



BIOECONOMY AND INFRASTRUCTURE IN AMAZON

STATE-OF-THE-ART ANALYSIS AND CASE
STUDIES ON INFRASTRUCTURE IN BRAZIL

Consolidation of results and way forward

WWF-Brazil and FGVces together
in the generation of knowledge
on the financing and typologies
of infrastructure – for and with
people – in the Brazilian Amazon.

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WWF-BRASIL

Sobre o estudo

Project

Bioeconomia e Infraestrutura na Amazônia
(Análise do estado da arte e estudo de casos sobre infraestrutura no Brasil)

Support

WWF-Brasil

Alexandre Prado
Alexandre Gross
Cássio Bernardino

Production

Centro de Estudos em Sustentabilidade. Escola de
Administração de Empresas de São Paulo.
Fundação Getulio Vargas (FGVces). 2021.

General coordination

Mario Monzoni

Program coordination

Annelise Vendramini
Daniela Gomes

Technical team

Gustavo Velloso Breviglieri
Camila Yamahaki
Carolina Derivi
Lucas Tacara Xavier
Samuel Mello
Victoria Kang

Layout and Image Treatment

Ludmila Sun Li

Cover Photograph

Coco Bounty / Shutterstock

Design por WWF-Brasil

WWF-Brasil: CLS. 114 Bloco D 35 CEP: 70377-540 Asa Sul, Brasília/DF

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EXECUTIVE SUMMARY

Based on the recognition that the “traditional” view of infrastructure and its implementation in the Amazonian territory resulted in major adverse socio-environmental impacts and contributed little to the economic and social development of the region, this research project sought to promote a positive discussion about the economic future of the region. Amazon. Thus, the study had as main objectives:

In addition to bibliographic research, between May and October 2021, 33 interviews¹ were carried out with representatives of cooperatives and associations present in the Amazon region, companies that purchase sustainable production chains, civil society organizations involved in these chains and financial sector actors (such as assets and impact investors) who invest or are interested in investing in businesses in the Amazon region.

¹ In total, eight interviews during Activity 2, 15 interviews during Activity 3 and ten interviews during Activity 4.

The research results are summarized in a [Flowchart](#) and briefly summarized below.

TABLE 1 - HISTORY OF LARGE INFRASTRUCTURE PROJECTS IN THE AMAZON

- Large energy, transport and logistics projects in Brazil and the Amazon continue to exert a decisive influence on migratory movements and the use and occupation of space, configuring a key challenge for the ambitions of environmental conservation and the protection of human rights. Also today, as before, expectations of social progress at the scale of territories and regions remain largely frustrated, due to the non-confluence of other productive and governance factors that could alter this typical trajectory.
- Therefore, the traditional practices of implementing infrastructure in the Amazon region were not able to provide economic development and well-being to local populations, in addition to favoring environmental degradation and social inequalities.
- Thus, the need to find a new model of action for the public sector in the region is identified, with policies that offer conditions for attracting financial resources to finance an infrastructure for the Amazon, as well as for the development of sustainable productive activities in the region, to be supported by such infrastructure, and generation of wealth for local communities.

Source: Preliminary Report 1: Bioeconomy and Infrastructure in the Amazon: historical contextualization and mapping of concepts, actors and relevant cases.

TABLE 2 - MAPPING OF CONCEPTS RELATED TO BIOECONOMY

Bioeconomy typology of the Bioeconomy Group of the Concertation for the Amazon (2021), distinguishing possible fronts for promoting the bioeconomy:

- **“Traditional” bioeconomy:** based on biodiversity, with activities related to extractivism, neo-extractivism and self-consumption agriculture. The degree of anthropization and the volume of production are low, with high dependence on biodiversity and contribution to its maintenance.
- **Forest bioeconomy:** based on forest management, with silviculture of native forests. The degree of anthropization and the volume of production are medium.
- **Commodity bioeconomy:** based on intensive production of planted forests and commercial agriculture. The degree of anthropization and the volume of production are high, with low dependence on biodiversity.

Amazon 4.0: term often used by scientist Carlos Nobre to refer to a development model for the Amazon region that reconciles current scientific-technological innovations – in particular the new technologies associated with the fourth industrial revolution – with the knowledge of forest peoples (Arapyaú, 2021).

Third Way of the Amazon: paradigm based on the idea of a standing forest bioeconomy that values biodiversity and the work of local communities (Nobre & Nobre, 2019).

Economy of knowledge of nature: presupposes three basic conditions for Brazil to transform its biodiversity into a source of development: avoiding the destruction of the greatest biodiversity on the planet; recognize the role of traditional populations and their activities as cultural wealth and civilizational and ethical value; and scientifically know biodiversity (Abramovay, 2019).

Source: Preliminary Report 1: Bioeconomy and Infrastructure in the Amazon: historical contextualization and mapping of concepts, actors and relevant cases.



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Table 1 - Heavy infrastructure found in the case studies

State	Case Study	Transport and logistics	Electricity	Telecommunications	Sanitation	Agribusiness and processing
AP	Açaí 1	It has its own boat with a cold chamber for the storage of açaí, which is very perishable	Poor power situation. Almost 25 days a month without power in the region.	There is internet access. In the morning the connection is better	There is no access to sanitation. Water quality is an issue. With sea level rising, river water is turning brackish	Finishing works in its agribusiness to carry out the processing of açaí
	Castanha 1	Logistics in the region is entirely done by river, which makes it difficult for other activities that could benefit from the opening of roads to enter.	No access to the electricity grid. Supply by diesel generator	There are regions with good and medium connections. Radio communication with chestnut pickers	There is a water treatment plant, built as compensation for environmental impacts	Chestnut processing in a micro-mill for oil extraction. Building a new industry in progress
AM	Pirarucu 1	Logistics by boats and ferries, with cold rooms	Poor access to energy. As it is a floodplain area, it is not possible to install electricity posts	There are very few internet access points. Factor restricts direct contact with potential buyers and favors the performance of middlemen	There is a water treatment plant, which was built as compensation for environmental impacts	Created a floating fish pre-processing unit powered by solar energy
	Açaí 2	As it is a factory ferry, the logistics are riverside. There is a cold room and physical-chemical and microbiological laboratories	The vessel has solar panels, B-box battery packs and diesel generators to complement solar power generation.	The factory ferry has satellite 24 hours a day. To communicate with communities, researchers visit communities before the ferry arrives. In the past, it worked exclusively with long-range radio	Technology used by the UN: water filters on the ferry have a processing capacity of 240,000 liters per day. Water collected from the river and returned treated after use	The ferry has the capacity to process 20 tons of fruit and 12 tons of frozen pulp per day, in addition to storing 300 tons in its refrigeration chamber.
	Pirarucu 2	Use of a small boat with refrigeration, insufficient for current demand. Donor considering purchase of new vessel	There is electricity, but it is very subject to bad weather that causes power outages for days. Diesel engine power in other communities	In the past, it worked exclusively with long-range radio communication. Today, satellite internet systems are being installed	Each residence received a septic tank and a bathroom. It also implemented systems for pumping water from wells or rivers with solar energy	Finishing the construction of a fish warehouse, where the arapaima will be processed. Objective of having arapaima distribution center in Manaus. Need for an ice factory
MT	Castanha 2	From the forest to the headquarters/factory, motorcycles and tractors to assist in the collection. Part of the trips are made by boat. From headquarters to customers, by trucks	All residences in the settlement and in the surrounding villages have access to electricity, the latter due to the Luz Para Todos Program.	Internet available in virtually every village. Although the quality is not good, it allows communication through messaging applications, such as WhatsApp	There is no basic sanitation in the region. The inhabitants use water from artesian wells	It has a factory for the processing of nuts (press and filters), acquired with the support of donors
PA	Diversos 1	Transport of products is done by highways. For export, the products are taken to the Port of Vila do Conde in Barcarena	All cooperative members have access to central electricity	All cooperative members have low-quality Internet access	Use of water from artesian wells and do not rely on piped water. There is treatment of effluents in the agribusiness.	Own agribusiness with diversified production
	Madeira 1	Wooden logs are delivered to the central patio and customers are transported. There is public transport to the communities near BR-163	Most residents already have access to electricity.	Low-quality Internet and community members seek to install it with their own resources	In the accommodation, there is potable water and a cesspool system. In the population area, most do not have access to sanitation	There is a sawmill, which was installed with resources from the Amazon Fund
	Diversos 2	Sometimes shipping costs more than the product itself. Transport is irregular (there are times when transport is unfeasible).	Electricity access exists for domestic use, but it is very costly	Many suppliers do not have internet access, even in regions close to Belém	Sanitation structure is precarious even in Belém	—

Note: the cases were anonymized and named illustratively based on the production chain in which they are most active. Only those cases that are located in the region and offer bioeconomy products were included in the table.

Source: Preliminary Report 2: Bioeconomy and Infrastructure in the Amazon: case studies on bioeconomy and infrastructure for a new economy in the Amazon.

Table 2 - Light infrastructure found in the case studies

UF	Estudo de caso	Transporte e logístico	Energia Elétrica	Telecomunicações	Saneamento	Agroindústria e beneficiamento
AP	Açaí 1	FSC certification of sustainable management, agroindustry chain of custody, ecosystem services, vegan certification and final phase of organic certification	Partnership with a federal university to offer technical courses on food in communities	Low level of education of managers, with some exceptions	–	–
	Castanha 1	–	The client offers constant technical support, with training, courses on occupational safety and the environment and logistical support	–	–	Customer advances 30% of the value of the contracted crop. Non-profit organization finances working capital at reduced interest
AM	Pirarucu 1	–	Management methodology has influenced management in other states and countries	–	–	–
	Açaí 2	It is possible to track the açaí, due to the direct purchase	Company intends to offer training courses to qualify extractivist riverside dwellers	–	Low degree of bankarization of producers limits the purchase of only those who receive government aid and, therefore, have a bank account	–
	Pirarucu 2	–	Already carried out visits in the case study "Pirarucu1" and hired its technical experts. Employees have certificates from these courses.	Adequate managerial skills	–	Based on a donation from an international agency, created a working capital fund
MT	Castanha 2	Organic certification. Helps attract larger customers	Partnership with anchor customer, which promotes exchanges between oil suppliers. Machinery training offered by manufacturers	–	–	Customer offers up to 30% advance payment for contracted production. An international organization made a donation to create a rotating fund for working capital
PA	Diversos 1	Process for obtaining ISO 22,000 certification, required by the export market	–	Good management helped cope with the pandemic	There are several banks in the municipality where the head office is located	–
	Mdeira 1	FSC certification, although the domestic market does not offer higher prices for the certified product (support from the Imaflora Social Fund)	New members undergo theoretical training together with forestry engineers from the cooperative and are referred for practical training in management activities	Non-profit organization assisted in the cooperative's long-term strategic planning process	Payment to managers is made based on productivity and mostly in cash.	–
	Diversos 2	They do not have certification. In the process of obtaining the System B seal and FSSC 22000 certification	Creation of its own program for training suppliers with support for formalization and technical assistance for planting cassava in an agroforestry system	–	All providers have access to banking services, facilitated by digital banks (less bureaucracy and less complex services offered)	–

Note: the cases were anonymized and named illustratively based on the production chain in which they are most active. Only those cases that are located in the region and offer bioeconomy products were included in the table. Source:

Preliminary Report 2: Bioeconomy and Infrastructure in the Amazon: case studies on bioeconomy and infrastructure for a new economy in the Amazon.

IDENTIFICATION OF BARRIERS TO FINANCING SUPPORTING INFRASTRUCTURE FOR THE BIOECONOMY

The eight private financial sector actors interviewed³ reported not investing or financing infrastructure to support the bioeconomy in the region, while three mentioned investing in businesses in or related to the Amazon and three said they intend to invest or continue to invest in businesses in the Amazon.

Regarding the difficulties to invest in business in the Amazon region, they reported:

- **Perception of risk:** Investors have the perception that it is much riskier to invest in the Amazon region than in other regions of the country. Many say they would rather donate to the region than become a partner in a business in the Amazon.
- **Regulatory and legal issues:** The investor observes an environment of legal uncertainty in the region, such as the lack of land tenure regularization and lack of timber inspection. One of the investors commented on the difficulty of acquiring land with regularized title and that has been legally deforested.
- **Formation of an investment pipeline:** The investor has difficulty finding businesses that meet their prerequisites, such as professional management and audited financial statements. One of the interviewees commented that the latter has made it difficult to form a pipeline and considers making the criterion more flexible.
- **Knowledge of the region:** The investor has little knowledge of the Amazon region and its operational challenges.
- **Restricted mandates:** Some managers have little flexibility in their investment mandates to invest in businesses in the Amazon region, generally with a lower degree of maturity and smaller size.

On the other hand, interviewees also mentioned levers of investments in the Amazon region:

- **Carbon market:** The development of a carbon market, regulated or voluntary, could offer greater liquidity in carbon credits and greater stability in the price of carbon, enabling investments in the Amazon, for example, in forest restoration.
- **ESG agenda⁴:** Strengthening investors' ESG agendas can promote investments in the Amazon region as they seek to mitigate their greenhouse gas emissions.

- **Legal Enforcement:** The application/compliance with environmental legislation could favor the development of the sustainable wood **management market in the Amazon**.
- **Investments via debts:** Investments via debts can favor investments in the Amazon as they do not generate co-liability for the financed venture, as in the case of investments via equity.

PROJECT RECOMMENDATIONS AND FUTURE STUDIES

Based on the survey results, the following opportunities for future studies and projects were listed:

- Categorization of types of infrastructure with a focus on the Amazon region⁵;
- Assessment and prioritization of the types of infrastructure that would have the greatest positive impact on the development of the bioeconomy in the region;
- Identification of which investors/financiers, public or private, would be most interested in investing in different types of infrastructure to support the bioeconomy, according to their mandates and financial return objectives;
- Application of a temporal “lens”, with classification of which obstacles (opportunities) should be removed (reinforced) at a first moment and those that can be addressed at later moments;
- Identification of synergistic actions to remove certain obstacles or strengthen opportunities, that is, actions that can solve or minimize more than one obstacle together; and
- Creation of recommendations for the promotion of infrastructure in the Amazon⁶.

³ A public bank, which allocates resources from the constitutional fund, and an initiative of private sector actors still in the early stages (of studies) were consulted throughout the Activity, but not included in this Summary.

⁴ Environmental, social and governance.

⁵ This opportunity will be contemplated in a second phase of the partnership between WWF and FGV.

⁶ Same

HOW TO READ THE FLOWCHART

Inspired by the approach pursued in similar studies conducted for the agricultural and energy sectors⁷, the flowchart (below) was built based on the supply and demand for financial resources. On the supply side, the main agents are financial institutions in the financial and capital markets; on the demand side, the productive sector (extractivists, producers, associations, cooperatives and companies).

However, for an infrastructure to support the bioeconomy in the Amazon to be developed, there is a need for the participation of other actors in addition to financial institutions and the productive sector itself. The public sector and, at times, multilateral organizations and donors represent a more patient source of capital, with less (or no) focus on financial returns, which could make a greater contribution by removing the obstacles encountered and/or pursuing the identified opportunities, creating the structural conditions that support the two ends of the flowchart.

The actions that can be taken by the public sector and donors are segmented at different levels⁸:

- **Level 1:** Superstructure (policies, plans, regulations);
- **Level 2:** Heavy or physical infrastructure (transport and logistics, sanitation, electricity, telecommunications);
- **Level 3:** Light or intangible infrastructure (certification, technical and managerial skills, access to banking services and working capital); and
- **Level 4:** Operational issues (inherent in the processes and practices of the financial institutions or the productive sector).

A greater role for the removal of barriers (increased opportunities) by the public sector can be seen as decreasing as the analysis moves away from the higher levels and approaches the base of the flowchart. Greater participation by the private sector can be seen as going the other way. For example, heavy infrastructure tends to be the target of direct provision or public sector concessions, while light infrastructure can be provided by donors and purchasing companies (as noted in the case studies).

Based on the results of the project's activities, different obstacles, motivations and opportunities were then classified into major themes (eg risk perception, strengthening of markets, etc.) and assigned to the most relevant performance levels. The same theme can be found at different levels of action, suggesting that more than one transforming agent can influence it.

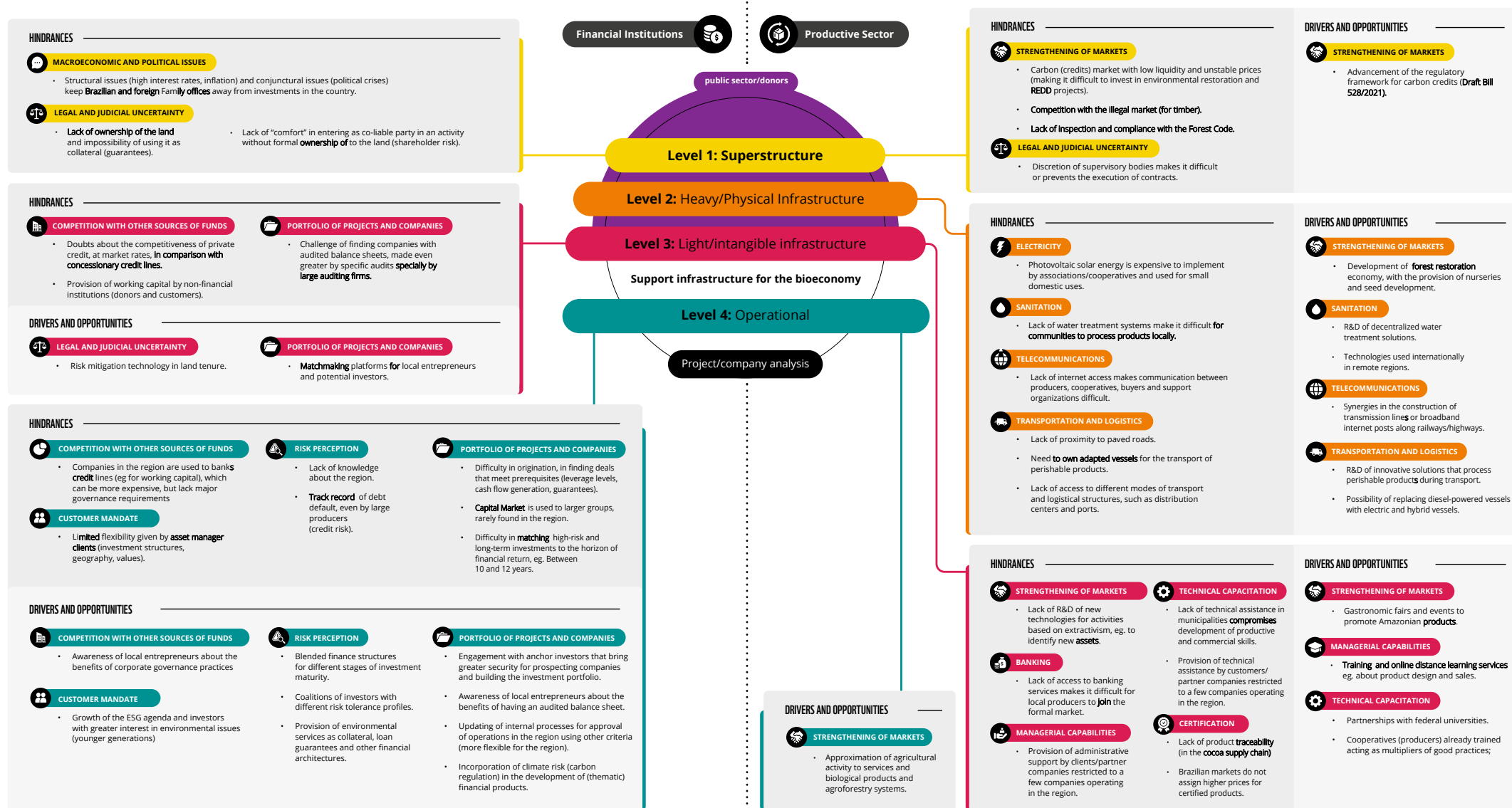
The flowchart is entirely built based on the results of the interviews (and literature review) carried out during the project activities. Although it is possible to consider other factors that explain the apparent mismatch between supply and demand for resources for the development of an infrastructure to support the bioeconomy in the Amazon, the figure is restricted only to those aspects mentioned by the actors consulted.

Thus, a valuable mapping is offered, from the perspectives of more than 30 stakeholders with activity or interest in the Amazon region and in bioeconomy activities, of the challenges to be overcome so that private financial resources can support the development of an infrastructure that supports such activities and, consequently, contribute so that a greater number of projects and companies dedicated to the bioeconomy become economically viable.

⁷ FGVces (2012). How to advance in the financing of the low carbon economy in Brazil: analysis of obstacles and opportunities in the allocation of financial resources to the agriculture and energy sectors.

Available at: <https://bibliotecadigital.fgv.br/dspace/handle/10438/15381>

CHALLENGES AND OPPORTUNITIES IN THE CHANNELLING OF FINANCIAL RESOURCES FOR INFRASTRUCTURE TO SUPPORT THE BIOECONOMY IN AMAZONIA.





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NATURE AND REDUCE THE
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