing income generated by the products.** Development of a tax incentive for socio-biodiversity products traded within the state of Pará, applying a special rate for interstate trade operations and exports to other countries, as those are specific products linked to the biome's biodiversity.



Masthead

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