



The Pride of Pará: Açai

*A Case Study Unveiling an Amazonian Value Chain and
Its Many Narratives*

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“O açaí, vive do açaí...”

- Miguel (2024)

(Açaí lives on açaí)

Colophon

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Never did I imagine I would have the privilege of conducting research in the Brazilian Amazon. For some years now, I had a dream of visiting the Amazon. My passion for adventure, exploring new cultures and how prof. Richard van der Hoff, my host supervisor once noted “my wanderlust for adventure”, brought me to Belo Horizonte, Brazil. Little did I know how this thesis journey would impact me personally – though in retrospect, how could it not? This work was made possible only through the generous help of many kind people. During my four months in Brazil, I have met many inspiring people, who went above and beyond to make Brazil feel like home. Well, they sure did.

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Throughout this thesis you will encounter diverse narratives about açaí and its cultural significance to various locals in and around the Amazon. I have also included some of my own experiences in story boxes throughout the chapters. While these personal narratives may not be academic in nature, they will help readers understand the perspective through which I wrote this thesis, as these experiences eventually shaped my research lens.

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Abstract

This thesis investigates the governance dynamics of the açai value chain in the Brazilian state of Pará, examining how different actors shape the sustainable development of this non-timber forest product within the Amazonian bioeconomy. Using the Policy Arrangement Approach (PAA) as a theoretical framework, the research analyzes how actors, resources, rules, and discourses interact to shape the açai value chain. Açai is an indigenous fruit that grows naturally in the Amazon. The berry forms a staple part of the daily diet for many local communities in the Brazilian Amazon and is traditionally consumed during lunch and dinner but has recently made its way to global markets.

The methodology employed a mixed-methods approach combining semi-structured interviews with value chain actors and personal observations during ten days of immersive fieldwork in Pará, and desk research.

Through desk research and fieldwork in Belém, Abaetetuba, and the remote community of Curalinho, the research reveals two interconnected yet distinct value chain pathways: a traditional extractive chain characterized by informal trade and local community practices, and a more formalized cultivation-focused chain driven by market demands. A significant finding is the lack of certification and regulation across the açai value chain, creating an 'institutional gap' increasingly filled by private actors. In the absence of state oversight, agribusinesses have implemented certification systems that, while promoting sustainability, often create high barriers for small producers and reinforce existing power asymmetries.

The research identified two competing discourse coalitions regarding sustainable açai production. The first, primarily comprising agribusinesses and (some) research centers, advocates for domestication and cultivation as necessary for bioeconomy development. The second, including local communities, local cooperatives, and NGOs, emphasizes traditional extraction methods as inherently sustainable. Both claim to support sustainable development but define it differently, reflecting tensions between scaling production and maintaining traditional practices.

The analysis demonstrates how the evolution of policy arrangements in the açai value chain reflects broader challenges in developing the Amazonian bioeconomy. While bioeconomy discourses promise inclusive sustainable development, the actual policy arrangements that have emerged often reinforce existing power imbalances and resource inequalities.

Key words: *Policy Arrangement Approach, Bioeconomy, Açai Value Chain, The Amazon, Private Certification Schemes*

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1. Introduction

1.1. Background

Understanding land use (LU) and land use cover change (LUCC) has been a global research imperative for decades (Angelsen & Kaimowitz, 1999; Geist & Lambin, 2002; Silva et al., 2023). The rate and spatial extent of human disturbance to the Earth's land surface is unprecedented (Boström et al., 2018; Díaz et al., 2019), and LU and LUCC are considered the most important reflections of this disturbance (Ferraz et al., 2007). After World War II, a first wave of LUCC was triggered by technological and political developments. Countries in both Asia and the Americas were deforested for LU (Rudel et al., 2009). Since the 1980s, deforestation has been a major concern in both developed and tropical countries. Numerous attempts have been made to understand the drivers and impacts of deforestation (Amelung & Diehl, 1992; Geist & Lambin, 2001; Lovejoy & Nobre, 2019; Robinson, 2004; Walker, 1987;), yet scientists have been debating the drivers of deforestation for decades (Allen & Barnes, 1985; Geist & Lambin, 2002; West & Fearnside, 2021). According to Geist & Lambin (2001, 2002), two broad strands have emerged in the literature since the 1980s, which are by no means exhaustive. The first explanation of tropical deforestation suggests that proximate causes such as changes in agricultural practices or population growth and urbanization are primarily responsible for deforestation (Amelung & Diehl, 1992; Myers, 1993; Wright & Muller-Landau, 2006). The second explanation suggests that there are multiple causes and underlying drivers of deforestation, with no clear pattern between these causes and deforestation, often depending on complex socioeconomic dimensions (Walker, 1987; Rudel & Roper, 1997; Rudel, 2006; Fisher & Christopher, 2007). Although the debate continues as to whether deforestation has proximate causal explanations (Wright & Muller-Landau, 2006) or multiple underlying drivers (Rudel, 2006), other researchers have attempted to map both single and multiple causal explanations for deforestation (Angelsen & Kaimowitz, 1999; Rudel et al., 2009). These researchers point to the importance of socioeconomic dimensions, location, and historical period in explaining deforestation. Initially, deforestation in both Latin America and parts of Southeast Asia was mainly driven by state-owned smallholders, but this has changed over the years. Since the early 2000s, deforestation has been driven more by large companies than by smallholders (Rudel, 2006; Rudel, 2007; Rudel et al., 2009). As noted above, the drivers of deforestation vary by continent. In Latin America, there is broad consensus that the expansion of cropland and pasture is a major driver of deforestation (Kant & Redantz, 1997; Malhi et al., 2008). The functioning of the Amazon and its deforestation has been a major research focus for decades (Betts et al., 2008; Ewers et al., 2008; Lovejoy & Nobre, 2019; Ometto et al., 2011; Fearnside 1983, 2005, 2017). Several scholars focus their research on the Brazilian Amazon, as Brazil is one of the countries that suffered most tropical forest loss in the world (Ewers et al., 2008; Malhi et al., 2008; Rudel et al., 2009). In recent decades, the Amazon biomes have suffered constant fires and severe deforestation, causing environmental problems (Amigo, 2020; Laurance et al., 2011; Silva et al., 2023). This deforestation is caused by several factors, such as industrial logging, large-scale agriculture, oil and gas developments and the building of proliferating roads (Laurance et al., 2011; Silva et al., 2023).

Main drivers for the causes of this deforestation are: (a) benefits of the use of the land in the Amazon, such as increases in price of land or increase in the price of timber; (b) public policies and credit, such as the availability to cheap credit; (c) accessibility, such as the construction of highways that facilitate access

to (new) frontier areas and; (d) macroeconomics, such as population growth (Reydon et al., 2020; Fearnside, 2017).

For many years now, programs and policies have been featured on (inter)national political agendas to reduce deforestation rates in the Brazilian Amazon (Simonet et al., 2019). The National Policy on Climate Change (PNMC – Política Nacional Sobre Mudança do Clima), established in 2009, is one of those policies. The PNMC was committed to reducing the much-disputed deforestation rate in the Amazon by 80% by 2020 in comparing to 2009 (Silva Junior et al., 2020). However, deforestation rates have been rising from 2013, resulting in a 182% higher deforestation rate in 2020 than the established target in 2009. The Brazilian Amazon Monitoring Program estimated a deforestation of 11,088 km² in 2020, making it respectively the highest number in the decade (Silva Junior et al., 2020). Deforestation of the Amazon is critical on a global scale, as tropical regions play an important role in the global carbon budget. The Brazilian Amazon alone stores more carbon dioxide than human-induced greenhouse gas (GHG) emissions over an entire decade (Fearnside, 2005; Ometto et al., 2011).

Furthermore, continued deforestation and degradation of the Amazon will lead to staggering losses of biodiversity, carbon, and, in turn, human well-being (Lovejoy & Nobre, 2019). If greenhouse gas emissions continue to rise, millions of people, animals and species will be at the mercy of rising sea levels, heat waves, droughts or floods. The world is facing the greatest extinction of species since the age of the dinosaurs, in part due to tropical deforestation (IPBES, 2019).

1.2. Research problem

Scholars argue that the Earth has entered a new epoch, the Anthropocene, wherein (some) human activities have become dominant drivers of Earth system changes (Crutzen, 2006; Folke et al., 2021; Steffen et al., 2015). Malhi (2017, p. 78) defines the Anthropocene as follows: *“The core concept that the term is trying to capture, is that human activity is having a dominating presence on the multiple aspects of the natural world and the functioning of the Earth system, and that this has consequences for how we view and interact with the natural world.”* The introduction and use of this concept has sparked extensive debate, with diverse and often conflicting perspectives regarding its implications. Discussions range from framing the Anthropocene as an urgent call to action (Tong et al., 2022) to exploring alternative futures (Cork et al., 2023). However, critical scholarship highlights several critiques on the concept. Crist (2013, p. 130) challenges the term, stating: *“To consider the shadowy repercussions of naming an epoch after ourselves: to consider that this name is neither a useful conceptual move nor an empirical no-brainer, but instead a reflection and reinforcement of the anthropocentric actionable worldview that generated ‘the Anthropocene’—with all its looming emergencies—in the first place.”* Similarly, Di Chiro (2017, p. 489) critiques the Anthropocene for promoting *“neoliberal, individualist, entrepreneurial forms of ‘resilience’, which trade on the notion that if ‘we’ (humans) are all to blame for the climate crisis, then no one is to blame and, therefore, no one is responsible.”* These critiques suggest that the Anthropocene is a contested discursive development, reflecting differing rationales and perspectives. Despite these debates, the Anthropocene is frequently associated with the planetary boundary approach, which seeks to define a "safe operating space" for humanity based on evolving understandings of the Earth system functioning and resilience (Biermann et al., 2017). This framework aims to enable human societies to thrive while respecting planetary boundaries (Biermann et al., 2017).

However, Steffen et al. (2015) and Díaz et al. (2019) emphasize that human societies are currently pushing these boundaries. These scholars argue for more cohesive interactions and integrated knowledge systems between the natural world and human societies to sustain both ecosystems and the contributions of nature to people. In attempt to manage the environmental concerns about the increasingly ecological consequences of human activities and socio-economic concerns about the human development issues, the concept of sustainable development (SD) emerged in the early 80's (Robinson, 2004). The most used formulation of the term 'sustainable development' stems from the World Commission on Environment and Development (the Brundtland Commission) in 1987: "*development that meets the needs of present generations without compromising the ability of future generations to meet their own needs*" (World Commission on Environment, 1987).

However, debates about the meaning of sustainable development in the Global North (GN) are widespread and include and critique the multiple definitions of the concept and therefore provoke different responses (Robinson, 2004; Hopwood et al., 2005; Gibson, 2006). The increased popularity of the concept has sparked an international debate regarding the understanding of human-nature relationships, which is in contrast with the dominant outlook, especially in the GN, that has been based on the view of a separation of the environment from socio-economic issues (Hopwood et al., 2005). One of the many critical stances taken by researchers is how discourses on sustainable development are perceived in the Global South (GS) and how discourses in the GS might differ from previously developed theories on sustainable development in the GN (Vanhulst & Beling, 2014; Bull et al., 2018; Inoue, 2018).

Since the 1980s, researchers have been calling for (agro)economic systems to include long-term benefits for populations of local regions, including agronomic sustainability, social sustainability, and opportunities to achieve self-reliance (Fearnside, 1983; Angelsen & Kaimowitz, 1999; Carrero & Fearnside, 2011). Scholars argue that conventional agricultural activities not only harm (tropica) forests, but also destroy the rural populations that live in these forests (Rudel et al, 2009; Brondizio et al., 2021). It is often proposed that reconciling social expectations and economic development with environmental conservation is fundamental to transition to a sustainable economy (Ometto et al., 2011; Borchardt et al., 2023). Many scholars mentioned the challenge of managing economic development in a sustainable way so that it would not affect biodiversity in harmful ways (Malhi et al., 2008; Fearnside, 2017).

One such proposed sustainable economic activity is the harvesting and commercialization of non-timber forest products (NTFPs). These products hold significant ecological and socio-economic importance and have become increasingly prominent within forest-based economic systems (Silva et al., 2020). The extraction of NTFPs forms a critical component of economies in countries within the Global South, where tropical forest resources, such as those found in the Brazilian Amazon, are utilized extensively (de Alcântara et al., 2020). The utilization of NTFPs is recognized as an essential strategy for sustainable development and serves as a primary income source for many communities residing in remote tropical forest regions. Various studies have explored the potential of NTFPs to enhance both socioeconomic and environmental outcomes in Brazilian forest ecosystems (Ros-Tonen, 2000; Shone & Caviglia-Harris, 2006; Lopes et al., 2019; Silva et al., 2020; Richards, 2024). Among the most significant NTFPs in the Brazilian Amazon are the Brazil nut (Kainer et al., 2007) and rubber (Barham & Coomes, 1994), although açai has recently emerged as a particularly notable product (Filho et al., 2021). Since the 1990s, açai has

experienced substantial growth in national and international consumer markets, driven by its high energy content, many antioxidants, and applications in the cosmetics industry, thereby establishing itself as a "superfood" (Freitas et al., 2015; Costa et al., 2017; Vanni, 2018; Superti et al., 2018; Silva Junior et al., 2019; Tregidgo et al., 2020). **A short description of the açai berry can be found in box 1.**

Box 1: The açai berry

Açai is an indigenous fruit that grows naturally in the Amazon. The berry forms a staple part of the daily diet for many local communities in the Brazilian Amazon and is traditionally consumed during lunch and dinner. Native açai grows high in palm trees and must be harvested by climbing these palms, a skill often practiced by Amazon inhabitants. Over the years, açai gained international popularity as agro-companies commercialized and marketed it as a 'superfood' ideal for post-workout recovery or as a healthy breakfast option (Vanni, 2018).

However, this fruit has been part of rural Amazonian communities for decades, if not centuries. Açai has been an essential part of the culture and livelihoods of many river dwellers in the Amazon estuary region in Pará (Weinstein & Moegenburg, 2004; Padoch et al., 2008; Freitas et al., 2015; Tregidgo et al., 2020). Many scientists have debated whether the upscaling of açai as an NTFP could boost local economies and contribute to Amazon conservation (Weinstein & Moegenburg, 2004; Shone & Caviglia-Harris, 2006; Pepper & De Freitas Navegantes Alves, 2017; Lopes et al., 2019; Freitas et al., 2021). The management, domestication and intensification (*açaízation*) of açai has increased rapidly in recent decades, leading scientists to debate whether traditional harvesting of açai can withstand the commodification of the NTFP (Homma, 1992; Weinstein & Moegenburg, 2004; Freitas et al., 2015; Freitas et al., 2021).

The phenomenon of shifting from extractivism to domesticated production in response to increased demand for NTFPs is not new. Homma (2012), a prominent professor of rural economics in Brazil, argues that as market demand for NTFPs rises, transitioning to cultivated production becomes necessary to meet this demand. For many products, does, according to Homma, extractive supply alone does not suffice for market growth, and when not domesticated, are risked overexploiting. Despite Homma's theory advocating for some level of NTFP domestication to prevent overexploitation, other scholars disagree, citing concerns that domestication could disrupt traditional harvesting practices, marginalize small-scale farmers, and exacerbate economic inequalities within rural communities. The domestication of açai might exclude rural farmers from competitive and fast-growing markets and that these markets could disrupt local livelihoods and affect local prices (Weinstein & Moegenburg, 2004; Pepper & De Freitas Navegantes Alves, 2017; Vanni, 2018).

This discussion also landed in international academic debates as some critics claim that social and environmental issues should be prioritized over economic development. Optimistic views regarding reconciling social expectations and economic development with environmental conservation may not be a sufficient response to manage sustainable development (Robinson, 2004). The utilization of NTFPs (such as açai) as a sustainable development strategy might not suffice to protect and conserve forest ecosystems, such as the Amazon. Concepts like the doughnut economy (Raworth, 2017) or degrowth economy (Kallis et al., 2012) were introduced, criticizing current economic systems for prioritizing growth at all costs, disregarding ecological and social damages. Even though approaches such as industrial ecology,

eco-efficiency, dematerialization, or the concept of the bioeconomy were introduced to reduce environmental impacts of economic activities, this may not translate to improvements of quality for all life (Steffen et al., 2015; UN Environment, 2019; Díaz et al., 2019).

The concept of the bioeconomy is one of the many sustainable development discourses embedded in global governance strategies and features prominently on political agendas in regions such as the European Union (EC 2012, 3) and the United States (The White House, 2012, 1). This concept has also gained traction in Brazil. The European Union's vision of the bioeconomy has significantly influenced the development of bioeconomy policies and discourses in South America, including Brazil (Bastos Lima, 2022; Gebara et al., 2023; Ollinaho & Kröger, 2023). Numerous 'win-win' strategies have been proposed, emphasizing the integration of traditional knowledge with technological innovations in Amazonian bioeconomy activities (Gebara et al., 2023; Nobre & Nobre, 2018), such as the commercialization of non-timber forest products like açai.

However, critics raise important questions about who truly benefits from the commercialization of indigenous forest products in the Amazon (Bastos Lima, 2021, 2022; Gebara et al., 2023; Ollinaho & Kröger, 2023). Do bioeconomy governance structures and initiatives genuinely align with local knowledge systems and practices? Who wields power in the commercialization of these indigenous value chains, such as the rapidly expanding açai value chain? Is this truly a 'win-win' scenario for the forest ecosystem, its inhabitants, and all other stakeholders profiting from the forest? To investigate the various dynamics within the açai value chain in the Brazilian Amazon, this study applies a policy arrangement approach as conceptualized by Arts et al. (2006).

1.3. Research aim & research questions

As the (inter)national popularity of açai keeps on rising, the cultivated production of açai continues to increase, driving innovation and optimization within the Amazonian value chain (Vanni, 2018; Silva Junior et al., 2019; Filho et al., 2021). A continuing debate centers on whether the expansion of açai supply effectively supports local Amazonian economies while contributing to forest conservation, intersecting with global bioeconomy discourses on pathways to achieving sustainable development. Further research indicates that actors operating in the açai value chain have varying perceptions of how açai contributes to the lives of people and nature. To withstand the pressure of açai getting commodified or overexploited, various solutions have been proposed. There are opponent views as regards to how açai should be harvested and sold, which has led to a mixture of methods used in the value chain: While some actors adhere to traditional extraction methods, others prioritize cultivation and commercialization, reflecting varied strategies in response to market and conservation pressures (Homma & Nogueira, 2006; Homma, 2012; Pepper & De Freitas Navegantes Alves, 2017; Vanni, 2018; Superti et al., 2018; Silva Junior et al., 2019; Filho et al., 2021).

This research aims to examine governance dynamics in the açai value chain in Pará, focusing on discursive conflicts among actors regarding the sustainable development of the value chain and its integration into the bioeconomy. The analysis employs the Policy Arrangement Approach to understand these interactions and their implications. To unravel the effects of this development, the following question is posed:

How have policy arrangements regarding the sustainable development of the açai value chain in Pará's bioeconomy evolved over the years?

To answer the main question, the following sub-questions are posed:

1. What is the current structure of the açai value chain and which actors have been influential in shaping its policy arrangements?
2. How has the role of açai evolved to a global product in the bioeconomy?
3. How have power relations and resource distribution shifted as the açai market has globalized?
4. How have formal and informal rules shaped the governance of the açai value chain?

1.4. Scientific relevance

As earlier mentioned, various studies have shown that the Amazon could turn into a degraded savanna due to the causes of deforestation, forest fires and climate change (Moran, 1993; Nepstad et al., 1999; Ometto et al., 2011; Fearnside, 2017). The increased risk of destruction of the Amazon raises the need to find solutions for socioeconomic alternatives to avoid further deforestation and irreversible tipping points of degradation (Nobre, et al., 2023). Preserving ecosystem structures and services can lead to opportunities for local communities to enter new sustainable markets, such as ecotourism, certified forests or agricultural products, which could include açai (Ometto et al., 2011). But the opposite is also true, if the açai berry gets commodified, there may be chances that rural communities get socially excluded from profits and local food access due to increased prices (Homma, 2012). According to Nobre (2019), there have been two different strategies in the past decades to protect the Amazon. The "first way" was to conserve the Amazon, and the "second way" was to intensify resource development.

Governments, NGOs and other environmental actors have tried to reconcile these two paths through "sustainable intensification" of agriculture, but with mediocre results. Nobre et al. propose a "third way" for sustainable development in the Amazon, which he describes as a fourth industrialization through technological innovation. Through this "Third Way," he

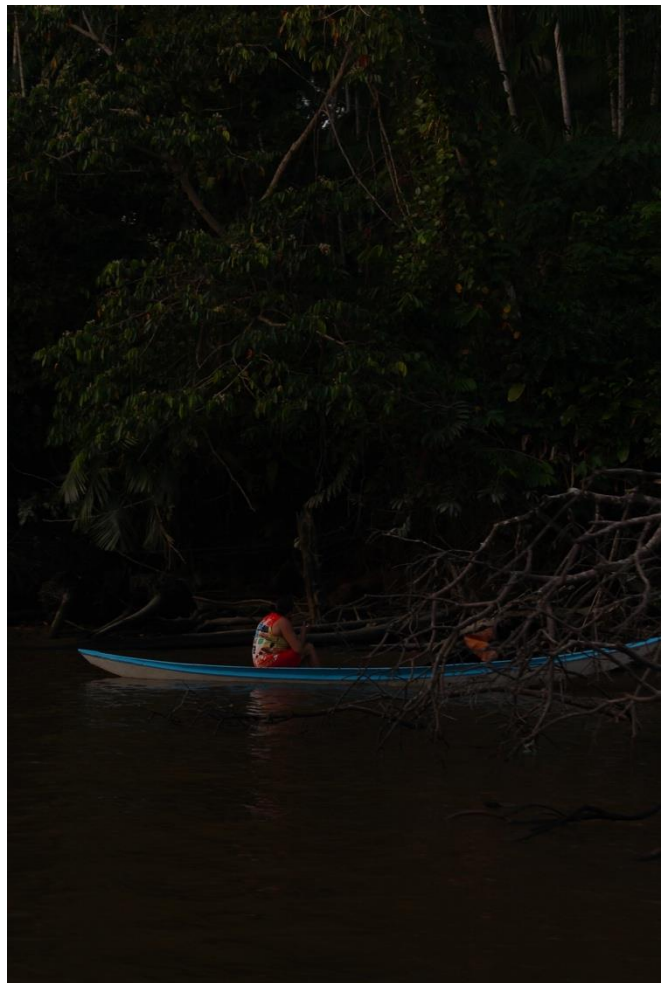


Figure 1. Woman on a boat on the Amazon estuary. Photo taken by author (2024).

says, a "forest-flowing river economy" could be sustained, while also being socially inclusive: Amazonia 4.0 (Nobre & Nobre, 2018). The implications of technological innovations for Amazonian communities, particularly in terms of social inclusivity, remain a topic of significant debate. A central question is how such innovations might be implemented in ways that support rather than marginalize local populations. Critics contend that attracting international capital to leverage Amazonian biodiversity for technological development risks imposing new infrastructures—including research and business facilities—within forest areas. This approach could also necessitate adjustments in property rights and institutional frameworks, potentially disrupting traditional land use and governance systems (Ollinaho & Kröger, 2023). This study contributes to the discourse on sustainable development within Amazonian value chains, examining the complex interplay between technological advancement and social equity. Additionally, it considers how dominant paradigms, such as the bioeconomy, influence sustainable development by prioritizing certain economic and environmental goals that may not fully align with local needs and priorities. By focusing on the açai value chain, this research provides a grounded, local perspective on sustainable development, highlighting how Amazonian communities navigate these emerging discourses while striving to keep agency over their resources and livelihoods.

1.5. Societal relevance

The voices of indigenous and local communities are often not heard or considered in (international) environmental debates. Many people dismiss other ways of knowing by categorizing these knowledge systems as myths, stories, superstitions, or irrational (Inoue, 2018). Forest dwellers often have little voice in policy-making, and even indigenous rights are shaped by Western interpretations of their world (Bull et al., 2018). This is also true for the *Ribeirinho* living on the Amazon estuaries. Ribeirinhos are riverine communities in the Amazon region, mainly based in Brazil. They mostly depend on the forest and water resources for their livelihoods. The word "ribeirinho" literally means "river dweller" in Portuguese. Ribeirinhos have a unique cultural identity and knowledge of Amazonian ecosystems and often rely on practices that preserve their environment as their way of life is tied to the health of forests and rivers (Brondízio, 2008; Superti et al., 2018). Many communities living in the state of Pará are vulnerable due to the neglect of basic services such as basic sanitation, education, and health, often living far from urban centers and only accessible across Amazonian rivers (Santos De Aguiar et al., 2023). Many of the respondents (of which some are Ribeirinhos) who participated in this research expressed as their main reason for participating that they wished their story about açai to be told. Some of the respondents mentioned the lack of attention given by governments to the regulation of açai production. The natural extraction of açai can be dangerous and brings many risks, as producers have to climb high palm trees to harvest the açai. However, many American and European consumers do not even know where açai comes from (personal observations, 2024). The societal relevance of this thesis is to tell the story of the people of Pará and hopefully inform others about the "Amazon reality". This thesis is dedicated to giving a voice to those who are often not heard, but who are most important in the protection and conservation of our standing forests.

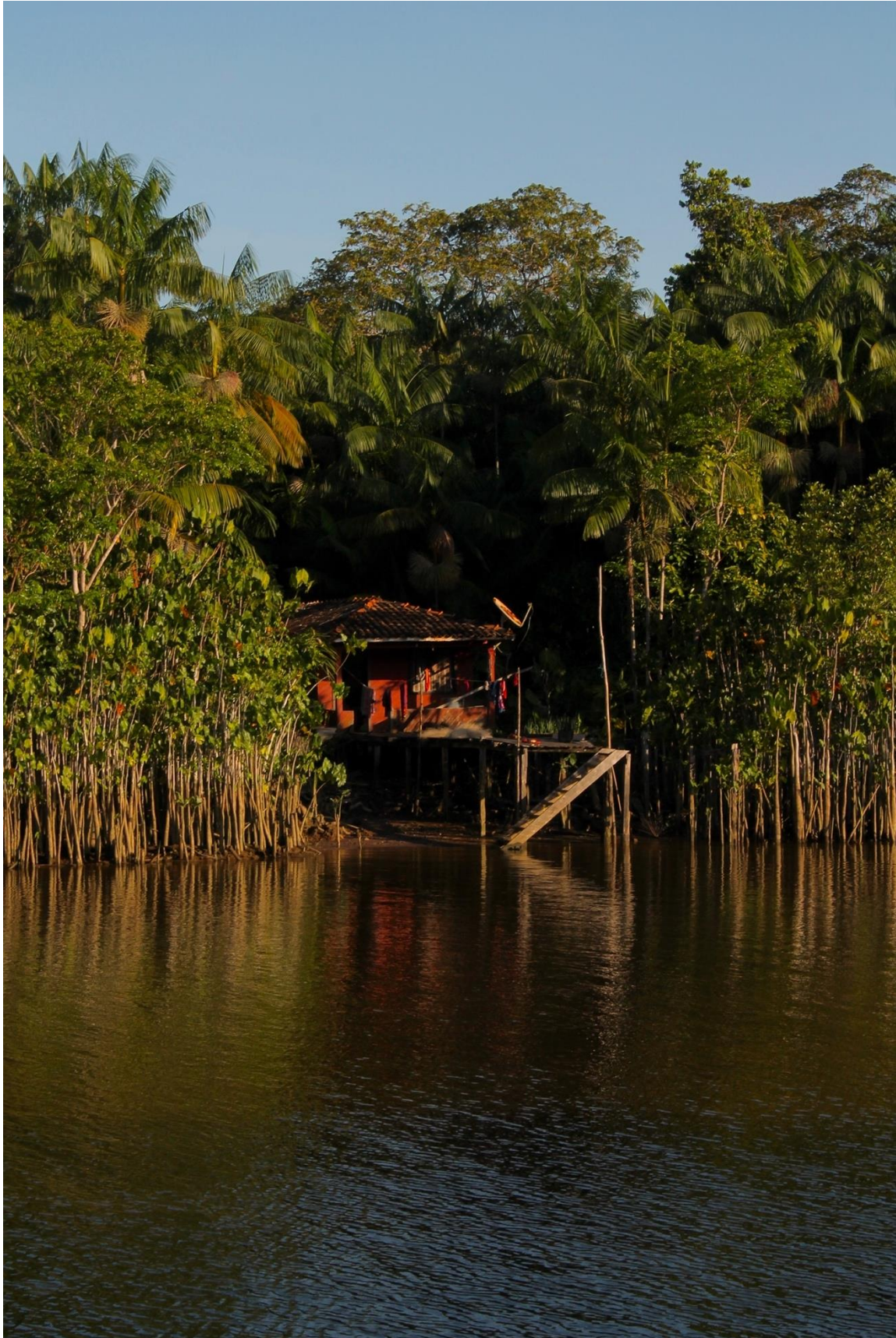


Figure 2. Photo of a Ribeirinho home in the municipality of Curralinho. Photo taken by author (2024).

2. Literature review and Theoretical framework

2.1. Review of relevant academic literature

2.1.1. The historical developments of global forest governance

As outlined in the introduction, various discourses exist regarding the global drivers of deforestation (Geist & Lambin, 2001; Geist & Lambin, 2002), which vary depending on historical period, geographical location, and socioeconomic factors (Angelsen & Kaimowitz, 1999). The Brazilian Amazon has been influenced by multiple such drivers (Fearnside, 2005; Fearnside, 2017). Moreover, scholarly debates extend beyond the causes of deforestation to encompass the global governance of deforestation mitigation and forest conservation (Arts & Buizer, 2009; den Besten et al., 2014; Bull et al., 2018). Discourses on global (forest) governance have been widely contested (Taylor, 2005; Visseren-Hamakers & Glasbergen, 2007; Arts et al., 2010), as numerous intergovernmental conservation initiatives have attempted to achieve global forest conservation without yielding substantial positive outcomes (Bernstein & Cashore, 2017; Bull et al., 2018).

International agreements on forest conservation have existed since the 1970s. In the early 1980s, international attempts to regulate deforestation began to emerge (Chan & Pattberg, 2008), as global concern increased, particularly among consumers in the Global North, regarding tropical deforestation and its associated social disruptions. This culminated in the establishment of the International Tropical Timber Organization (ITTO) in 1983, founded to regulate the tropical timber trade and mitigate deforestation. However, the international community was unable to propose a suitable policy framework during the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992 (Chan & Pattberg, 2008). The conference resulted in the adoption of the Forest Principles, yet no binding international agreement on forests was reached. At the same UNCED meeting, the Convention on Biological Diversity (CBD) was established (Visseren-Hamakers & Glasbergen, 2007). Later, the United Nations Forum on Forests (UNFF) emerged from the Forest Principles (Visseren-Hamakers & Glasbergen, 2007).

Recognizing the need for a universal definition of sustainable forest management, governments sought to implement policies based on agreements such as the Forest Principles (Núñez et al., 2016). However, implementation remained insufficient, as fundamental divergences in perspectives on forests persisted, complicating the formation of effective international agreements (Visseren-Hamakers & Glasbergen, 2007). This resulted in an international deadlock in global forest governance.

Significant transformations in governance systems occurred when non-state actors began to collaborate based on shared interests, particularly in areas where intergovernmental bodies proved incapable of effective regulation (Rosenau & Czempiel, 1992). This shift was also evident in global forest governance, where multicentric systems involving both public and private actors emerged. In this context, non-state actors began to engage in voluntary initiatives as intergovernmental bodies struggled to coordinate effective governance measures (Pattberg, 2005; Pattberg, 2006; Visseren-Hamakers & Glasbergen, 2007; Chan & Pattberg, 2008; Bernstein & Cashore, 2017).

Consumers and non-governmental organizations (NGOs) from the Global North increasingly demanded greater transparency regarding the origin and nature of timber products—a demand that major corporate

actors often struggled to meet. In response, private organizations sought to establish new accountability mechanisms to safeguard their reputations and economic interests. Under pressure from NGOs and civil society, and in light of the ITTO's limited engagement with forest certification, closer collaboration between civil society and private actors emerged. This collaboration ultimately led to the development of initial forest certification systems that were both economically viable and aligned with conservation objectives (Chan & Pattberg, 2008; Bernstein & Cashore, 2017).

Introducing environmental governance

As outlined earlier, governments began shifting from traditional government practices toward collaborative governance approaches, increasingly incorporating private actors into environmental decision-making processes. Before further exploring the literature review, it's important to establish a clear understanding of the concept of 'environmental governance'.

According to Lemos and Agrawal (2006, p. 298), environmental governance refers to *"the set of regulatory processes, mechanisms, and organizations through which political actors influence environmental actions and outcomes."* Environmental governance manifests in various forms, through the political-economic relationships that occur within institutions and are embodied by these institutions, which in turn shape actions, outcomes, and identities of these institutions (Lemos & Agrawal, 2006). Examples of arenas in which environmental governance operates include international institutions, national policymaking and legislation, international accords, local decision-making processes, and environmental NGOs. Furthermore, it is important to distinguish between the concept of government and governance, as they do not have the same meaning. As explained by Ansell and Torfing (2022, p. 2), governance *"perceives private and civil society actors as resources and instruments for co-produced public policymaking, instead of reducing them to passive targets and subjects of public regulation."* The inclusion of diverse institutional or governance arrangements find their foundation in Ostrom's work, *Governing the Commons* (1990). This perspective asserts that market and state actors can overcome their contradictions to effectively manage natural resources (Ostrom, 2015).

Given the central role of institutions in environmental governance, it is necessary to further deepen this definition. Ostrom (2005, p. 3) defines institutions as *"the prescriptions that humans use to organize all forms of repetitive and structured interactions, including those within families, neighborhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales."* However, Schmidt (2008) extends this definition by emphasizing the communicative and ideational dimensions of institutions. According to Schmidt, can institutions constrain its actors but also serve as constructs that are created and altered by those actors. This suggests that actors play an active role in shaping and maintaining institutional arrangements by using their capacity to interpret and assign meaning to any given context within those institutions (Schmidt, 2008).

2.1.2. The rise of certification schemes

As the concept of certification schemes plays a big role in this research, a deeper reflection on its complexity is necessary. Certification schemes (CS) are used as a tool to influence consumer behavior by providing information to support environmentally friendly, socially beneficial and economically viable forest management (Council, F.S, 2014) and are a form of hybride or private arrangements in

environmental governance (Visseren-Hamakers & Glasbergen, 2007). In this way, consumers can choose products with an eco-label or certification. Another essential element of certification is the provision of information to producers on responsible forest management to achieve economic, environmental and social objectives through the provision of standards (Van Der Ven & Cashore, 2018).

A widely recognized voluntary scheme is the Forest Stewardship Council (FSC), which was pioneering at the time of its establishment in 1993. The FSC was among the first private transnational regulatory organizations to form partnerships between industries and social and environmental groups. It represented the first major forest certification scheme for sustainable forest management (Visseren-Hamakers & Glasbergen, 2007). Following the FSC, several other certification schemes emerged, aiming to regulate deforestation, promote sustainable development, ensure fair trade, and enhance social inclusion in tropical forest regions. Other well-known certification schemes in sectors beyond forest governance include the Program for the Endorsement of Forest Certification (PEFC) in the forestry sector; the Rainforest Alliance, UTZ, and Fair Trade for commodities such as tea, coffee, and chocolate; or the Roundtable on Sustainable Palm Oil (RSPO) for palm oil (Clark & Hussey, 2016; Merger et al., 2011; Mol & Oosterveer, 2015; Renard, 2005; Tröster & Hiete, 2018; Van Der Ven & Cashore, 2018).

After decennia of using forest certification schemes, evidence of positive social and environmental impacts are mixed and inconclusive (Van Der Ven & Cashore, 2018; Romero et al., 2017). Over time, scholars began to express concerns regarding private certification schemes. As Pattberg (2005) critically observed: *"Private approaches to world politics raise substantial questions when it comes to their actual performance as providers of public goods"* (p. 357). CSs are often seen as a form of non-state regulation, mentioned by Cashore (2002) as 'non-state-market-driven governance' (Clark & Hussey, 2016).

The FSC, in particular, became a focal point for many scholars. Critics questioned whether the FSC primarily served corporate interests (Pattberg, 2005; Chan & Pattberg, 2008; Bernstein & Cashore, 2017; Tröster & Hiete, 2018). A significant proportion of FSC-certified areas were located in North America and Europe, while certification in Asia, Latin America, Africa, and Oceania lagged behind. This disparity was partly attributable to inadequate infrastructure and economic imbalances in developing countries. Another issue concerning FSC's impact was the cost of certification; tropical forests were found to be more expensive to certify than temperate or boreal forests, leading to geographical patterns of certification that favored Northern actors (Rametsteiner & Simula, 2003; Pattberg, 2006; Chan & Pattberg, 2008).

Critical literature on CSs highlights these concerns. Various researchers have analyzed the effectiveness and local outcomes of voluntary schemes and concluded that certification may benefit selected groups in developing countries while unintentionally excluding others (Raynolds et al., 2007; Tröster & Hiete, 2018; Van Der Ven & Cashore, 2018). According to scholars such as Baletti (2014), Gereffi (2001), Rametsteiner and Simula (2003), Pattberg (2006), and Visseren-Hamakers and Glasbergen (2007), the role of third-party organizations in regulating forest certification introduces significant challenges. These schemes are typically private, rather than public, which limits opportunities for democratic participation and raises questions about who truly benefits from certification. Furthermore, many certifications are based on Northern standards, creating high entry barriers for local producers and, in some cases, excluding them from participating in lucrative international markets (Baletti, 2014; Koc & Dahlberg, 1999; Gereffi, 2001;

Raynolds et al., 2007; Hirsch et al., 2011; McKay & Colque, 2016). Smallholders typically require support from NGOs to meet certification requirements (Oosterveer et al., 2014). Additionally, in developing countries, women may have less access to technology or training, limiting their ability to benefit from ongoing development initiatives in their communities (Serrano et al., 2022). Another challenge associated with CSs is the necessity of multi-level governance, which can be highly complex. The transaction costs associated with policymaking and certification implementation can be an extra layer of difficulty, particularly when financial resources are limited (Pattberg, 2006; Gallemore et al., 2015).



Figure 3. The Amazon estuary. Photo by author (2024).

2.1.3. Ecological Modernization

An example of an environmental discourse is the theory of ecological modernization (EM), whose definition was first coined by Huber (1985, 1991). However, Mol and Spaargaren (Mol, 1996; Fisher & Freudenburg, 2001; Spaargaren et al., 2000) have debated its multiple meanings over time and are most known for clarifying the concept of EM. EM has been used in different contexts and its theory has multiple interpretations, but two clear distinctions can be made (Mol, 1996). On the one hand, EM can be seen as a social theory that shows a complex understanding of post-industrial society, where its' concept is originated on thought of how technological and industrial progress can help overcome ecological crises in the developed world (Buttel, 2000; Fisher & Freudenburg, 2001; Mol, 1996). On the other hand, EM is occasionally used as a political program for change, inspired by the environmental reform of industrial society. In this way, EM can be seen as a theory of political modernization (Mol, 1996; Fisher & Freudenburg, 2001). Ecological modernization theorists such as Mol and Spaargaren argue that due to developments in the new industrial society, production processes are increasingly based on ecological criteria in addition to economic criteria (Hajer, 1995; Mol, 1995; Mol & Sonnenfeld, 2000; Spaargaren et al., 2000). According to Mol (1995), EM theory should focus on the emancipation of the ecological sphere in addition to the three existing spheres in modern society (economic, political and social). However, there other scholars that critique the EM theory. Buttel argues that EM lacks *"an identifiable set of postulates and exhibit agreements on research hypotheses and research agendas"* (Buttel, 2000, p. 64). According to Buttel (2000), EM can be seen as a broader environmental science or policy concept, but is not based on more profound social theories, as for example the theory of treadmill of production does. Other authors such as Pellow, Schnaiberg and Weinberg (2000) are more critical. Although they agree that the ecological sphere has developed separately from the other three spheres in modern society, they argue that there is no evidence that the ecological sphere has been emancipated from the economic sphere in decision making.

2.1.4. The Bioeconomy

One concept closely aligned with the EM discourse is the one of the bioeconomy and has a central place in this thesis. A deeper understanding is therefore needed. The bioeconomy theory partially grounds in the EM theory, as will become clear in the paragraphs to follow.

The term "bioeconomics" was first introduced in the 1960s by Zeman, who employed it to classify economic systems that recognize the biological foundation of nearly all economic activities (D'Alisa et al., 2015). However, in the late 1970s, another scholar adopted the term to express concerns regarding the incompatibility of unrestricted economic growth with finite natural resources (D'Alisa et al., 2015). Over time, various researchers have used different iterations of the term "bioeconomy" to highlight the ecological implications of industrial progress. Nevertheless, the concept only gained significant traction when it was introduced as a policy framework by the European Commission (Lewandowski, 2018). A definition that is commonly used to describe the bioeconomy, acknowledged at the Global Bioeconomy Summit in 2018 is as follow: *"the production, utilization and conservation of biological resources, including related knowledge, science, technology, and innovation, to provide information, products, processes and services across all economic sectors aiming toward a sustainable economy"* (Calicioglu & Bogdanski, 2021).

By the early 2000s, the bioeconomy had become an essential component of policy agendas in both

the European Union and the United States (Goven & Pavone, 2015). This is exemplified by the publication of several policy documents, such as the European Commission's 2007 report entitled *En Route to the Knowledge-Based Bioeconomy*. In this report, the bioeconomy was described as a means of "transforming life science knowledge into new, sustainable, eco-efficient and competitive products" (EU Presidency, 2007). Similarly, the European Commission's 2012 report, *Innovation for Sustainable Growth: A Bioeconomy for Europe*, framed the bioeconomy as "a unique opportunity to comprehensively address interlinked societal challenges such as food security, natural resource scarcity, fossil fuel dependency and climate change, while achieving sustainable economic growth" (EC, 2012, p. 3).

In the United States, the *National Bioeconomy Blueprint* further underscored the policy significance of the bioeconomy, emphasizing its potential to "enable Americans to live longer, healthier lives, reduce our dependence on oil, address key environmental challenges, transform manufacturing processes, and increase the productivity and scope of the agricultural sector while growing new jobs and industries" (The White House, 2012, p. 1). Following the implementation of initial bioeconomy policies in both the EU and the US, numerous other countries—ranging from highly industrialized nations to transition economies and developing states—formulated their own bioeconomy strategies (Aguilar et al., 2019).

The bioeconomy: a discourse on sustainable development (?)

As the concept of the 'bioeconomy' started to rise in popularity, its meaning however, still seemed in a flux (Pülzl et al., 2014). A multitude of bioeconomy strategies have been developed over the years and have spread across all continents (Aguilar et al., 2018). According to the German Bioeconomy Council (2010), the bioeconomy can be conceptualized through two primary perspectives: (1) the resource substitution perspective and (2) the biotechnology innovation perspective. The former pertains to the replacement of oil-based resources in response to rising oil prices and increasing fossil fuel scarcity. The latter emphasizes the exploration of sustainable technologies as alternatives to oil (Lewandowski, 2018).

The bioeconomy is widely promoted as a strategy for sustainable development by researchers and policymakers (Aguilar et al., 2018, 2019; Calicioglu & Bogdanski, 2021; Levidow et al., 2012) and is discussed in international reports, such as the *Bioeconomy Policy (Part III) – Update Report of National Strategies around the World*, published by the German Bioeconomy Council (2018), and *The Bioeconomy to 2030: Designing a Policy Agenda*, produced by the Organization for Economic Cooperation and Development (OECD) (2009). Both reports highlight the increasing global recognition of the bioeconomy and its potential to address environmental sustainability challenges through innovations such as biotechnologies in primary sectors, including fisheries, agriculture, and forestry. However, Calicioglu and Bogdanski (2021) emphasize the importance of assessing its actual impacts to ensure that bioeconomic strategies contribute to sustainable development.

Besides its many global understandings and implementations, criticism has been raised as well. Some scholars argue that the presentation of the bioeconomy is just a new concept for old neoliberal ideas (Birch & Tyfield, 2013; Goven & Pavone, 2015; Lewandowski, 2018). Others warn for governments and companies misusing the concept and thereby 'greenwashing' non-sustainable practices and policy agenda's (Lewandowski, 2018; Ollinaho & Kröger, 2023). Beyond its economic and technoscientific

dimensions, the bioeconomy has increasingly been framed as a political project that has evolved into a discourse in its own right (Birch & Tyfield, 2013; Pülzl et al., 2014; Goven & Pavone, 2015). Pülzl et al. (2014) characterize the bioeconomy as a rising (meta)discourse, defining it as follows: "*The bioeconomy discourse interweaves arguments of doom (limits to growth) with technological arguments (ecological modernisation) and economic arguments (neoliberalism), while being concerned mostly about the economy*" (Pülzl et al., 2014, p. 391). Some scholars question the extent to which the bioeconomy genuinely fosters sustainability, raising concerns about its implementation and potential unintended consequences (Birch & Tyfield, 2013; Pülzl et al., 2014; Goven & Pavone, 2015; Ollinaho & Kröger, 2023)

2.2. Theoretical framework

The theoretical concepts and approaches explained in the following paragraphs, will together provide a comprehensive framework for analyzing how different actors construct meaning around environmental governance, how these meanings translate into concrete policy arrangements, and how competing discourses influence governance outcomes. The combination of these theoretical tools is particularly relevant for examining complex governance arrangements where multiple stakeholders hold different perspectives on governing value chains and development pathways. The theoretical framework builds on the concepts of Hajer's discourse theory, the Policy Arrangement Approach, discursive institutionalism as explained down below.

2.2.1. Discourse Theory

To begin with, the definition of discourse is provided, as discourses play a central role in this thesis and multiple other concepts in this thesis build on discourse theory. *Discourse theory*, as explained by Hajer (2005), is often used to understand environmental discourses. Discourses are seen as both the result and the medium of human action (Hajer, 1995). By giving meaning to the world, human agencies construct discourses. However, pre-existing discourses simultaneously influence this meaning-making process (Arts & Buizer, 2009). Hajer (2005, p. 175) defines discourses as "*an ensemble of ideas, concepts, and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices.*"

A discourse can be revealed by analyzing the different coalitions, practices, and meanings associated with the phenomena. By analyzing these coalitions, practices, and meanings associated with the phenomenon, discourse analysis can reveal a discursive structure among social groups of which these groups themselves may not be aware of (Hajer, 1995, 2005). According to Hajer & Versteeg (2005), through discourse analysis one can unravel how language shapes one's views and reality of the world, rather than being a neutral actor. The use of language is important in environmental discussions because these discussions can lead to the revision of rules, creation of institutions, or the enactment of laws. Studying discourses thus allows one to see how actors actively try to influence the definition of a problem. However, discourses can also be understood in a more abstract sense. Discourses exist in peoples' minds and in the social networks to those people belong. These discourses are based on peoples' experiences and histories, which therefore influence how people speak and act. This results in different "frames" through which people experience and define problems in the world (Arts & Buizer, 2009).

2.2.2. Discursive Institutionalism

Building on the understanding of discourse theory, Discursive Institutionalism helps explain how different actors interpret and shape policy arrangements through ideas and discourse. As noted in the above-mentioned literature, many researchers point out that environmental policies and proposed sustainable solutions do not always have the desired impacts on local communities and biodiversity (Pattberg, 2006; Gallemore et al., 2015; Bernstein & Cashore, 2017). This gap between policy and practice can be understood through the lens of Discursive Institutionalism (DI), which provides a theoretical framework for analyzing how ideas and discourse shape institutional change and policy outcomes. DI emerged as the newest strand of new institutionalism, distinct from rational choice, historical, and sociological institutionalism. While new institutionalism broadly focuses on the interplay between institutions and society, DI specifically analyses how ideas and discourses introduce new or reshape existing institutional arrangements (March & Olsen, 2006; Schmidt, 2008, 2010). In environmental governance, this theoretical perspective is particularly relevant as it helps explain how different ontologies and discourses surrounding social practices in forests and nature governance influence policy outcomes (Sharp & Richardson, 2001; Arts et al., 2013; den Besten et al., 2014). The significance of DI in environmental governance becomes clear when examining how global forest discourses and differing ontological understandings of "forests" have led to mismatches between technical solutions proposed by policymakers and the realities faced by local communities (Alcorn, 1993; Inoue, 2018; Bull et al., 2018; González & Kröger, 2020). These mismatches often stem from Western interpretations of concepts like "nature", which are then being imposed on diverse local contexts (Pinho et al., 2014; Bull et al., 2018; Díaz et al., 2019).

2.2.3. The Policy Arrangement Approach

Within the framework of Discursive Institutionalism, the *Policy Arrangement Approach* (PAA) provides a concrete analytical framework for studying institutional change and stability in environmental governance. The PAA has emerged as a tool for analyzing changes in various nature and forest policies, thus also a relevant framework for this thesis (Park, 2015; Van Gossum et al., 2011; Veenman et al., 2009; Wiering & Arts, 2006). It operationalizes DI's theoretical insights through three foundational concepts: institutionalization, political modernization, and policy arrangements.

The concept of *institutionalization*, as defined by van Tatenhove & Leroy (2000, p.18), refers to "the ongoing process of patterning, preservation, construction, organization, and deconstruction of day-to-day activities and interactions in institutions." This process-oriented understanding aligns with DI's focus on how ideas and discourse shape institutional change.

Political modernization, a central concept in PAA, captures how structural processes of social change impact the political domain (Arts et al., 2006; van Tatenhove et al., 2013). This concept helps explain how new relationships between state, market, and civil society create new power relations and influence policy development. These evolving relationships are particularly relevant in environmental governance, where traditional top-down arrangements increasingly coexist with multi-actor governance approaches.

A policy arrangement can be described as "the temporary stabilization of the content and organization of a particular policy domain" (van Tatenhoven et al., 2000, p. 54). The stability and change of these arrangements and the driving forces behind them form the basis of the PAA analysis (Arts et al., 2006). There has been an rise in a variety of governance arrangements in environmental policies, such as governments interacting with markets and civil society and bottom-up arrangements, or the use of private certification schemes (Arts et al., 2006; Bernstein & Cashore, 2017). This analytical framework is relevant for examining policy arrangements in a value chain context, where multiple actors interact across different scales, power relations are often complex, and competing discourses shape policy outcomes. The PAA's systematic approach helps unravel how these different elements interact to produce particular policy arrangements within the value chain.

Policy arrangements are part of society, which means that changes in individual policy arrangements may affect actors or stakeholders at micro level, but may also lead to more structural changes on societal level. On the other hand, changes in the broader social, political, cultural or economic context can have an impact on individual actors involved in the policy arrangement. In other words: "structural change in individual policy arrangements often originates in broader processes of change" (Lieverink, 2006, p. 49). Changes in those domains need to be empirically determined. An important aspect thereof is defining how change (resulting from innovation) in one dimension affects the other dimensions.

Dimensions of the PAA

The framework of the PAA contains four dimensions (as shown in figure 4). These four dimensions include *actors, power and resources, rules of the game* and *discourses* (Lieverink, 2006). The four dimensions of the PAA are interwoven, meaning that changes in one dimension will induce changes in the others. The relationship between the four dimensions is symbolized by a tetrahedron, with each corner representing a dimension (Arts et al., 2006). Thus, the analysis of a policy arrangement is only complete if all four dimensions are analyzed. Further explanation of the four dimensions can be found in Appendix 1.

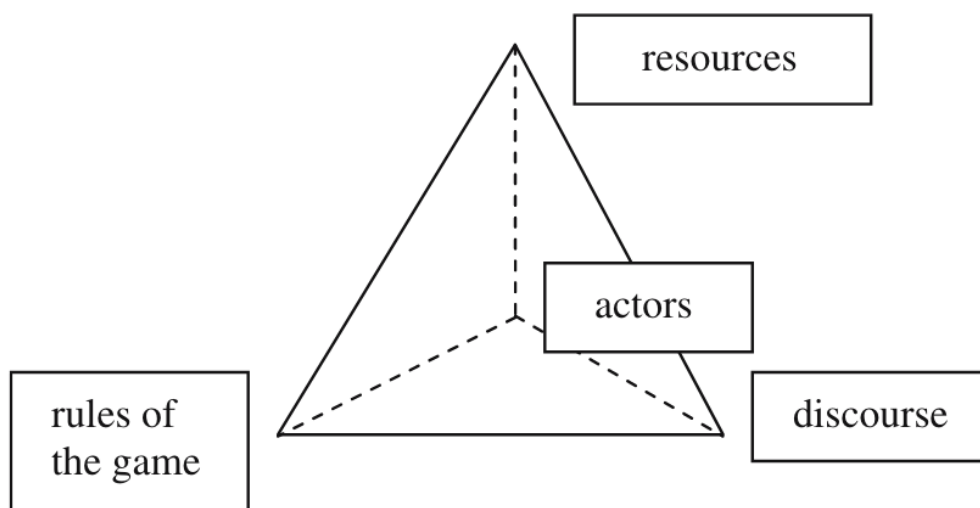


Figure 4. The tetrahedron as symbol for the connections between the dimensions of an arrangement. (Arts et al., 2006, p. 99)



Figure 5. Two kids waiting on the boat at the Feira do Açaí in Belém. Photo by author (2024).

2.2.4. Conceptual framework: operationalization of concepts

This research aims to investigate the governance dynamics underlying the development of the expanding açáí value chain, with a particular focus on the discursive conflicts surrounding its sustainable development and its place within the bioeconomy. The conceptual framework integrates three theoretical approaches to analyze these dynamics.

The combination of DI, PAA, and Hajer's discourse theory provides an analytical framework for examining how different actors construct meaning around environmental governance in the açáí value chain, how these meanings translate into concrete policy arrangements, and how competing discourses influence governance outcomes. Hajer's discourse theory provides the foundation for understanding how actors create "an ensemble of ideas, concepts, and categories through which meaning is given to social and physical phenomena" (2005, p. 175) in the açáí value chain. These discourses shape how actors perceive problems and solutions regarding the sustainable development of the açáí value chain.

Building on this foundation, Discursive Institutionalism helps analyze how competing discourses influence institutional change in forest governance and value chains. DI shows how ideas and discourses introduce new or reshape existing institutional arrangements, explaining the gap between policy intentions and outcomes as explained in the literature review. The Policy Arrangement Approach operationalizes these theoretical insights through an analysis of four dimensions: actors, power and resources, rules of the game, and discourses. In this research, while all actors in the value chain will be identified to establish context, the empirical analysis will focus equally on the other three dimensions.

Rather than using the theory of political modernization that usually grounds the PAA, this research employs ecological modernization theory as the backdrop for analyzing all PAA dimensions. The bioeconomy concept, which (partially) emerged from ecological modernization discourse, serves as an institutionalized concept through which all dimensions of policy arrangements in the açáí value chain will be analyzed. The açáí value chain itself serves to focus the analysis on relevant actors and their governance interactions, but the chain's structure is not the primary subject of analysis (detailed definition of Global Value Chains provided in Appendix 2). Instead, the value chain provides the context for examining how policy arrangements regarding sustainable development have evolved over time. The conceptual framework can be seen in figure 6.

Much of the literature and conceptual frameworks referenced above are rooted in Western knowledge systems and perspectives, often marginalizing indigenous knowledge and viewpoints (Arts et al., n.d.; Inoue, 2018; González & Kröger, 2020). While acknowledging that the frameworks and models employed in this research predominantly reflect Western epistemologies—and may therefore inadequately represent how actors perceive the value of açáí—they nevertheless provide a useful foundation for examining discursive conflicts.

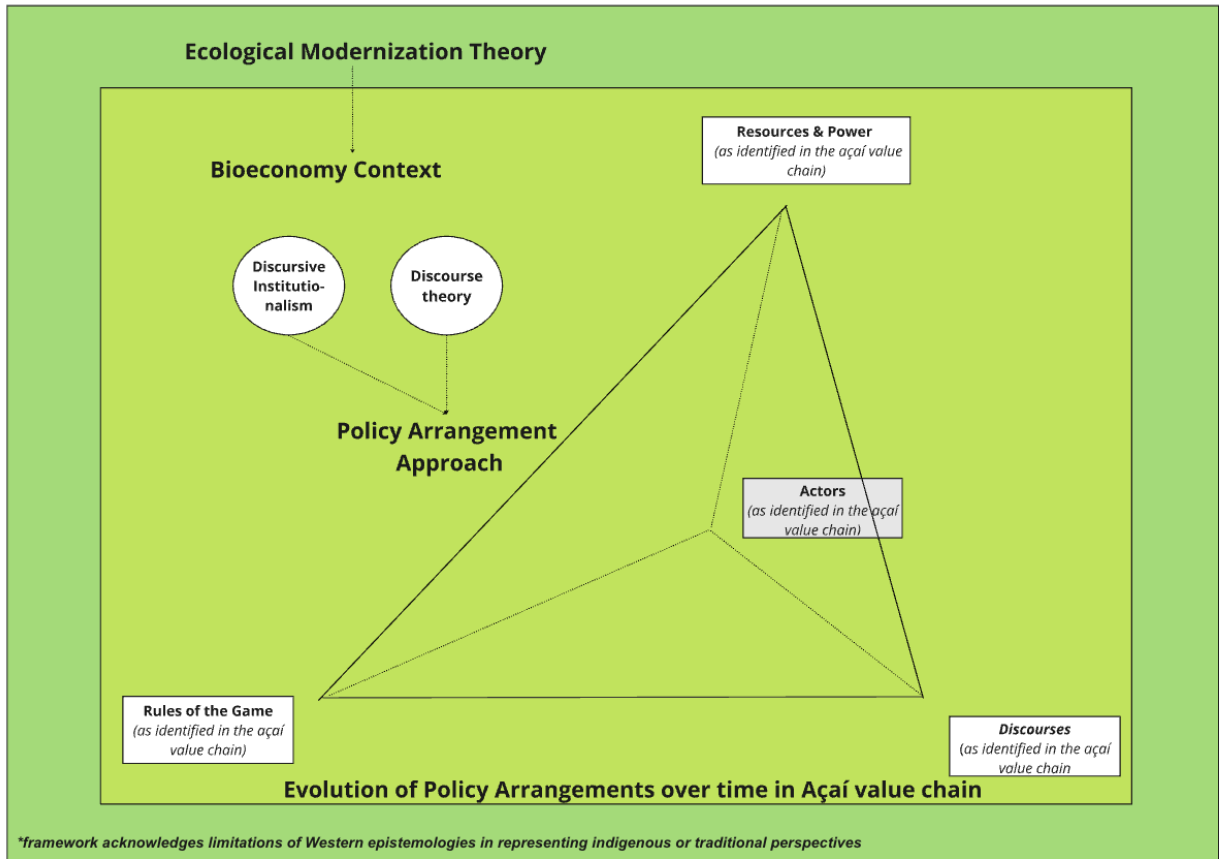


Figure 6. Adjusted Policy Arrangement framework derived from Arts et al. (2006)

3. Methodology

3.1. Research strategy & Philosophy

Research philosophy

It is important to have a clear understanding of the methodological foundations of this research as the concept of methodologies imply important differences in understanding the world (Moses & Knutsen, 2012). The methodology used in this research relates to the philosophical underpinnings that guided the fieldwork preparation, interview question formulation, and data analysis. By critically reflecting on what we can know, how we can know, and how this knowledge affects our decisions and actions, one can unravel his or her worldview. Philosophical perspectives represent a value system to which people adhere (Moon & Blackman, 2014). This worldview can also be seen as a paradigm, defined by Guba & Lincoln (1994) as: "a set of basic beliefs (or metaphysics) that deals with ultimates or first principles. It represents a worldview that defines, for its holder, the nature of the 'world', the individual's place in it, and the range of possible relationships to that world and its parts, as, for example, cosmologies and theologies do" (Guba & Lincoln, 1994, p. 107). To explore and analyze diverse worldviews, this study employs the concepts of ontology and epistemology. Definitions on the concepts of ontology and epistemology can be found in Appendix 3.

This research positions itself within both realist and relativist ontological perspectives, particularly due to its use of the PAA. The PAA inherently integrates both (post-)positivist and constructivist elements - while certain aspects like legislation and policy frameworks exist as objective realities that can be analyzed independently (realist), the research simultaneously acknowledges multiple truths in how different stakeholders interpret and experience these frameworks (relativist).

Furthermore, this research aligns with constructivist epistemology, (Moon & Blackman, 2014). This alignment is demonstrated through the research methodology, particularly in the engagement with local communities through both interviews and immersive fieldwork. This approach acknowledges that knowledge emerges through the interaction between researcher and subjects, recognizing that understanding is created not just through formal data collection, but through experiencing and observing how different individuals and communities construct meaning around the same phenomena.

Research strategy

A research strategy encompasses the overall design and method of data collection that guides the research process. This research employs the research strategy of a case study. According to van Thiel (2014), a case study is defined as "*a research strategy in which one or several cases of the subject under study are examined in an everyday, real-life setting*" (p. 86). Sociologists and anthropologists have historically employed case studies to investigate individuals' lives, experiences, and interpretations of their social and cultural environments, aiming to understand how these individuals ascribe meaning to their contexts (Harrison et al., 2017). This research strategy is commonly used in qualitative research designs, where the case study approach has evolved into a pragmatic research method (Harrison et al., 2017; van Thiel, 2014). However, its application, definition, and validity may vary depending on the specific context (Harrison et al., 2017). According to Yin (2003), a well-defined case study research design consists of five key components: an appropriate research question, a clearly formulated research problem, and a defined unit of analysis. Additionally, it must include an explanation of how the data will be utilized post-collection, how the data relate to the research problem, and the manner in which they will be interpreted (Yin, 2003). This research follows an embedded single case study design, as the research unit cannot be confined to a singular unit (different kind of actors in different positions along the value chain are analyzed). An embedded single case study encompasses multiple "subunits" within the main unit of analysis, such as the processes, actors, or stakeholders in the value chain (Yin, 2003). According to Yin an embedded single case study best be described as following: "*The same single-case study may involve more than one unit of analysis. This occurs when, within a single case, attention is also given to a subunit or subunits... When you conduct such a study, you would have designed what has been called an embedded case study design*" (Yin, 2003, p. 42).

In this study, various actors—occupying different roles in Brazilian society and situated within distinct social and cultural contexts—are interviewed, all of whom contribute in some way to the açai value chain. The case study focuses on different study sites in the state of Pará, Brazil, based on strategic and practical considerations. Further elaboration and explanation on the case study can be found 3.3.

Research program - Federal University of Minas Gerais

This thesis forms part of a broader research program currently under development at the Federal University of Minas Gerais (UFMG) in Belo Horizonte, Brazil. The overarching theme of the research program is the Amazonian bioeconomy. To develop and prepare for this study, as well as conduct 10 days of fieldwork in the Amazon, I spent four months in Brazil during the Northern hemisphere summer of 2024. Prior to my arrival in Belo Horizonte, I engaged in multiple discussions with my supervisor in Brazil to refine the research focus. As part of this process, my supervisor introduced me to an undergraduate student at UFMG who assisted with various aspects of the research, including establishing contact with potential respondents, conducting interviews, and organizing fieldwork in the Amazon. During the interviews, she facilitated translation between English and Portuguese, ensuring clear communication with respondents. Moreover, she played a crucial role in helping me integrate into Brazilian society and gain a deeper understanding of Brazilian culture.

The majority of my time in Brazil was spent at the university, conducting research and establishing a network of individuals who could support the study. Through full immersion in Brazilian society and an effort to learn the language, I was able to develop a more comprehensive understanding of the dynamics at play in and around the Amazon.

3.2. Research methods

3.2.1. Research design

This study employs a mixed methods research design, as the integration of multiple sources enhances the reliability of the case study. Given that small units within case studies may compromise validity and reliability, triangulation is implemented to reduce these risks (van Thiel, 2014). The application of triangulation proposes a diversified approach to data collection, thereby strengthening the findings (van Thiel, 2014). Through this methodological framework, the researcher systematically gathers a variety of data to identify appropriate operational measures and establish causal relationships between the examined concepts (van Thiel, 2014).

Semi-structured interviews

The primary research method comprises semi-structured interviews conducted with stakeholders within the açai value chain. These semi-structured interviews were performed during the ten days of fieldwork in Pará. The interview questions were designed to balance structure with flexibility, thereby allowing respondents to reflect their perspectives whilst the researcher holds the opportunity to pose follow-up questions if necessary (van Thiel, 2014). As previously noted, the respondents represented diverse socioeconomic and cultural contexts within Brazil. Therefore, four different interview guides were developed, each tailored to the specific respondent group, ensuring that data collection remained sensitive to social and cultural understandings that the respondents could possibly have. The four interview guides can be found in Appendix 7. All interviews were conducted in Portuguese. To streamline the communication, a Brazilian student from UFMG assisted in the fieldwork, providing translation between Portuguese and English. Nevertheless, occasional linguistic and cultural misunderstandings led sometimes to difficulties during the translation process. An elaborate overview with all semi-structured interviews included can be found on page 34.

Desk research

The second methodological approach involved a desk research of previously conducted case studies, relevant policy documents, and other grey literature. During this early research phase, several conversations and email exchanges took place with professors from UFMG, as well as other professors who specialized in açai value chains or Amazonian communities, in order to get more familiar with the research topic and to get an understanding of the possible study sight. These preliminary conversations and exchanges are documented in Appendix 8 and 11. Through this initial desk research, the researcher found academic and grey literature regarding bioeconomy concepts that later became part of the empirical findings, which are referenced in chapter 5.

Observations

The final methodological approach included observations. Observations composed a fundamental component of this research. Several interviewees mentioned the difficulty of comprehending the "Amazon

reality" without experiencing the "Amazon reality". Consequently, ten days of immersive fieldwork, during which the researcher traveled across the region, engaged with a local community, the forest, trees, and açaí helped gain insights into their lived experiences, and supported in understanding this reality. These observations significantly supported to the understanding of the research topic, providing a perspective on the ways in which (inter)national policies and decisions affect local realities in the Amazon. A detailed table documenting personal and informal observations recorded during fieldwork is available in Appendix 9.

Validity & reliability

Validity and reliability are important for establishing the quality of a case study. Different concepts of validity and reliability are employed to assess the quality of the empirical data collected. The definitions of validity and reliability can be found in Appendix 4.

In this research, sufficient validity is ensured through an extensive literature review, multiple discussions with professors specializing in the relevant area, and the careful selection of interview participants and the use of observations. Reliability is maintained through the precision of the measurement instruments used for data collection. The reliability of the study is further enhanced by the development of structured interview guides and critical reflection on the most effective approaches for conducting interviews and engaging with respondents, as well as a systemic approach for the coding and analyzing of the gained data. Lastly, the ability to stay in Brazil for a significant amount of time and the possibility to collaborate with locals and researchers increased the validity and reliability of this research significantly.

3.3. Case selection, data collection and analysis

The decision to focus on the state of Pará for this case study is primarily due to its status as the largest producer and cultivator of açaí in Brazil. Beyond its economic significance, açaí is deeply embedded in the cultural identity of Pará (Matos et al., 2017; Filho et al., 2021). From a practical perspective, logistical and safety considerations also played a key role in selecting Pará as the research site. The Amazon region is vast, with limited infrastructure; traveling between locations can take several days and often requires boat transport. Additionally, certain areas within the Amazon are unregulated and lack oversight, making them potentially unsafe without proper authorization or local guidance. These factors were considered when determining which actors to interview and which locations to visit. By reviewing existing literature on local açaí supply chains in Pará and setting up networks established through connections at UFMG, I was able to connect with local actors. These connections proved very important, as they facilitated introductions to other relevant stakeholders essential for the fieldwork and research. ***The time-intensive nature of relationship building became evident during the initial phases of the fieldwork (see Box 2). This experience exemplifies the importance of allowing sufficient time for trust to develop when conducting research in indigenous or traditional contexts.***

Appendix 5 provides further details about the establishment of local networks in Pará and a comprehensive timeline of the ten-day fieldwork period. Before we started our fieldtrip I send around a detailed day- to-day itinerary, which can be found in Appendix 10. I also kept a day-to-day log in the office that I worked at, as shown in figure 7. This plan outlined our daily schedule, the locations we would visit,

the means of transportation, and the individuals we would interview. Details of all visits, (in)formal conversations and observations during the fieldwork can be found in Appendix 9.

Box 2: Building Community Trust and Cultivating Local Networks

Building a relationship with the community leader of Curralinho was crucial for gaining access to the local communities, residing in the area. It required time and patience, as she expressed concerns about visiting researchers and companies appropriating local knowledge for their own research or commercial purposes. Much of the research conducted in the region was rarely communicated back to the communities. Given this legitimate skepticism regarding my research intentions, I engaged in multiple conversations and maintained frequent WhatsApp correspondence with the community leader. Her initial distrust became apparent as she kept modifying her promises: first offering accommodation at her house during our community visits, then changing these arrangements in other conversations. During a somewhat vague video call, her reluctance to help us became evident. This made me nervous, as we had already booked the trip and without her consent, visiting Curralinho would be impossible. I consulted professors to prepare for community interactions and read literature about 'research extractivism'. I came to understand that many Western research designs are not designed for non-Western environment, something I will elaborate on in Box 3. Building a personal relationship with the community leader was essential before I could expect her to connect me with respondents.

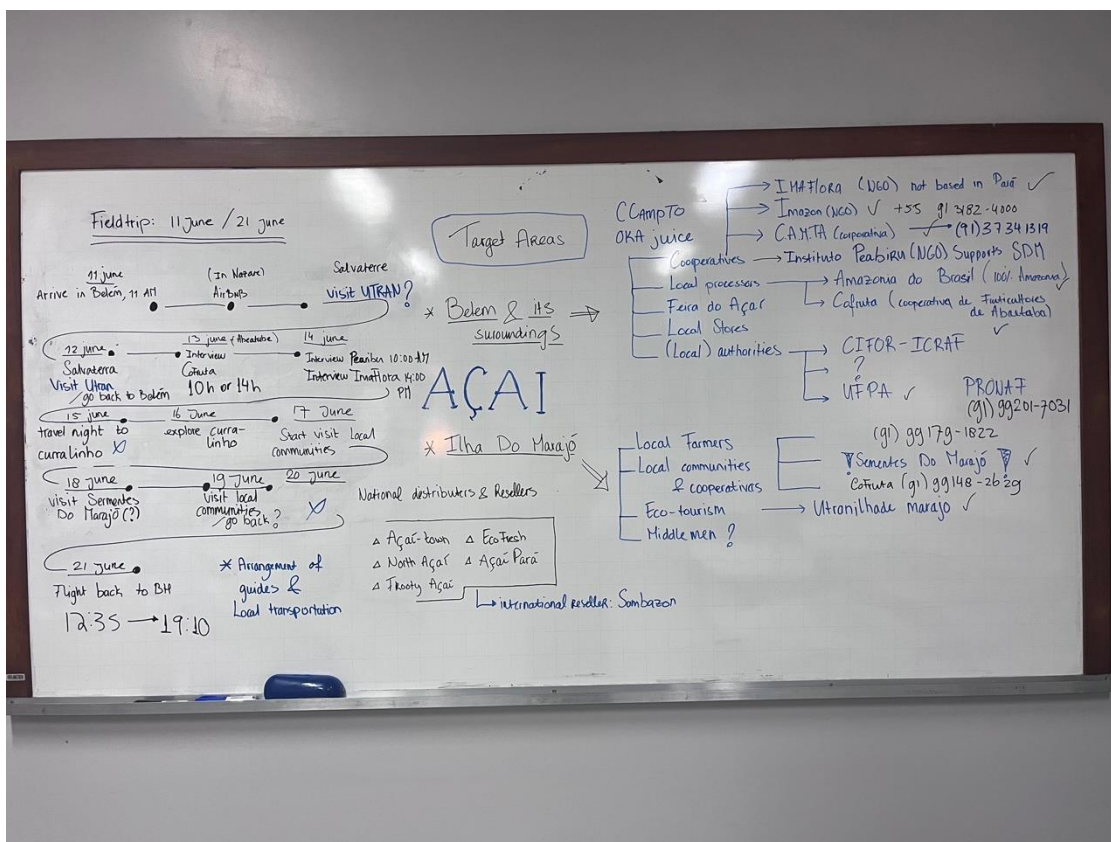


Figure 7. Fieldwork planning



Figure 8. Middlemen trading açai at the Ver-o-Peso in Belém. Photo by author (2024).

3.4. Key respondents during fieldwork

The table below shows details of all respondents who were formally interviewed during the fieldwork. The selection of interview participants was based on the identification of key actors within the açai value chain in Pará, as highlighted in existing literature. Although some intended participants did not respond to interview requests, a comprehensive understanding of the relevant actors and their roles was achieved through extensive interviews and conversations with other stakeholders and a thorough review of academic and grey literature. Most of the empirical findings presented in chapter 4 and 5 are derived from these interviews. The respondents are numbered in the table from 1 to 9. These numbers will be used to reference to the respondents in the following chapters. However, as mentioned before, both during the fieldwork and in the months preparing for the fieldwork, many informal and preparatory conversations took place to help better understand the research topic, the socioeconomic and geographic context of the Amazon, and to build a network in Pará. These interactions helped shape the broader context of this thesis. Thus, the table shown below, is not exhaustive but simplified for reading purposes. A more elaborate documentation of (in)formal conversations and correspondence can be found in Appendices 8, 9 and 10.

Table 1. Description of respondents during the fieldwork

	4. Date	Participant(s)	Description of Participant	Duration (hours)	Location	Interview Focus	Documentation
1	June 13, 2024	Administrative Staff, Cofruta	Two employees responsible for daily administrative operations at Cofruta, a local açai processing cooperative	1.5	Cofruta Processing Factory, Abaetetuba, Pará	Daily operations and processing procedures at Cofruta	Audio recording
2	June 13, 2024	President, Cofruta	Leading executive of Cofruta, involved in strategic decision making and community relations	1.5	Cofruta Processing Factory, Abaetetuba, Pará	Historical development of Cofruta and regional açai industry	Audio recording
3	June 14, 2024	Communications manager, Instituto Peabiru	NGO representative working with Amazonian communities on sustainable development	1	Instituto Peabiru, Central Belém	NGO's community support initiatives and local development	Audio recording
4	June 14, 2024	Senior Researcher and	Scientific expert specializing in	1	Imaflora, Central Belém	Deforestation patterns and	Audio recording

	Biologist, Imaflora	Amazon deforestation monitoring			community pressures		
5	June 16, 2024	Former president açai cooperative	Former president of Sementes do Marajó, key figure in establishing local açai cooperative	1	Family home, Boa Esperança community, Amazon rivers	Organizational development and forest management of açai	Audio recording
6	June 17, 2024	Executive açai producers	Executive producer at Sementes do Marajó, responsible for certification compliance and production oversight	1	Family home, Boa Esperança, Amazon rivers	Açai certification and documentation	Notes
7	June 18, 2024	Producer Family Mother	Local açai producer and supplier to Sementes do Marajó, representing traditional harvesting family	1	Home porch, Boa Esperança, Amazon rivers	Conversation about forest life and the role of açai in their family	Notes
8	June 18, 2024	Producer Family Couple	Açai producers with additional insight from husband's former role as middleman in the supply chain	1	Home porch, Boa Esperança, Amazon rivers	Conversation about forest life and the role of açai in their family and experiences as working as middleman	Notes
9	August 12, 2024	Environmental Secretariat Representative	Government official from SEMAS (State Environmental Secretariat)	2	Online	Environmental policies regarding the açai value chain	Audio recording

3.5. Data analysis

The qualitative data analysis was conducted by dividing large data sets into smaller units, which were then labeled with codes and compared to identify connections between them (Van Thiel, 2014). The interviews were analyzed using an inductive approach, aligning with the inductive nature of the interviews themselves, which were tailored to the cultural and socioeconomic contexts of the respondents. Before coding and analyzing the data, the interviews were transcribed in Portuguese and subsequently translated into English. The analysis was carried out using Atlas.ti, a software tool for qualitative data analysis. The coding process evolved progressively during data examination. By continuously revisiting the various interviews, a coding system emerged, revealing recurring or opposing themes and overlaps within the data units. These coding structures formed the foundation of the empirical evidence presented in this thesis. A detailed overview of these coding systems is provided in Appendix 12.

Research ethics

Applying Western concepts to organize non-Western ideas and movements presents challenges, including the risk of imposing Western-based frameworks onto environmental movements and other stakeholders in the Global South. This can create misunderstandings and further injustices rather than mitigating them (Álvarez & Coolsaet, 2020). Non-Western knowledge is often perceived as secondary or valuable only for empirical observation, while Western scientific frameworks dominate theoretical discourse (Álvarez & Coolsaet, 2020). This notion is rooted in decolonial theory, which critiques the imposition of Western epistemologies at the expense of other ways of knowing. Such epistemic dominance constitutes a more subtle but nonetheless harmful form of violence, exacerbating environmental injustices for marginalized communities in the Global South (Rodríguez & Inturias, 2018). ***The methodological challenges of conducting research across cultural boundaries are further explored through a personal reflection in Box 3.***

It is crucial for researchers in environmental science to critically reflect on their knowledge production practices avoiding replicating the extractive logic of capitalism (Gorman, 2024). As previously discussed, it is relevant to define nature not only in a scientific context but also in an empirical and normative one, as normative worldviews and values are at play in any definition of nature (Visseren-Hamakers & Kok, 2022). These ethical considerations were central to this research, and efforts were made to integrate them at every methodological stage. By emphasizing an inductive research approach, the study sought to create space, and encourage respondents to share their worldview and ways of knowing regarding the research topic. Leading up to the semi-structured interviews, each respondent was asked for consent to record the interview. However, three interviews were not recorded as these respondents appeared very nervous about the process. Anonymity was guaranteed for all respondents. Additionally, agreements were made with the community leader to simplify and translate the final research into Portuguese, ensuring that the community in Currálinho could also benefit from the findings.

Box 3. Research extractivism

During the research process, I was confronted with the historic effects of Western colonialism on local Brazilian populations. As briefly explained in an earlier text box about building community trust, I initially struggled to establish a relationship with the community leader of Curralinho due to her negative experiences with researchers from various institutes and companies. Unfortunately, this situation is not uncommon. The concept of 'research extractivism' refers to practices where researchers (often from Western institutes) 'extract' data or knowledge from (frequently marginalized or indigenous) communities without providing benefits to those communities or acknowledging their contributions. Additionally, the concept of 'research' itself is a Western construct, typically offering minimal involvement for local communities in research design or implementation. Indigenous knowledge is often only recognized as "true" or "legitimate" if it fits within a Western framework and holds value for non-indigenous cultures (Smith, 2021). This realization increased my awareness of my role as a researcher during the fieldwork. Throughout the fieldwork, but also my time in Brazil in general, I observed how my interactions were sometimes influenced by my skin color, limited Portuguese proficiency, and European background. The range of responses during my fieldwork was telling: some people appeared shy or anxious during our interactions. Some others refused direct engagement with me, choosing instead to communicate with my Brazilian research colleagues. Other people were very interested or curious about my country of origin and the reason for my visit. They took proud in showing their country.



Figure 9. Photo of one of the main streets in Curralinho. Taken by author (2024).

3.6. Introduction to the case study

Description of the study sights

The state of Pará was chosen as the focal point of this case study due to its status as the largest producer and cultivator of açai in Brazil. Additionally, açai is widely regarded as a fundamental aspect of Pará's cultural identity (Matos et al., 2017; Filho et al., 2021). With 92.1% of Brazil's açai production concentrated in the northern regions, Pará led national production in 2023 with a total of 167,600 tons, accounting for 70.2% of Brazil's total açai output (Instituto Brasileiro de Geografia e Estatística [IBGE], 2024). Pará is Brazil's second-largest state, covering approximately 1.24 million square kilometers, which represents 14.6% of the national territory and nearly 45% of the northern region. Despite its significant contributions to Brazil's economy—particularly through açai exports—Pará also has some of the country's highest poverty and child labor rates (Talley, 2019).

Belém: port to the Amazon

Belém, the capital and largest city of Pará, serves as the epicenter of national and international açai trade. With a population of 1,398,500 people (IBGE, 2024), the city functions as a key logistical hub for the Amazon region. It is often considered the "port" to the Amazon due to

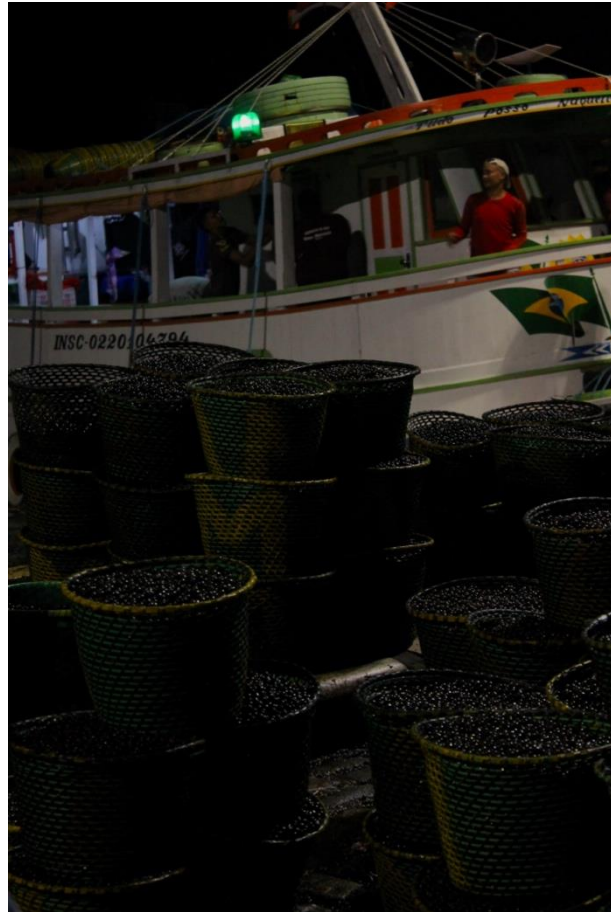


Figure 10. Photo of latas (baskets) açai in Belém. Photo taken by author (2024).

its extensive network of rivers and the presence of the Port of Belém, the region's largest port (Weinstein & Moegenburg, 2004). In addition to its economic significance, Belém is also a regional center for governmental organizations, NGOs, and academic institutions, all of which are involved in various aspects of Amazonian governance and conservation efforts (Talley, 2019). One of the most significant locations in Belém is the *Ver-o-Peso* market, which houses the *Feira do Açai*, the central trading point for açai in the Brazilian Amazon (Weinstein & Moegenburg, 2004). Buyers, sellers, and intermediaries converge here daily to trade açai, which arrives from across the Amazon. The market usually starts at 3:00 a.m., with most transactions completed by 7:00 a.m. During the peak harvest season (July–August), vendors sell approximately 204,000 kg of açai per day. The majority of this açai is comes from Ribeirinhos, sourced from local riverine communities that harvest wild açai from surrounding floodplain forests (Weinstein & Moegenburg, 2004). Given Pará's economic and cultural centrality in the açai trade, as well as the accessibility and concentration of key actors involved in the industry, the state was a strategic and practical choice for this research.

The isolated communities of Curralinho

The study site was partially located in *Curralinho*, a municipality on *Ilha do Marajó* in the eastern Amazon region. Situated at the mouth of the Amazon River, *Ilha do Marajó* is the largest freshwater-surrounded island in the world, although its northeastern coastline faces the Atlantic Ocean (Cohen et al., 2008). The island is characterized by its vast *várzea* region, an ecosystem shaped by seasonal and tidal flooding and poorly drained clay soils (Weinstein & Moegenburg, 2004). *Curralinho*, home to approximately 36,500 residents (IBGE, 2024), is one of the most remote and socioeconomically challenged municipalities on the island. The region is only accessible by boat or small aircraft, with boat journeys from *Belém* taking 8 to 12 hours depending on tides and vessel type. Flights take around 45 minutes but are rare due to high costs and are mainly used for emergencies or official purposes. The isolation of *Curralinho* contributes to limited access to healthcare, education, and basic sanitation, making it one of the many municipalities in *Pará* with high levels of social exclusion (Santos De Aguiar et al., 2023).

Despite these challenges, *Curralinho* plays a crucial role in *açai* production, which forms the backbone of the local economy. While timber and other non-timber forest products contribute to livelihoods, *açai* is the most significant NTFP in the region (Talley, 2019). Harvested from the surrounding floodplain forests by *Ribeirinho* communities, *açai* from *Curralinho* is transported via the Amazon's extensive river network to markets in *Belém*. This connection to *Belém*, the primary trade hub for *açai*, is vital for producers and middlemen seeking access to broader markets. *Curralinho's* economy and daily life are deeply intertwined with the Amazon's natural cycles, where transportation, trade, and even food security of locals depend on the river. The challenges of isolation shape the ways in which local communities organize their livelihoods, reinforcing the need for sustainable and community-driven approaches to resource management in the region (Talley, 2019).

Botanical description of açai

Açai, (*Euterpe oleracea*) as understood in this research is a multi-stemmed palm native to the Amazon basin, producing purple berries that form a critical part of local diets and economies (see Appendix 6 for a detailed botanical description).



Figure 11. Unripe wild *açai* in palms. Photo by author (2024).



Figure 12. Wild açai palms at the Amazon estuary. Photo by author (2024).

Maps of the study sights



Figure 13. Map of Brazil with emphasis on Isla do Marajó (The Editors of Encyclopaedia Britannica, 1998).

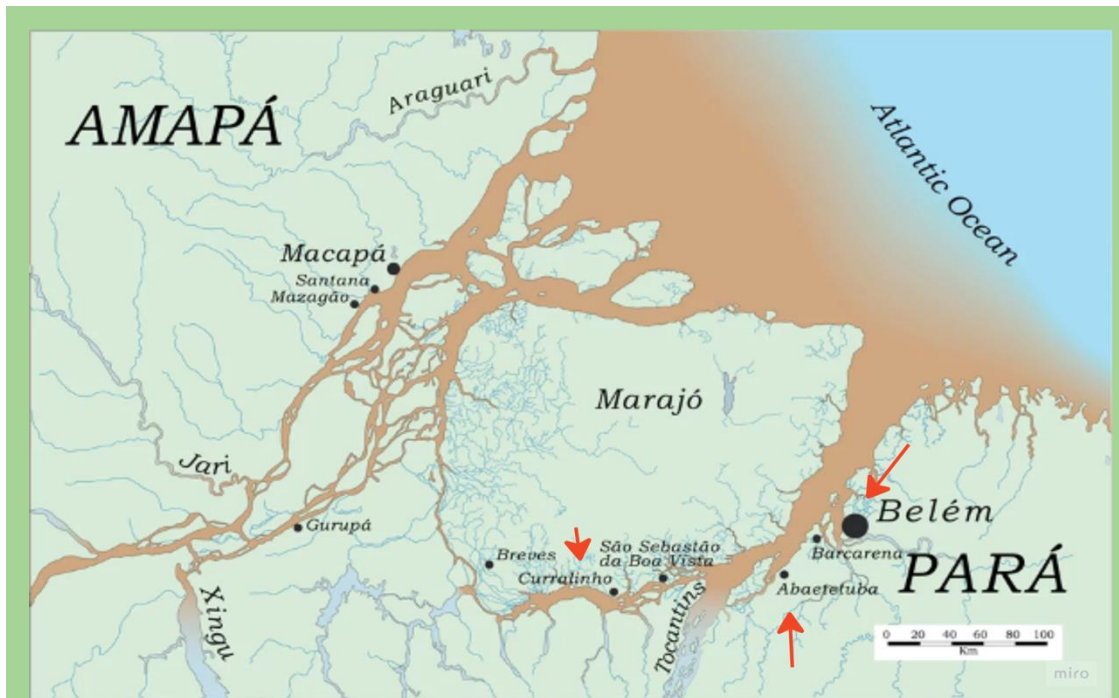


Figure 14. Edited map of Pará with Belém, Marajó, Abaetetuba and Curralinho included and appointed. (Amazonwaters.org, 2024).

4. Pará's açai value chain explained: mapping key actors and their role in the chain

4.1. Snapshot of the current situation

This chapter provides a comprehensive explanation of the current açai value chain in Pará and thereby addressing the research question: *"What is the current structure of the açai value chain and which actors have been influential in shaping its policy arrangements?"*

The chapter is part of the empirical findings; however, it is not part of the analysis. It is relevant to understand the context and background of all actors included in the value chain, before the analysis can be understood. The research process allowed for the construction of a simplified representation of the current açai value chain in Pará. It is relevant to note that this representation is a simplified depiction of empirical findings specific to Pará. Amazonian value chains are characterized by their complexity, variability across locations, and dynamic nature. A more detailed version of the value chain is provided in Appendix 13. The presented diagram identifies the key actors, their roles, and points of engagement within the chain.

This simplified value chain reflects the materialization of bioeconomy discourses and their potential counter-narratives. Throughout the chain, various power dynamics, resource allocations, policies and agenda-settings are evident, which will be elaborated upon in the next chapter.

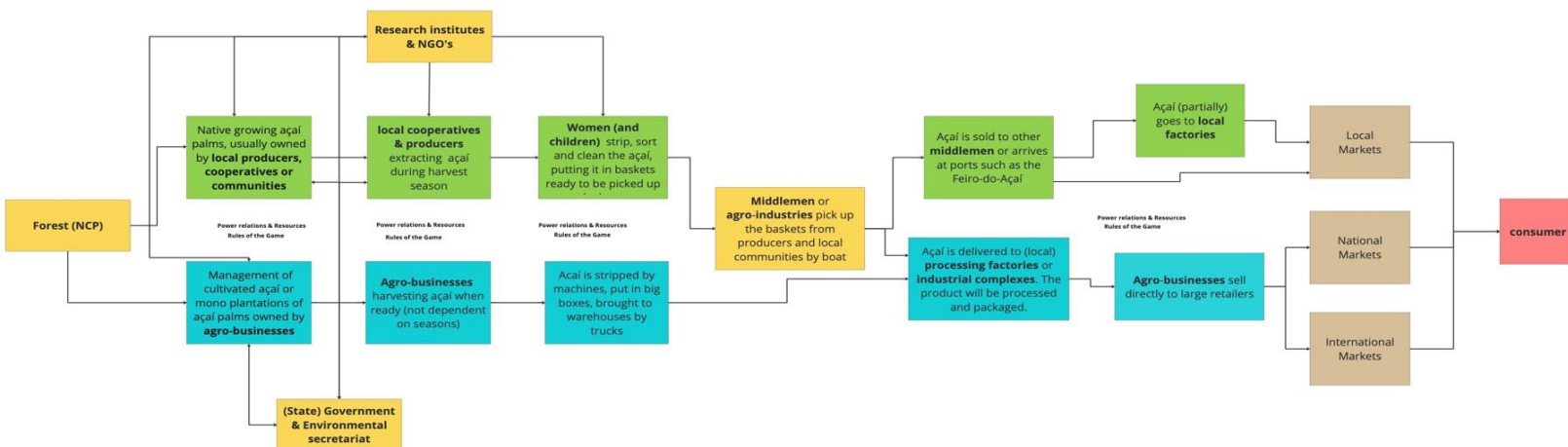


Figure 15. Simplified example of the açai value chain in Pará. Based on personal observations of the author and on Superti et al., (2018), Veloz (2020), Vanni (2018) and Weinstein & Moegenburg, (2004).

The value chain distinguishes two interconnected pathways: the green elements represent a traditional value chain emphasizing natural extraction and informal trade, while the blue elements illustrate a value chain focused on cultivation and formal trade. Although these chains are depicted separately, they often intersect in practice.

4.2. Introduction of the involved actors

Eight different types of actors were identified to play a crucial role in the açai value chain. These actors will be set out, one by one, in the paragraphs to follow. After the introduction of the various actors involved in the açai chain, the other dimensions of the PAA will be discussed.

4.2.1. Smallholders & local communities

Many communities and smallholders living in the Amazon are fundamental for the conservation of the Amazon and for the production of NTFPs, such as açai. (Superti et al., 2018; Veloz, 2020; Vanni, 2018). These local communities and smallholders often form the *first node* of the (in)formal açai value chain. Açai is generally seen as a very important product within the communities. Families both eat açai as a daily staple, but also harvest and sell açai during harvest season. During this season, families harvest as much product as possible, for both to secure their income, but also to make sure that they have enough açai for the "off season", as açai only grows during summer. Producers go into the forest to climb high into trees to harvest açai berries. Usually women (and occasionally children) help the producers clean the açai and prepare the fruit to be picked up by boats. Most of these extractive families depend on the açai harvest, as it is usually their main source of income. Respondent 7 acknowledged this: "*in this way we can take care of our families...açai influences our our day positively.*" Because these communities are so dependent on the harvest of açai and thus on the growth of the trees, they tend to be protective of the standing forest, emphasizing the *fundamental* role of açai in the forest. Informal communication and agreements are usually the *modus operandi* within communities and between local producers; most açai is sold to middlemen without any proof of documentation (Superti et al., 2018; Veloz, 2020; Vanni, 2018). For example, respondent 8 mentioned that middlemen would randomly stop by their house by boat asking if the producer had açai to sell. According to the interviewed producers, açai is important for people, birds and other species. Some of the interviewees mentioned that açai solidifies the soil and that the branches contain iron, which helps other species to grow. Respondent 7 said the following about caring for açai and the forest:

"I have a very nurturing relationship with açai. I am glad that there is açai and I like taking care of the forest through manejo...The leaves nourish the forest. Taking care of açai humanizes the forest... The forest is everything to us".

These families feel a responsibility to protect the forest from invaders as they are aware that foreigners want to deforest land. These families believe that they must protect the forest as they depend on it. People living in extractive communities (*produtores*) that extract açai from the forest often see themselves as "protectors" of the forest.

4.2.2. Local cooperatives

There are various local cooperatives based in and around the Amazon that support local communities and family farmers to harvest their fruits and vegetables, train them to organize their business in a sustainable way, and buy products from family farmers (Futemma et al., 2020; Pepper & De Freitas Navegantes Alves, 2017). These cooperatives usually have networks with companies or agro-industries to which they then sell the product. These cooperatives (*cooperativas*) are usually situated at the beginning of the value chain, forming the *second node*. The cooperatives included in this research are

Cofruta and *Sementes do Marajó*. Both cooperatives have strong ties within the local communities they work with. The employees of these cooperatives are also part of these communities and have a lot of local knowledge about the history of the communities, the forest and the native fruits and vegetables growing in the forest. Both cooperatives were formed because the communities that these cooperatives are connected to, sought greater social cohesion and the ability to sell fruit collectively at a better price. Respondent 1 described her work as:

“So the cooperative is not for profit, but for the welfare of the members. Yes, for the well-being and improvement of the members too. In fact, when the cooperative was set up, it was to add value to the product within a family structure...for a long time this açai product was undervalued and at the market it was thrown away. And that’s why the cooperative came about, to organize this production and sell the product in a more correct way”.

Cofruta is located in *Abaetetuba*, which is relatively close to Belém (about 2 hours by car from Belém). *Sementes do Marajó* is located in the municipality of *Currálinho*. The açai is usually transported by boat to Belém (or to *Amapá*), which can take up to 10 hours. Both cooperatives buy açai (and other fruits as well) from local farmers at a (according to the cooperatives) fair price and resell the açai to agro-industries with they usually have contracts with. *Cofruta* processes açai and other fruits and delivers fully packaged end products to companies, as they have a processing factory. *Sementes do Marajó* buys the açai from local producers and then sells it to agro-industries or ships it to processing plants in Belém. Both cooperatives train producers in the sustainable harvesting of açai.



Figure 16. Buriti pulp ready for selling at the *Cofruta* processing factory. Photo taken by Author (2024.)

4.2.3. Middlemen

Middlemen play a crucial role in the açai supply chain (as well as in other Amazonian value chains). There is a large body of literature on the influence of middlemen in the açai value chain and the role they play (Superti et al., 2018; Veloz, 2020; Vanni, 2018; Weinstein & Moegenburg, 2004). All respondents have spoken about the role of middlemen in the value chain and how they influence (local) markets. Middlemen are usually scattered over the complete value chain. The number of intermediaries involved varies depending on the region, the season and the final destination of the products. The middlemen stop by the producers (in the forest) to pick up the açai by boat. In general, middlemen pay low prices for the harvested açai, however, these middlemen are often the only source for producers to sell their harvest to. Middlemen usually have a deep understanding of the complex logistics in the Amazon and can organize the capital to distribute the açai. For this reason, middlemen play a crucial role in the chain. Entering the Amazon can be dangerous, and a good understanding of all rivers is necessary to navigate the right way. Depending on where the açai is distributed to, middlemen sell to other middlemen, which significantly increases the price. When middlemen arrive with the product in Belém (at the Feira do Açai), they usually sell to other vendors, processing factories or agro-industries. Buying and selling açai through the network of middlemen is usually considered an informal way of supplying açai. The açai is generally not certified, as there is no way to control where the açai comes from and how it is harvested. Prices fluctuate, as they are highly dependent on the harvesting season and the origin of the açai. Respondent 3 commented the following on the role of middlemen in the value chain:

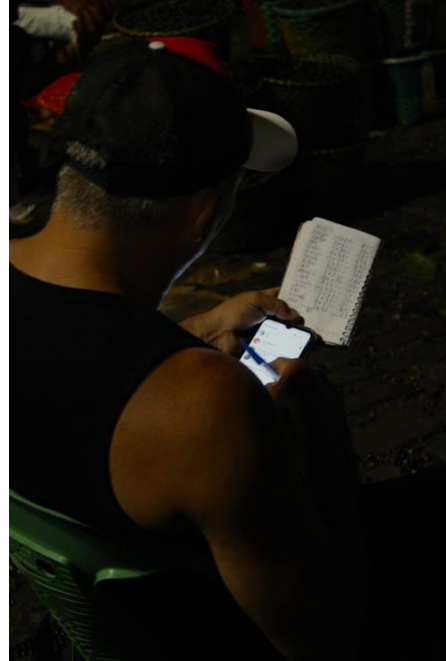


Figure 17. Middleman doing his administration at the Feira do Açai. Photo taken by author (2024).

“The guy who picks up the açai at the producers house and takes it to the company or here to the port. He earns a lot and has a lot of influence. Those who have less influence are the extractivists, because they depend a lot on their means of getting the açai from their homes to the ports. [...] This is precisely because of this lack of access, because of the social and economic condition of these communities”

4.2.4. Agro-industries

Agro-industries and large companies play a major role in setting prices and regulations within the açai value chain and are usually the node towards the end of the chain (Vanni, 2018). Some of these industries buy directly from cooperatives, municipalities or intermediaries and process the product themselves, while others buy already processed products from processing plants, cooperatives or other suppliers. Two large (agro) companies mentioned in several interviews were *Sambazon* and *Natura*, companies that also have been studied by other researchers (McGahan & Pongeluppe, 2023; Pepper & De Freitas Navegantes Alves, 2017; Vanni, 2018). *Sambazon* is an American company and market leader that sells açai in the United States and is slowly gaining market share in Europe. *Sambazon* markets açai as a

healthy and energizing superfood that can be consumed right before or after surfing or any other sport. They claim to only sell açai products that are 'ethically sourced' and 'hand harvested' by local farmers, making it 'Certified Organic' and 'Fairtrade' açai (Sambazon, 2024). Another company interested in buying açai in bulk, is Natura. Natura is a Brazilian cosmetics company that uses a lot of (indigenous) organic products to make cosmetics. They use açai in their shampoos, soaps, perfumes, shower gels and many other products. They claim to work exclusively with fair trade ingredients (Natura, 2024). Cofruta is currently researching the possibility of extracting açai oil from the açai seeds, as they anticipate a demand for cosmetic açai oil in the future.

4.2.5. Research institutes & Non-Governmental Organizations

Several research institutes and NGOs around Belém focus on supporting local and indigenous communities, monitoring deforestation, and researching the Brazilian Amazon. This study examines two key institutions: *Imazon* and *Instituto Peabiru*.

Imazon, a well-established research institute, tracks deforestation in the legal Amazon and regularly publishes data on forest loss and degradation. Through their field research, they develop sustainable models that can be implemented in Amazonian communities with as goal to create income and jobs for local communities. These models are often presented as well to public institutions and decision makers. Imazon primarily serves an advisory role, providing environmental secretariats, municipalities, and state governments with crucial information about deforestation, degradation, and developments affecting local communities.

Instituto Peabiru is an NGO committed to supporting local communities through various programs focused on Amazonian value chains, biodiversity conservation, corporate social action, and social protection. They help communities gain access to basic rights and services, including education, sanitation, and social protection. Peabiru's core mission is to amplify community voices, operating strictly on a request basis - they only work with communities who ask for their support. Their approach emphasizes community autonomy, never entering territories without permission and ensuring communities maintain control over their own decision-making processes.

4.2.6. (State) Government & environmental secretariat

This research included an interview with a technical advisor from the *Secretariat of Environment and Sustainability of the State of Pará (SEMAS)*. The advisor provides specialized guidance on environmental challenges including deforestation, technological solutions, environmental monitoring systems, and fire management, while supporting the Chief Secretary and Assistant Secretariats. The Environmental Secretariat's primary function is overseeing natural resource management in the state of Pará. They handle licensing and the registration of activities conducted by entrepreneurs, families, and small farmers within the Legal Amazon territory.

An example of their registration framework is the Cadastro Ambiental Rural (CAR), which plays a crucial role in documenting and managing rural territory profiles. This system monitors land use in rural areas and aims to increase community visibility. Through CAR registrations, the government can track activities within property boundaries and verify compliance with the Brazilian Forest Code (de Alcântara Laudares et al., 2014). Additionally, the state government provides financial support and subsidies to various stakeholders, including research institutes, local NGOs, and cooperatives—a practice confirmed by all actors interviewed during this research.

4.2.7. Financial institutions

All interviewees identified several banks or financial institutions that have influenced their daily business. Financial institutions often support local initiatives and programs, and these actors are very dependent on them. Cofruta, Sementes do Marajó, Imanzon and Instituto Peabiru all mentioned receiving some kind of support from financial institutions or banks. Examples mentioned were the '*Caixa Fund*' or the '*Fundo Amazônia*'. Both funds are managed by banks such as *Caixa* or the *Brazilian Development Bank*. The banks have special funds that NGOs and cooperatives can apply for. Respondent 3 gave an example of social aid they used to receive from Petrobras (a Brazilian oil company) to set up a social program in Curralinho, but that Petrobras suddenly withdrew their fund:

“Petrobras blocked all the projects and they weren't renewed...The government was investigating corruption. And all funding when it came to social aid was cut off. Because Petrobras is a state company and they ended up [...] funding the social initiative. And then, at the time, none of this program's initiatives were renewed by the entire Petrobras program”.

Banks also play an important role in providing credit to small farmers and cooperatives. There are several government programs that provide credit. One such program is the Programa Nacional de Reforma Agrária (PNRA) (National Agrarian Reform Program). The PNRA gives a '*credito de instalação*', which is a credit that families in rural areas can apply for in the first stage of their business.

4.2.8. The Forest

The actors interviewed all have their own epistemological view regarding the forests' contribution to them. To characterize how the forest is valued from different perspectives, but also to give nature's contribution a central role in this thesis, the forest is seen as an actor and its part in the value chain is explained. Many local actors described açai to be the cultural pride of Pará and that açai is often seen as the identity of the Amazon. Conversations about açai and the forest were often intertwined and seen as a coherent theme. Respondent 9 described her view of açai as follows:

"it needs to be valued in marketing from the point of view of more than just being a food, but that it has the identity of the Amazon, the identity of the state of Pará. We are the largest producer in Brazil, so I think that's it. For me, it's like I say, it's an experience, it's the pride we have, before anything else. It's a pleasure to drink açai and know that we're the largest açai producer in the country!"

Other actors who live in the forest said that to be living in the forest is very gratifying. Living in the forest makes them happy and allows them "a life at ease". They take pride in the forest and see themselves as protectors of the forest. One of the producers (respondent 8) living in the forest said: *"We have the best relation possible with the forest. There are a lot of people in and outside of Brazil that want to deforest, so we need to protect the forest because we depend on it"*. Another community member (respondent 5) said the forest to have effect on their mood and mental health: *"it's a mental therapy, [the forest] helps people to calm down, if they are stressed, they go into the forest and come back another person"*. Many producers and local communities that work with açai also preserve the landscape. The communities spend a lot of time preserving the landscape of the island to make a living. The management of açai is the main source of income for most of them. Most of the açai consumed in Pará comes from these extractive communities and therefore from the forest. The extractive communities are important for the forest, but also for everyone who consumes açai. Respondent 3 mentioned the following: *"Most açai production today is extractive. It's native açai, açai that's in the forest. You need the forest...So I see it like this: I see a chain that has the potential to transform, to show that the forest can generate value for communities... It's an opportunity to show the value of the forest"*. The president of Cofruta (respondent 2) grew up in the Abaetetuba region, an area where local communities produce a lot of açai, palmheart and sugarcane. He explained that he grew up in a family that did not have much money to spend, but that açai and the forest had always been a way of life to them. He explained that his relationship with açai and the forest is indescribable:

"[...] I can't even explain it [...] I can't even find a sentence, a word to say [...] We were born in the açai grove, right [...] I'll see if I can make one [...] Ever since I was born, açai has always been a staple food in our family. It was a matter of food, so there was nothing else, just açai. There was nothing else to eat [...] it was just açai...so people would never cut down the açai trees."



Figure 18. The Forest. Photo taken by author (2024).

5. Conflicting agendas in the value chain

This chapter examines the empirical findings related to the three remaining dimensions of the Policy Arrangement Approach: discourses, power and resources, and rules of the game. Each research question is addressed sequentially, starting with the discourse dimension.

5.1. The discursive role of açai

This paragraph is dedicated to answering the research question: *“How has the role of açai evolved to a global product in the bioeconomy?”*

During this research did all respondents recognize that açai is an important NTFP for the Amazonian bioeconomy and emphasize that its production generates opportunities for local communities. There is consensus among respondents regarding the bioeconomy discourse and its positive impact on the Amazon and local economies. However, divergent views emerge concerning how açai should integrate into this bioeconomy. Two opposing discourse coalitions were identified regarding the perspectives of actors on how to sustainably meet the growing demand for açai, within the value chain. The sustainable development of the increasing demand for açai is interpreted in different ways by the respondents. The respondents hold different *‘utopias’* as to how this desired bioeconomy status should be reached: the first discourse coalition believes cultivation to be the most sustainable way of producing açai. The second discourse coalition believes natural extraction to be the most sustainable way of producing açai. The empirical evidence for the above-named statements will become clear in the paragraphs to follow.

5.1.1. Açai as an indigenous staple food

Before gaining international recognition, açai was primarily consumed locally by the population of Pará. It held minimal economic value and was closely associated with the indigenous and river-dwelling communities of the Amazon. Respondent 3 characterized açai as the food of the "river dwellers," a staple consumed daily by Ribeirinhos. Those living on the outskirts of Belém often relied on açai because it was an inexpensive source of sustenance. As a result, açai carried a "negative" connotation, often being linked to impoverished or indigenous populations. Ribeirinhos, many of whom inhabit the Amazon region, have historically been marginalized, both socially and economically. Generations of cultural and economic exclusion have left these communities in poverty. Indigenous and local communities have long been undervalued and underestimated in their role as stewards of the forests they inhabit, as evidenced by various studies (Bull et al., 2018; Vanni, 2018; Inoue, 2018).

Before the 1980s, local populations in the Amazon primarily relied on producing indigenous fruits such as sugarcane, andiroba, or cupuaçu, with açai serving mainly as a dietary staple rather than a commodity for trade. Traditionally, açai was mixed with manioc flour, fish, or rice, forming the foundation of the diet for Amazonian inhabitants, who typically consumed it two to three times a day (Personal observations, 2024; Brondízio, 2008). In the late 1980s, researchers and environmental organizations began identifying açai as a potential NTFP that could support forest conservation while delivering economic benefits to local communities (Vanni, 2018; Weinstein & Moegenburg, 2004). This potential was also recognized in the 1990s by a few surfers. Respondent 2 recounted how açai gained new status when surfers participating in

a Pororoca tournament¹ in the Amazon discovered its ability to sustain their energy levels. They began popularizing açai as a beach beverage in cities like Rio de Janeiro. This narrative is confirmed by other researchers as well (Neves Fonseca & Lima, 2024; Vanni, 2018). The preparation of açai also changed: instead of the slightly bitter broth traditionally consumed in the Amazon, it began to be served as a sweet beverage-like treat, often paired with fruits and other energy-rich foods (Neves Fonseca & Lima, 2024).



Figure 19. Açai prepared in a traditional way in the Brazilian Amazon with manioc flour (on the left). Photo taken by Author (2024).



Figure 20. Açai prepared in a 'Western' way, bought in an açai shop in Belo Horizonte. Photo taken by author (2024).

5.1.2. The rise of the açai market: from staple to superfood

A turning point for the popularization of açai came in the early 2000s when national and international companies began to recognize the market potential of açai, particularly in the United States, where it was branded as a "superfruit" due to its high nutritional value (Vanni, 2018). Some scholars even gave a third connotation to açai as: "a food of the working masses" (Neves Fonseca & Lima, p. 252, 2024). In these cases, açai is not consumed because its healthy, but because it is extremely sweet, energizing, fresh and usually very cheap. This kind of açai is prepared with granola, condensed milk, sweets and powdered milk, all of which are ultra-processed foods (Personal observations, 2024; Neves Fonseca & Lima, 2024). ***The cultural significance of açai across different Brazilian regions is illustrated through a personal narrative in Box 4.***

¹ The Pororoca is a tidal bore, a natural phenomenon occurring when an incoming high tide flows into shallow rivers, generating waves. In the Amazon, this phenomenon attracts surfers, as the Pororoca is renowned for producing some of the longest waves in the world (PBS News, 2023).

This increased demand for açaí led to the initial organization of the value chain, with cooperatives like Cofruta and Sementes do Marajó emerging to centralize and formalize production in local communities, as extractive communities still used açaí as a staple food. These cooperatives played a crucial role in introducing producers to new business practices that were better aligned with national and international market standards, as traditional and informal business practices did not ‘match’ with Western market standards. Respondent 2 explained challenges of this transition that he experienced with producers that sold sugarcane:

“Historically, the sugarcane people were like this. The sugarcane people took the money before they produced the cane. Yes, you take the money to plant, to drill and to plant cane. When the cane was ripe for cutting, you already owed the mill owner. So it still is today. Nobody wants to deliver the product only to receive [money] 10 days later, 15 days later. They want to receive it immediately.”

Box 4. Breakfast with açaí

After a ten-hour journey on a night boat, we arrived at 3:30 in the morning at the docks of Curralinho. We had no clue what to expect. In my last contact with the community leader, she promised that her brother would pick us up at the dock and show us a place to rest for the remainder of the night. However, I had never spoken to her brother and could almost not believe that someone would randomly pick us up in the middle of the night (and internet service is nearly impossible in the Amazon, so once we stepped on the boat, I had no means of connecting to the world). I had to trust them anyway. Both me and the other student anxiously stepped off the boat, looking for a man as described by the community leader. Someone approached us immediately after we walked onto land. He recognized us right away. After five minutes of friendly conversation, I felt major relief; this man had no bad intentions and wanted to provide us a safe place to spend the night. He welcomed us in and showed us a room where we could hang our hammocks to finally get some sleep. The following morning we were welcomed by him and his parents for a traditional Brazilian breakfast, which consisted of coffee with powdered milk and some baked bread and crackers. We started talking about açaí, and almost immediately he opened a freezer to get us a liter of açaí. The student who came along with me started explaining that açaí is consumed as breakfast or as a sweet dish down South in Brazil. The family started laughing and could not believe us. However, we started eating the açaí with banana as our breakfast, while being watched and playfully mocked by the family as this was not their way of consuming açaí.

During the starting phase, the cooperatives faced challenges in securing market for their product, as stated by both respondents from the cooperatives (respondents 2, 5). Initially, açaí was sold predominantly at local markets, but the rise in global demand began to attract larger buyers. By 2010, the açaí industry experienced significant growth, marking the beginning of its global boom. Both cooperatives saw a sharp rise in demand during this period, driven by the increasing popularity of healthy, organic products like açaí in international markets, particularly in North America and Europe. This boom is confirmed by reports from CONAB². Initially, production data recorded by IBGE³ focused solely on açaí extracted from vegetable and forestry activities, in Portuguese named as the PEVS report (Produção da Extração Vegetal e da

² CONAB (Companhia Nacional de Abastecimento) is a public supply company under the Brazilian Ministry of Agriculture, Livestock and Food Supply. It manages supply and agricultural policies (Companhia Nacional de Abastecimento, 2024).

³ IBGE (Instituto Brasileiro de Geografia e Estatística) is the Brazilian institute for Geography and Statistics under the Ministry of Planning, Budget and Management and focus on statistical research and geoscience data (Instituto Brasileiro de Geografia e Estatística, 2024).

Silvicultura). However, from 2015 onward, IBGE expanded its data collection to include managed açai production from Municipal Agricultural Production (PAM (Produção Agrícola Municipal)). This inclusion

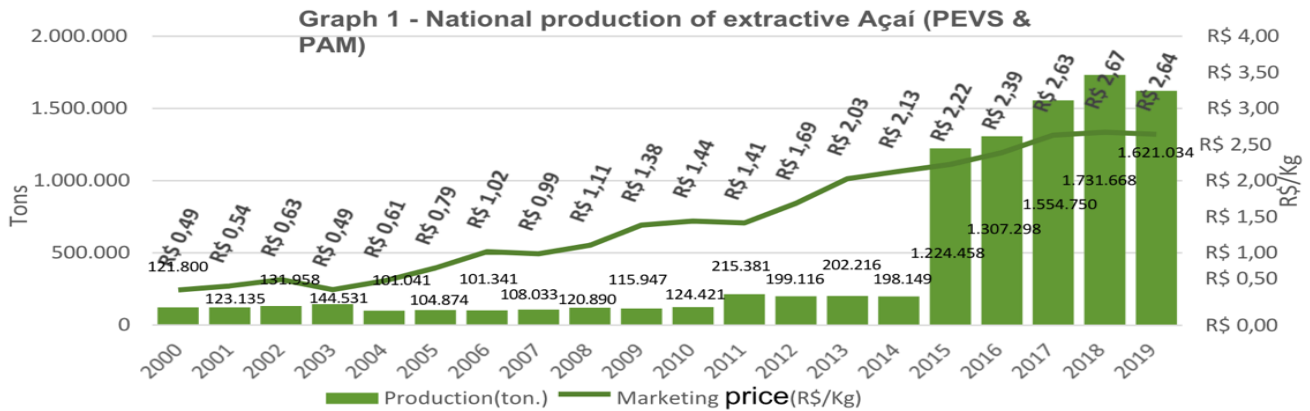


Table 2. National açai production between the years of 2000 and 2019. CONAB (2021).

significantly increased recorded production levels in Pará, the primary producing state, and highlighted the minimal production levels in other states, as can be seen in table 2. The inclusion of data from managed açai productions may also reflect the sudden exponential demand for açai, prompting governments and researchers to respond to this rapid increase in açai production. According to CONAB’s national report, Pará remains the dominant player in açai production both regionally and nationally (CONAB, 2021).

5.1.3. The Promises of the Bioeconomy

The bioeconomy as an overly optimistic narrative

As the (inter)national demand for açai expanded, so did the discourse regarding the Amazonian bioeconomy and the role of açai within it. The global transition to a biobased economy is increasingly seen as an imperative, and Brazil has positioned itself as a key player in this transformation. Since the bioeconomy primarily builds on existing sectors such as agriculture and forestry, it is essential to critically examine the dynamics of power within this transition. Research indicates that the restructuring of Brazil’s agricultural sector has catalyzed collaboration between public institutions and private actors, aiming to influence global agricultural regulatory frameworks (McMichael, 2009; Søndergaard, 2023).

According to various scholars, agribusinesses significantly impact local economies through the expansion of monoculture plantations and innovations within the sector. These developments have widened the gap in socioeconomic opportunities between extractive communities and local industries that benefit from such innovations (Nogueira & de Santana, 2009; Nogueira et al., 2013). Many researchers express skepticism regarding the role of technological innovation promoted by agribusinesses in advancing the Amazonian bioeconomy. These agribusinesses frequently leverage the concept of the “bioeconomy” to justify the expansion of land for flex-commodities such as açai, often resulting in deforestation or the displacement of small-scale farmers, as previously discussed (Bastos Lima, 2021). Both Bastos Lima (2021) and Ollinaho & Kröger (2023) argue that overly optimistic narratives portraying the bioeconomy as universally beneficial are unrealistic. They contend that the transition to the bioeconomy, often framed as

an opportunity to create employment, drive local development, and conserve biodiversity, is strategically employed as a rhetorical device. In practice, agro-conglomerates dominate the bioeconomy agenda. These conglomerates subsume agroforestry, indigenous, and local practices under the same “bioeconomy” label, positioning their activities alongside those of smaller, traditional actors (Ollinaho & Kröger, 2023). Many of these arguments were also reflected during the interviews, as will become clear in the paragraphs to follow.

The bioeconomy as a narrative of prosperity for all

However, there are many other Brazilian scientists, scholars and policymakers that have an optimistic view regarding the future of the Brazilian bioeconomy. Brazil’s pursuit of a biobased economy reflects a broader strategy of ecological modernization, with various actors contributing to this transition. Government agencies, private sector players, and the scientific community have launched numerous projects to position the Amazon as central to this shift (Jepson et al., 2005). Prominent examples include the *Amazon 4.0 Project*, the *Amazon Assessment Report*, and the *New Economy for the Brazilian Amazon* report. The *Amazon Assessment Report*, compiled by 200 researchers under the United Nations Sustainable Development Solutions Network, presents a comprehensive vision for the Amazonian bioeconomy. It emphasizes the importance of integrating local communities and ecosystems into global bioeconomic frameworks while addressing the “paradoxical distance” between the region’s sociobiodiversity and its underutilization. The report outlines the potential to develop diverse products and improve the well-being of forest-dependent communities (Nobre et al., 2021; Ollinaho & Kröger, 2023). Similarly, the *Amazon 4.0 Project*, spearheaded by scientists and researchers, seeks to merge socio-biodiversity with technological innovations. By engaging local communities and leveraging their traditional knowledge, the initiative aims to create high-value products that establish the Amazon as a leader in the global bioeconomy (Amazonia 4.0, 2024). The *New Economy for the Brazilian Amazon* report builds on this vision, positioning the Amazon as a catalyst for decarbonizing Brazil’s economy. It identifies key transformations, including halting deforestation, expanding the bioeconomy for sustainable goods production, restoring forests, adopting low-emission agricultural practices, and transitioning to renewable energy sources (Nobre et al., 2023). These recommendations underscore the potential of the Amazon to generate diverse forms of capital, from agroforestry to carbon credits (Ollinaho & Kröger, 2023). These initiatives promise – or frame – optimistic futures for everyone that take part in these ambitious bioeconomy strategies. But how do these initiatives translate to opportunities for local people involved in the açai value chain (and many other Amazonian value chains)?

5.1.4. What role does açai play in shaping the bioeconomy discourses?

Açai extraction versus cultivation

The integration of açai production systems, encompassing both extractive and cultivation methods, into the Amazonian bioeconomy has been a subject of scholarly debate (Carvalho Ribeiro et al., 2024; Costa et al., 2017; Freitas et al., 2021; Homma, 1993; Homma, 2012; Homma & Nogueira, 2006; Tavares et al., 2022; Pepper & De Freitas Navegantes Alves, 2017; Weinstein & Moegenburg, 2004). Distinct discourse coalitions have emerged regarding sustainable approaches to meeting increased market demands. These divergent perspectives have generated different strategies for incorporating expanding açai production into the Amazonian bioeconomy. This was both confirmed during interviews (respondents

2,3,4,5,9) and can also be found in literature regarding the Amazonian açai value chain (Homma & Nogueira, 2006; Tavares et al., 2022; Pepper & De Freitas Navegantes Alves, 2017; Weinstein & Moegenburg, 2004).

In response to the increase in domestic and international açai demand (Tavares et al., 2022), an academic and policy debate has emerged among scientists, researchers, governmental entities, and agricultural stakeholders regarding optimal production strategies. This debate primarily centers on competing definitions of what sustainable açai production should be. Actors in the first discourse coalition advocate for domestication and cultivation as the most sustainable strategy for upscaling the NTFP to make its way to the desired bioeconomy. In contrast, actors in the second discourse coalition maintain that traditional extractive practices should remain the predominant strategy for achieving bioeconomic objectives. The subsequent paragraphs will examine these contrasting discourse coalitions and their opposing perspectives.

Discourse Coalition 1 : domestication and cultivation as a sustainable development strategy for açai production

Proponents of açai domestication and cultivation claim that açai domestication can lead to a sustainable expansion of açai production. Domestication of açai refers to making açai more convenient to grow and manage as an agricultural crop, rather than relying solely on extractive harvesting from wild or semi-wild areas (Tavares et al., 2022). Domestication of açai could play a role, particularly in upland (*terra firme*) areas where traditional floodplain (*varzea*) cultivation may not be possible. Controlled and domesticated cultivation could potentially reduce the environmental impacts associated with large-scale extraction from floodplains (Tavares et al., 2022). According to Homma, the prominent Brazilian researcher who specializes in Brazilian NTFPs and works for EMBRAPA⁴, it is possible that extractive production of açai could transform these floodplain ecosystems into "homogeneous açai forests" due to poorly managed extractivism, such as families cutting down trees on their land to give açai palms more space to grow (Homma, 2012; Weinstein & Moegenburg, 2004). Homma asserts that: *"there is no denying that the extractive economy has been the reason and cause of regional underdevelopment by relying on the availability of natural resources, in the belief of their inexhaustibility. To maintain the extractive economy, it is important to research the domestication of plants and animals that can be incorporated into the production process"* (Homma, 2012, p. 183). Examples such as rosewood, cocoa, and rubber illustrate NTFPs that transformed their cultivation techniques to satisfy market needs (Homma, 1992, 1996). Homma describes extractivism as a temporary solution, allowing time for alternative methods to emerge and helping to prevent deforestation. He notes that extractive reserves have not always been successful in conserving natural resources, as the exploitation of these resources can lead to their depletion and forest destruction. Moreover, Homma (2012) asserts that cultivating NTFPs could stimulate local economies, suggesting that domesticated plantations are essential for protecting extractive resources

⁴ EMBRAPA (*Empresa Brasileira de Pesquisa Agropecuária*) is a Brazilian research institute that is focused on generating knowledge and technology for Brazilian agriculture and falls under the Brazilian Ministry of Agriculture and Livestock (MAPA). The institute specializes in crops and livestock production efficiency and quality, environmental sustainability, partnerships with the production sector and agricultural research (Portal EMBRAPA, 2024).

(Homma & Nogueira, 2006; Homma, 1992, 1996, 2012 According to him, extractive products that involve greater demand than supply should be domesticated, as continued insistence on extractivism leads to social losses for producers and consumers (Homma, 2012; Richards, 1993; Tavares et al., 2022).

All respondents have extensively discussed the practice of cultivating açai productions and most of the respondents acknowledged both its advantages and disadvantages. The discourse coalitions are therefore diffuse and not easy to pin down to one discourse coalition. (Academic) proponents (respondents 4,9) of cultivating and irrigating açai (on terra firme) argue that it is difficult to sustain an NTFP market based solely on extractive supply, as Homma (2012) also notes. Açai is a highly seasonal product that can only be harvested once a year. This leads to fluctuations in price and supply, resulting in very expensive açai during off-season. According to respondent 4 could cultivating açai be a solution to this fluctuation: *“In the specific case of açai plantations, the producers who achieve the most stable production are those who irrigate, you know, when we think about açai plantations, in order to have a more regular production, not to have big fluctuations between harvests, irrigation comes into play”*. The respondent noted that NTFPs are generally difficult to manage on large scale. Brazil nuts, for example, do not have stable harvests. According to the respondent is it difficult to create a stable production of NTFPs that are based on seasonal supply solely, especially when the markets demand a specific product, due to increased popularity.

According to respondent 9, it is a "cost-benefit" decision whether to use cultivation and irrigation to grow açai. Although irrigating açai costs a lot of water, it could be an alternative to keep açai production stable. The respondent also mentioned that these larger productions create employment opportunities for local communities. According to the respondent could EMBRAPA be a leader in developing new açai crops that can be planted on *terra firme*, which until now seem to be successful. The respondent claimed that: *“[irrigation] is the price we pay. I think it’s hard to develop a technology that is positive but doesn’t have a negative side”*. Respondent 2 confirmed this dilemma as well: *“There is a heavy discussion going around here about sustainably harvesting and processing of açai. EMBRAPA has developed a type of açai that is productive. But it consumes 50L of water per tree. I don't know if it's per day. I just know that there is a big discussion.”*

Discourse Coalition 2: Natural extraction as a sustainable development strategy for açai production

A scholar from the Universidade Federal Rural da Amazônia (UFRA), renowned for their expertise and extensive research on açai value chains in Pará, critiques the large-scale domestication of açai (Nogueira et al., 2013). De Santana emphasizes that improved crop management and logistics within the value chain could keep Ribeirinhos involved and meet growing demand without compromising extractive areas. By stimulating extractive supply chains and involving local communities, riverbanks could remain protected, and traditional livelihoods preserved, providing both environmental and economic benefits (Nogueira et al., 2013; Vanni, 2018).

Although acknowledging the potential for cultivated açai production, respondent 2 strongly opposes its expansion. The respondent argues that while monoculture plantations may yield higher productivity, they are inherently unsustainable. According to the respondent, cultivating a single species introduces

vulnerabilities such as disease, soil degradation, and excessive water usage, concerns mentioned by multiple researchers as well (Byerlee et al., 2014; Cannell, 1999; Liu, 2018). Additionally, the respondent notes that the pursuit of higher profits has led some in the region to abandon traditional pastures for açai plantations, thereby disrupting the local economy. This viewpoint is supported by respondent 3, who highlighted the impact of monoculture plantations on family farmers and cooperatives engaged in extractive açai production. The respondent observed that market demand has driven extractive communities to abandon traditional harvesting practices. However, respondents 2,3 and 5 argued that monoculture plantations are not suited to the extreme weather conditions of the Amazon, a stance in contrast with claims made by respondents 4 and 9.

Another significant challenge for extractive producers is the difficulty of scaling their operations. While agribusinesses cultivating açai can scale production relatively easily, extractive açai producers face limitations. The only viable method to increase extractive output is through the so called "*manejo*" (management) technique, also confirmed in other studies such as in Vanni (2018) or Weinstein & Moegenburg (2004). This method involves cutting down diseased or aging trees and leaving them to naturally fertilize the soil with their minerals, thereby stimulating the soil, which eventually leads to more açai yields while protecting the standing forest. Producers (respondents 1,5,6,7,8) express optimism about this technique, which aligns with their commitment to sustainable forestry practices. Additionally, the native açai berry is widely preferred over domesticated açai for its superior quality. Respondents 2 and 5 acknowledge that while extractive production ensures sustainability and quality, the forest cannot be forced to produce beyond its natural capacity. Therefore, expanding supply relies on finding additional producers, a task with logistical challenges that contribute to the higher cost of extractive açai compared to its cultivated counterpart. The difference in cost between extractive and cultivated açai is explained by



Figure 21. The processing of açai. Photo taken by author (2024).

respondent 2:

“[agro - industries] plant in rows, so, for example, the machine goes in the middle of the row and two people pick up the bunches, lower them on a conveyor belt [...] so you can produce a lot of açai in a day. Whereas in the floodplain area, you have to go up, down, pluck by hand, in the bunch. You have to take it to the canoe on the riverbank and then bring it into the boat. This has a very high cost.”

Despite advantages of extractive açáí—its (more) sustainable harvesting practices, superior quality, and support for local economies—producers face significant challenges in competing within the broader market. Local governments and markets often fail to distinguish between cultivated and extracted açáí, except in cases where organic certification is required. Respondent 2 questioned himself: *“Family farming can't compete with the big agribusinesses, it can't. But you can't [...] abandon this area of family farming either, right?”*

5.2. Power dynamics in a globalizing açai market

This paragraph is dedicated to answering the research question: *“How have power relations and resource distribution shifted as the açai market has globalized?”*

Drawing on the insights gathered from all interviews and conversations conducted during the research, multiple power dynamics and relationships among the actors in the açai value chain were identified. The açai value chain exhibits clear power asymmetries between different actors. As global demand surged, agribusinesses gained dominant market positions through vertical integration and certification requirements. While this created economic opportunities for locals, it simultaneously made açai unaffordable for local communities and established high barriers for small producers. Agribusinesses maintain their advantage by controlling pricing mechanisms and implementing certification systems that often exclude local producers due to costly entry requirements. This structure perpetuates existing power imbalances, concentrating resources and market control among larger industrial players while limiting the economic autonomy of local communities and small-scale producers. The empirical evidence supporting these statements, will become clear in the following paragraphs.

5.2.1. The price of rising inequalities in the value chain

As the açai market started to expand in the 2010s, power imbalances became increasingly visible within the value chain, particularly between local producers, cooperatives, and large (inter)national companies. As earlier mentioned, açai was mainly consumed by natives of the Amazon, serving as a daily staple. But the increased demand for açai has had mixed impacts on local communities. On the one hand, the increased demand has created economic opportunities. On the other hand, rising prices have made açai unaffordable for many low-income families who traditionally relied on it as a staple food. Between harvests, the price of açai usually rises due to scarcity and goes to the highest bidder. As respondent 9 noted: *“When prices rise, the açai goes to other states or countries, leaving no affordable açai for the local population.”* Additionally, the shift from traditional harvesting practices to high-frequency production has increased the risk of accidents for harvesters. Respondent 3 mentioned this to be a problem: *“It affects their way of life. They leave the traditional way to meet a market demand. It demands that the person who only used to absorb açai ten times a week, for their own consumption, can now go up to three hundred, five hundred times, increasing the risk of an accident, due to the increasing market.”*

The rise in demand for açai has led to increased involvement from agribusinesses in the açai value chain. Due to growing international demand, the cultivated production of açai has increased, often reflecting the influence of management and agricultural practices (Filho et al., 2021). According to respondent 4, have several national companies verticalized their supply chain to achieve stable supplies at a global level and are able to capture more value than traditional açai farmers in local supply chains, also confirmed in other literature (Vanni, 2018; Filho et al., 2021). During interviews, several respondents (R2,R3,R4,R8,R9) highlighted the legitimation of agribusiness actions in the Amazon and the resulting power imbalances between these companies and local communities. Many agribusinesses purchase açai through middlemen, leaving local producers with limited opportunities to earn a fair wage. While some companies buy directly from cooperatives or producers, they often pay low prices. Respondent 4 elaborated on this dynamic:



Figure 22. Ribeirinho harvesting açai in the forest. Photo taken by author (2024).

“There are some agro-industries that are close to communities that have a lot of açai, so the producer can deliver directly to them, but they usually pay a very low price. Then the profit, I mean, depending on which chain you're thinking of, the profit goes to the agro-industry, you know? Then, when the producer takes it directly, there's no middleman, but the profit ends up going to whoever sells or processes the product.”

The introduction of private certification schemes

Local producers and extractive communities experience significant external pressures, such as being compelled to sell at low prices, focus solely on the production of açai, or even to sell their land. Communities suffer a lot of pressure from outsiders to sell their land. These people usually want to plant soy or grain on these lands. Ribeirinhos experience even more pressure as they usually have land with a lot of forest cover. In response, cooperatives like Cofruta and Sementes do Marajó were established to give smallholders and communities greater control over their supply chains. By selling collectively to agribusinesses, these cooperatives have strengthened their bargaining power. For example, respondent 5 noted that agribusinesses working with cooperatives are often obliged to provide essential support services, such as technical training in açai management or assistance in establishing medical centers. The cooperatives received technical training and financial support to manage their operations more efficiently. Projects funded by Banco do Amazônia and SEBRAE⁵ helped producers formalize their production practices and adopt sustainable techniques. Respondent 5 also highlighted how technical assistance improved their

⁵ SABRAE (Serviço Brasileiro de Apoio às Micro e Pequenas Empresas) is a Brazilian non-profit organization that supports micro businesses and small entrepreneurs to set up their businesses and help them grow (SABRAE, 2024).

practices, enabling them to manage açai palms more sustainably and ensure year-round productivity: *“Because sometimes before [the technical trainings] we’d cut down the açai grove, we’d cut it all down. But not today, we have technical assistance. It’s to keep it producing all the time.”* This shift from traditional practices to sustainable methods has been crucial in enabling producers to meet market demands.

One significant element of the formalization of the açai value chain was the introduction of private certification schemes. However, the introduction of these systems added a layer of complexity for most producers. Certifications often require compliance with high standards related to environmental sustainability, labor practices, and traceability. Yet, many producers struggle to understand and follow through this bureaucratic process, as (some) producers have a basic understanding of reading and writing.

5.2.2. Açai certification schemes: who really benefits?

The demand for certified açai rose sharply as companies sought to meet international market standards and appeal to consumers interested in sustainable and ethical products. Respondents (R2,R4,R5,R6) highlighted how companies like Sambazon played a pivotal role in shaping the certification landscape, leveraging their influence to dominate the export market for certified açai. Scholarly critique on CSs aligns with observations from the majority of the respondents, emphasizing barriers of certification. For small-scale producers and cooperatives, the cost of certification is very high, and the process itself is complex. As respondent 5 explained:

“Producers were obliged to maintain the Sambazon certificate, but it’s a lot of work and very expensive. Only the companies can afford it ... Most European markets ask for certification from Sambazon, which is an American company, they look for these producers, but the producers were obliged to maintain the Sabazon certificate.”

Despite these barriers, certification became an essential gateway for accessing bigger markets. Producers and cooperatives that could navigate the system, like Cofruta and Sementes do Marajó, benefited from higher prices for certified açai.

Yet, the majority of the value continued to be captured by large companies, which controlled processing, packaging, and exports. The commodification of açai shows patterns observed with other indigenous products such as soy, cocoa, and coffee (Neves Fonseca & Lima, 2024). While certification ensures traceability and market access, it often emphasizes unequal power dynamics. Respondent 4 noted that small farmers and cooperatives lack infrastructure to export açai independently, leaving them reliant on agribusinesses and middlemen. This dependence reduces their bargaining power and limits their share of the value generated in the global market. Respondent 6 illustrated how Sambazon's certification system functions in practice. Producers wishing to certify their açai must submit their information through the cooperative, which then sends a list to Sambazon. The company dispatches technicians to inspect the properties for compliance, including checks for illegal logging and adherence to labor and safety regulations. Producers who meet the criteria receive certification and gain access to Sambazon’s export market. Additionally, Sambazon developed a traceability system using receipts to monitor the movement of açai through the supply chain. Sambazon issues three receipts that are constantly checked at each port through which the açai passes. One receipt is for Sambazon, one for the cooperative, and one for the

producer. If all the information matches when the açai arrives at its final destination, the producer receives a check.

While respondent 6 agrees with the system's transparency and traceability, he also acknowledged its broader implications. He claimed if more açai could be tracked within Currálinho, the local Gross Domestic Product (GDP) would likely increase. The community would probably be able to attract investment and subsidies from the government. He claims that governments' involvement in promoting documentation and regulating the açai value chain remains limited. This lack of public oversight leaves the power to regulate and enforce certification standards largely in the hands of private companies, emphasizing existing inequalities.

The value chain reflects unequal power dynamics between local communities and external actors, including governments and agribusinesses. The majority of the interviewees (R1,R2,R3,R5,R6,R7,R8) argued that the entry barrier for local producers to obtain a certificate is very high and, in most cases, too expensive. This excludes them from entering the 'new' supply chains, created by agro-industries such as Sambazon. Producers who have been able to become certified have increased their income by being able to sell their açai at a better price. This creates a gap between those who can add value to their product and enter a larger market, and those who are not able to enter this market. ***While some communities have found ways to benefit from increased açai demand, others face exploitation and environmental degradation, also explained whilst a dinner conversation during the fieldwork (Box 5).*** These structures keep resources allocated to those who are already in power. Sambazon's certification system allows producers to sell at higher prices but excludes those unable to afford the initial costs to meet its requirements. Respondent 3 pointed out that the lack of documentation among family farmers limits their visibility and bargaining power, excluding them from shaping the bioeconomy agenda.

Box 5. A dinner conversation about deforestation

During one of our informal dinner conversations, Miguel, the head of the family we stayed with, shared insights about the current situation in the Amazon. He explained that in his community (Boa Esperança), people were living in harmony with each other. The increased demand for açai had enabled the community to collectively benefit from the surge in market interest. However, this was not the case in other areas of Marajó. In some communities, children were still involved in harvesting açai, or the harvesting was done in dangerous ways, resulting in people falling from trees. Miguel revealed that during the açai off-season, some people in other areas resort to desperate measures, deforesting land to sell timber. These people have no other income during the off-season, forcing them to clear forest land to provide for their families. According to Miguel, the federal government had issued warnings about the consequences of this deforestation: the cleared land would weaken the soil, which will eventually sink under water, resulting in significant land loss. Despite being notified, Miguel noted that the State government had not yet taken any action.

5.2.3. The financial gatekeeping of governmental bodies

Governmental bodies seem to exert their power through withholding financial resources, as stated by three respondents. Respondent 2 criticized the lack of financial reliability that social initiatives experience when relying on state institutions. Previously, the municipality of Pará purchased açai from

Cofruta; however, delays in payments from these government entities placed significant strain on cooperatives. As respondent 2 explained: *“Then three or four months go by, and the municipality doesn’t pay. So you have an obligation to deliver, but then they keep waiting to pay. For example, if they owe me 200,000 R\$, they’re going to send me 60,000 R\$, then another day passes... and so it goes.”* Similar concerns were raised by respondents 3 and 4, who highlighted the broader issue of financial instability in social programs across the Amazon. Government support for community initiatives had been reduced, and previous administrations had even sought to discredit scientific data on deforestation. The justification for cutting social aid or delaying payments was often politically motivated, further exacerbating financial uncertainty for cooperatives and social organizations.



Figure 23. Ribeirinho harvesting açai in the forest. Photo taken by author (2024).

5.3. The (lack of) rules that govern the açai value chain

This paragraph is dedicated to answering the research question: *“How have formal and informal rules shaped the governance of the açai value chain?”*

The governance of the açai value chain is shaped by complex structures of legislative frameworks, political cultures and agenda-settings often influenced by governments and agribusinesses. These dynamics impact local communities, small producers and the forest, as stated in all interviews, but also fits into the broader bioeconomy narrative in Brazil. Scholars have mentioned how political and economic power often shape agrifood systems, structuring policies and agendas in ways that prioritize corporate interests (Bastos Lima, 2021; McMichael, 2009; Søndergaard, 2023). According to these scholars, the bioeconomy could also be seen as a narrative that is used to control agenda setting, procedures, division of authority, and resource allocation (Bastos Lima, 2021; Pülzl et al., 2014; Søndergaard, 2023). Various actors (respondents 2,3,5,6,9) have noted a lack of documentation across different stages of the açai value chain, which presents significant challenges in achieving the bioeconomy status that many stakeholders aspire to. This has resulted in private actors taking on a governance role in the value chain that local governments are currently lacking. The empirical evidence supporting these observations will be outlined in the following sections.

5.3.1. Land use registrations: a bureaucratic maze (or mess)

The majority of respondents (R2,R3,R4,R5,R6,R9) indicated that the government fails to adequately regulate the açai market in a manner that benefits local communities, small-scale farmers, local businesses, and cooperatives in Pará. A commonly cited issue is the lack of formal documentation within the value chain. Participant 9 specifically highlighted the issue of underreporting in the Amazon as a significant problem, a concern that is also emphasized in existing literature (Pepper & De Freitas Navegantes Alves, 2017; Vanni, 2018). Many local producers experience difficulties in obtaining the necessary documentation to record their harvests, which often renders them ineligible for financial support, such as bank loans.

One form of documentation that producers occasionally lack have to do with land titles or property rights over their land. In an effort to regulate rural land use and deforestation, the Brazilian government introduced a land registry known as the Cadastro Ambiental Rural (CAR). This national electronic public registry is intended to monitor rural land profiles. According to the Brazilian government’s official website, the CAR is defined as a *“national electronic public registry, mandatory for all rural properties, with the purpose of integrating environmental information on rural properties and possessions, composing a database for control, monitoring, environmental and economic planning and combating deforestation”* (Inscrever Imóvel Rural no Cadastro Ambiental Rural (CAR), 2024). Respondent 9 mentioned that every property owner should be registered in the CAR system. Through these registrations, local governments can oversee land use and deforestation. Within the Amazon, landowners are legally required to maintain a reserve of 80% of their property when it falls within Amazonian biomes (Azevedo et al., 2017). The CAR registration is a legal obligation and is designed to facilitate the monitoring of activities within rural territories. According to the interviewee, the registry is intended to encourage landowners to register their properties, thereby increasing oversight and transparency concerning land use in these regions. The respondent also noted that CAR registration enhances the visibility of communities occupying these areas.

Nevertheless, the respondent identified several limitations associated with the CAR system. While the system provides a degree of visibility regarding land use and management, it does not grant legal land ownership, nor does it guarantee protection for communities residing in these rural territories. CAR registrations are frequently misused by agribusinesses engaged in land-grabbing (*grilagem de terra*), wherein falsified documentation is employed to appropriate territories that have been inhabited by local communities for generations. This exploitation of the CAR system aligns with broader patterns of land appropriation, as discussed in Bastos Lima et al. (2021). Although the interviewee acknowledged the existence of these issues, they noted that addressing such challenges is complex, as legal authority to intervene resides with multiple governmental entities. However, the respondent underscored the following: *"In fact, the rural environmental registry is often used to invade community areas, for example. So I want to emphasize that there is no problem with the environmental registry. There is a problem with the way the cadaster is often used."*

5.3.2. Missing numbers in the value chain

The majority the respondents (R2,R3,R5,R6,R7,R8,R9) identified the lack of formal documentation within the açai value chain as a persistent challenge, an issue that has also been highlighted in academic literature. Specifically, there is a notable absence of statistical data concerning extractive harvesting practices, managed cultivation areas, and plantations on dry lands. This data gap poses challenges for accurately estimating açai production volumes (Neves Fonseca & Lima, 2024; Moraes & Mello, 2023). This was also recognized by respondent 6. The interviewee claimed that Sambazon offered a solution to this problem by introducing a new certification system. However, Sambazon only manages its own production and no state or nationwide documentation. Yet, there are two specific state decrees that should regulate the açai production in Pará:

1. The State Açai Quality Program (PEQA), which emphasizes promoting sustainable harvesting practices and ensuring the quality of açai pulp;
2. The Industrial Açai Policy, which provides tax incentives for companies that engage in the vertical integration of the açai production chain within Pará.

The Industrial Açai Policy grants a tax exemption that includes one of Brazil's most significant state taxes: the Tax on Operations Relating to the Circulation of Goods and the Delivery of Interstate and Intermunicipal Transportation and Communication Services (ICMS). The ICMS plays a critical role in reducing the costs associated with fruit and pulp transportation, procurement of packaging materials, and acquisition of machinery (Neves Fonseca & Lima, 2024). The tax exemptions under this policy, however, are limited to companies operating within the administrative region of Marajó (Região de Integração do Marajó). Additionally, eligible companies are required to commit to developing three new açai-derived product lines, such as cosmetics, energy bars, or ice cream. These new product lines must meet specified sales percentage targets within the first five years of the project (Nunes & Gomes Júnior, 2024). The Industrial Açai Policy forms part of the broader bioeconomy strategy implemented by the Pará state government. This strategy aims to support industries that sustainably leverage the resources of the Amazon (Nunes & Gomes Júnior, 2024). Despite these initiatives, respondent 9 noted that most producers in Marajó lack the capacity to add value to raw açai, as most açai processing facilities are not located within

the region. According to the respondent, the government has fallen short in organizing and fostering opportunities for local producers to enhance the value of their products. This observation was corroborated by the presidents of both cooperatives interviewed (R2,R5), who stated that their organizations lack the necessary infrastructure to process or export açai. Consequently, larger agro-industrial enterprises, which have the financial and logistical capabilities, fill in this gap. Only a small number of açai producers can process açai in bulk, and even cooperatives face significant challenges in establishing the infrastructure required to diversify their product lines. As a result, the benefits of the Industrial Açai Policy appear to favor entities that already possess the infrastructure necessary to add value to their products.

Table 3 provides an overview of relevant policies applicable to actors within the açai value chain. However, none of the respondents mentioned benefiting from these policies, apart from technical training initiatives or government açai purchases. It is worth questioning which actors truly benefit from these policies. While these initiatives are positioned as being part of a broader bioeconomy strategy and claim to include local entrepreneurs and initiatives, family farmers and smallholders interviewed, appear to be largely excluded from the opportunities envisioned within this policy.

Table 1. Table with policies relevant for actors in the açai value chain. Derived from the research table of Moraes & Mello (2023).

Steps in açai value chain	Relevant (Public) Policy	Source of subsidy	Goal of policy
The (agricultural) production of açai	PRONAF (1995) – <i>Programa Nacional de Fortalecimento da Agricultura Familiar</i> (National Plan for Family Farming).	Federal program	PRONAF was created in order to support family farmers. Its main objective is to enhance the productivity and income of small-scale farmers by offering subsidized credit lines (Climate Policy Initiative, 2023).
	PAE-AF – <i>Programa de Atendimento Emergencial à Agricultura Familiar</i> (Family Agriculture Emergency Care Program)	Federal Program	PAE-AF was introduced to support family farmers during crises, like the COVID-19 pandemic (Moraes & Mello, 2023).

	Technical support and trainings for farmers in the sustainable management of açai.	EMATER (Pará) – Empresa de Assistência Técnica e Extensão Rural (Company for Technical Assistance and Rural Extension). NGO'S/local cooperatives/programs from national banks	The training and support for farmers in the açai berry management in order to decrease deforestation and support family businesses (Moraes & Mello, 2023 and authors' observations, 2024)
Harvest of açai	PEQA – Programa Estadual de Qualidade do Açai (State Açai Quality Program) (Decree No. 2,475 09/10/2010)	Government of the State of Pará	This program aims to stimulate the quality and safety of açai through (a) ensuring hygienic standards to reduce pulp contamination (of pathogenic organisms); (b) promote best harvesting practices; (c) and support traditional producers (Moraes & Mello, 2023)
Storage of product	No current policies (Moraes & Mello, 2023)		
Transport of product	No current policies (Moraes & Mello, 2023)		
The pulp extraction of açai	PEQA – Programa Estadual de Qualidade do Açai (Decree No. 2,475 09/10/2010) (State Açai Quality Program)	Government of the State of Pará	The financing of "blanching" tank (<i>tanque de branqueamento</i>) in order to reduce health risks and improve the safety and quality of the extracted pulp (Moraes & Mello, 2023)
Cooling of product	No current policies (Moraes & Mello, 2023)		
Land use	Código Florestal Brasileiro (Law No. 12,651/2012) (Brazilian Forest Code (BFC))	Federal Program	The BFC requires landowners to conserve native vegetation on their rural properties, keeping a Legal Reserve (LR) that occupies 80% of the property in the Amazon and 20% of the property in other biomes (Soares-Filho et al., 2014)

	CAR – Cadastro Ambiental Rural (Rural Environmental Registry)	Federal Program	Land registry that is used as a tool for government agencies to identify perpetrators of deforestation and monitor whether individual landowners are complying with the BFC (Azevedo et al., 2017).
Selling and marketing of açai	PGPM-Bio – Política de Garantia de Preço Mínimo para Produtos da Sociobiodiversidade (Minimum Price Guarantee Policy for Socio-Biodiversity Products)	Federal Program (CONAB)	The PGPM-Bio aims at promoting and supporting the sustainable production and use of socio-biodiversity products from traditional and indigenous communities and family farmers, who rely on the use of these natural resources (Moraes & Mello, 2023).
Tax (incentives)	Política Industrial de Açai (Industrial Açai Policy State Decree No. 1.522/2016)	State degree	Degree that enforces tax benefits for companies that help verticalize the açai production chain within Pará (Neves Fonseca & Lima, 2024; Nunes & Gomes Júnior, 2024)

5.3.3. Who rules the value chain?

All respondents from the producing cooperatives indicated that state and federal governments fail to adequately regulate the açai value chain, albeit for different reasons.

To address gaps in açai documentation, the company Sambazon introduced a certification system to monitor the harvesting process. Respondent 6 highlighted the lack of government regulation, stating: *“The government should do more to stimulate documentation. The government is not interested in regulating; it is not a priority to them as, for example, with wood or cattle.”* He further emphasized that *“millions of reais are flowing through the ports of Curralinho each week during harvest season, and only 2% is tracked.”* The implementation of certification systems was, in part, a response to the growing international demand for açai. In the absence of state oversight, private actors have taken on regulatory functions to meet market demands. Access to global markets requires producers to comply with specific certification standards, and certifications such as those promoted by Sambazon enable producers to sell their products in high-value markets. However, these certifications also pose significant challenges, including high costs and complex bureaucratic procedures. Despite these obstacles, certification remains essential for producers aiming to reach buyers in Europe and North America. This issue was also emphasized by respondent 9, who argued that it should be the government’s role to stimulate and regulate açai production. According to this respondent, better regulation of the value chain is necessary to mitigate market fluctuations and to manage the “market appetite” of agribusinesses. The respondent further noted that a comprehensive state policy is currently lacking to coordinate the entire value chain and streamline production processes.

This problem is acknowledged by various respondents (R2,R3,R4,R5,R6,R9) and scholars as well. Although respondents did not specify particular certification systems, those from producing cooperatives explicitly referred to the "Sambazon certification system." According to Sambazon's website, "all Sambazon açai is Fair Trade Certified" (Sambazon, 2023). Similarly, the Fair for Life website, a certification program for Fair Trade supply chains, states that Sambazon was the first Fair Trade Certified açai company and has, since 2000, worked to protect the Amazon rainforest through its certified açai, ensuring that local collectors can earn a sustainable livelihood from the intact forest (Fair for Life, 2024).

However, an investigative report published in *The Washington Post* in 2021 raised concerns about child labor within the açai supply chain. An anthropologist who conducted dissertation research on child labor in açai cultivation contended that it is impossible to guarantee that all açai is sustainably harvested and free from child labor (Talley, 2019; McCoy, 2021). This was echoed by the respondents (R2,R5,R6) from both cooperatives as well; tracking all açai remains a considerable challenge, given that the fruit is harvested across vast and decentralized networks throughout the Amazon. Furthermore, as previously mentioned, many producers struggle to navigate certification paperwork, forcing impoverished families to make difficult survival choices, meaning sometimes being forced to include children in their labor or to deforest land.

Furthermore, respondent 4 argued that, in a more general sense, governmental bodies are unwilling to visit unregulated sites in the Amazon, as these areas are considered dangerous. As a result, the responsibility for conducting fieldwork often falls on non-governmental organizations, such as Instituto Imazon and Instituto Peabiru.



Figure 24. Ribeirinho looking for açai on his land. Photo taken by author (2024).

6. Conclusion

Based on the empirical evidence and academic and grey literature presented in the above-named chapters, this research sought to answer *how policy arrangements regarding the sustainable development of the açai value chain in Pará's bioeconomy have evolved over the years.*

Using the Policy Arrangement Approach, this study analyzed the interplay between actors, resources, rules, and discourses that shape the governance of this value chain. The empirical findings and academic literature reveal how the açai value chain has developed into two interconnected pathways: a traditional chain emphasizing natural extraction and informal trade, alongside a formalized chain focused on cultivation and certification. This duality reflects broader tensions in the Amazonian bioeconomy between traditional practices and market-driven development. These pathways have become increasingly distinct as açai demand has surged, though they often intersect in practice.

A significant finding is the lack of state regulation across different stages of the açai value chain, presenting challenges. In the absence of state oversight, private actors have taken on governance functions to meet market demands. This institutional 'gap' has shaped resource allocation and decision-making processes, often at the expense of local actors' interests. The role that private actors have assumed in the value chain, particularly through certification systems, has created high barriers for small producers while enabling larger players to maintain their advantage through control of pricing mechanisms.

The evolution of these policy arrangements is particularly visible in shifting power dynamics. While market expansion created economic opportunities for local communities in Pará, it simultaneously established new hierarchies and made the product increasingly inaccessible to the most impoverished families. Large agribusinesses gained dominance through certification requirements and vertical integration, while local communities faced growing barriers to market participation. As demonstrated in Chapter 4, these power asymmetries materialized most clearly in the implementation of certification systems which, while intended to ensure sustainability, often excluded smallholders and family farmers due to high entry costs and complex bureaucratic requirements.

The research identified two competing discourse coalitions regarding sustainable açai production. The first coalition, primarily comprising agribusinesses, government actors, and research centers, advocates for cultivation and domestication as necessary steps toward a sustainable bioeconomy. The second coalition, including local communities, cooperatives, and some NGOs, emphasizes traditional extraction methods as inherently sustainable. While there is consensus among respondents regarding the bioeconomy's potential positive impact on the Amazon and local economies, with açai recognized as an important NTFP, these opposing views reflect fundamental tensions between scaling production and maintaining traditional practices.

The interaction between these dimensions has created a self-reinforcing cycle. Private certification schemes, introduced to meet international market demands, have become de facto governance mechanisms in the absence of state oversight. This has further concentrated power among larger market players while reinforcing existing resource inequalities. As shown in the empirical chapters, even well-intentioned sustainability initiatives often end up privileging actors who can meet formal market requirements over those practicing traditional and often informal methods.

This analysis demonstrates how the evolution of policy arrangements in the açaí value chain reflects broader challenges in developing the Amazonian bioeconomy. While the bioeconomy discourse promises inclusive sustainable development, the actual policy arrangements that have emerged often perpetuate existing power imbalances and resource inequalities. When examining the evolving value chain and bioeconomy over the years, it becomes clear that both the popularization of açaí and its role in the bioeconomy, together with critiques of its governance have increased. The case thus illustrates the complex challenges of translating bioeconomy ideals into practices that benefit local communities and natural ecosystems, particularly in contexts where state governance is limited and private actors assume governing roles.

7. Discussion

7.1. Interpretating key findings in relation to existing literature

Throughout this thesis, arguments are made to emphasize the necessity of critically reflecting on the various narratives surrounding the açaí value chain in the state of Pará. What regulations and resources were used? To establish what agenda? Which actors were involved in agenda-setting and rulemaking, and who were excluded? And in what context? What does sustainable development mean in the context of the 'bioeconomy'? What does nature mean? Which narrative is the 'correct' narrative? These were all questions raised during the research process and explored in this thesis. The use of the PAA helped address these questions due to its discursive nature.

The case of the açaí value chain in Pará illustrates that in contexts where market demand is increasing and state governance is weak, policy arrangements evolve accordingly, as also explicated by Liefferink (2006) and Arts et al. (2006). The PAA framework demonstrated how private actors assumed a role in shaping resource governance through various mechanisms. The development of açaí certification systems exemplifies how the use of resources and regulatory frameworks become interwoven, a phenomenon also highlighted by proponents of PAA theory, such as Liefferink (2006). Although these certification schemes are designed to ensure sustainable production, they simultaneously generate new power dynamics by influencing market access. This case illustrates how private governance can simultaneously promote and constrain sustainable development. As argued by Arts and Buizer (2009), the scope of private regulatory systems is limited, thereby excluding certain actors from benefiting from these rule systems. Arts and Buizer (2009) proposed a solution, by introducing the concept of 'smart regulation,' advocating for collaboration between public and private actors to enhance environmental governance. According to this concept, private actors contribute expertise and commitment, while public actors provide facilitation and support. Something, that in this açaí value chain appears to be largely absent.

The discourse coalitions identified in this research reflect a deeper debate regarding environmental governance. Rather than only technical disagreements regarding production methods, these coalitions show competing visions of human-nature relations. Whilst both coalitions claim sustainable development, they define it differently. This phenomenon aligns with the discourse theory of Hajer (2005), which posits that actors assign meaning to their environment, thereby constructing discourses. The research findings indicate that actors residing in and around the forest have a different perception of sustainable

development and the integration of açaí into the value chain compared to those who do not inhabit the forested areas.

This research showed how the role of local communities transformed from primary users of açaí as a staple to market participants selling açaí and became actor coalitions. While bioeconomy narratives promise (from both private and public actors) the integration of traditional and modern practices, the findings suggest that power asymmetries often prevent real synchronization of the proposed systems. The introduction of a new certification system into the açaí value chain perfectly illustrated this. The empirical findings align with critical perspectives on private governance, as articulated by scholars such as Pattberg (2006) and Cashore (2002), who argue that actors from Southern countries have not significantly benefited from private governance. These scholars contend that private governance structures primarily derive their policymaking influence from the manipulation of global market dynamics and consumer preferences.

However, the power relations that emerge from the implementation of private certification systems are not always intentional. As highlighted in the findings, some communities have experienced an improvement in their livelihoods after participating in certification programs. Various studies and reports attempt to demonstrate that local communities can derive economic benefits from newly introduced business models that integrate sustainable forest management, provided these initiatives are effectively implemented (see Da Silva et al., 2023; Borchardt et al., 2023; Nobre & Nobre, 2019). Furthermore, some researchers emphasize that agro-industries are increasingly willing to learn from past mistakes (McGahan & Pongeluppe, 2023). However, despite these observations, other scholars question whether the Amazon and its inhabitants should be subjected to commercialization at all, given that many local communities already live in harmony with the forest. Some studies argue that indigenous and forest-dependent populations are the most effective guardians of the forest (Borchardt et al., 2023), yet their knowledge systems are frequently marginalized in the formulation of new public and private policies (see Bull et al., 2018; Gebara et al., 2023; McGregor et al., 2020; Ollinaho & Kröger, 2023). This is a phenomenon that is unfortunately again illustrated through the findings of this research.

7.2. Limitations

During this research, several limitations were encountered, the most significant being the language barrier. All interviews, conversations, and communications were conducted in Portuguese. This barrier posed particular challenges during interviews, as it limited the ability to engage in deeper discussions beyond the predefined questions in the interview guide. Due to this constraint, direct responses to participants were not possible. Additionally, the translating student assisting during the interviews has a background in engineering, thus not familiar with certain environmental terminology or policies which occasionally led to misunderstanding.

Furthermore, practical constraints such as financial and time limitations inevitably influenced the fieldwork. The research could likely have been more comprehensive had it been possible to spend more time in and around the Amazon; however, financial constraints made this unfeasible. Consequently, the data collected was specific to the locations visited, and as a result, the findings of this case study cannot be generalized to other areas within the Amazon. Even more, the Amazon is incredibly vast and each area

has unique vegetation and inhabitants thus also comes with its unique challenges, which therefore is another reason that the findings applicable for this value chain in this specific area might not at all be applicable for other areas in the Amazon. Also, the inability to interview actors from açai companies, although tried many times, resulted in an outcome without response from agrobusinesses. This may have led to a more one-sided conclusion, than what in reality might occur.

Another limitation that I struggled with, was that most frameworks and models predominantly reflect Western epistemologies and therefore inadequately represent how local actors in the Amazon understand and value açai, but also the concept of nature in general. It is difficult to linguistically capture other (non-Western) worldviews in Western developed frameworks without diminishing its original meaning. Although I am aware of my background and epistemology, it is possible that this thesis does not entirely reflect or misinterpreted some of the data that originated from the local community in Curralinho.

7.3. Recommendations for future research

Many (Brazilian) literature and scholars have focused their research on possible innovations within the açai value chain, often assuming that (a) locals want to take part in these innovations and (b) that innovation within chains is needed for actors involved to become part of a broader bioeconomy strategy. Many (anthropological) case studies have been done based on getting a better understanding of the traditional açai value chains in the Amazon, however, scholarly literature regarding local voices on value chain innovation seemed to lack. I wondered if these bioeconomy strategies matched with local realities and voices. Based on the empirical evidence, locals do wish açai to be included into an Amazonian bioeconomy, however, do not feel supported by the government, missing practical tools to innovate. This study has contributed to academic literature through proposing a better understanding of competing discourses within an Amazonian value chain by revealing tensions between local perspectives on sustainable development and value chain innovation. It also shows that local actors support bioeconomy but face barriers in participating in it through limited government support, power imbalances between local and global actors and unequal distribution of power and resources along the chain.

I would suggest widening this research into other Amazonian areas: it would be interesting to see whether actors in açai value chains in other areas struggle with the same kind of difficulties or that the outcomes suggested in this research are unique to the açai value chain in Pará.

Also, further research needs to be done regarding possible solutions to bridge the gap between government policies and regulations with local realities in bioeconomy initiatives. Furthermore, the lack of government support in facilitating the documentation of açai throughout the value chain seems to be a serious problem and a major cause of other actors taking unequal control of the value chain. It is proposed to investigate potential mechanisms for making açai documentation more accessible to local communities in the Amazon.

Further research is suggested regarding a more equal distribution of power and resources amongst the value chain and the studying of potential ways to make açai documentation more accessible. Diving into alternative governance literature to better incorporate local practices in local policies is also suggested.

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9. Appendices

Appendix 1. Dimensions of the PAA

The 'Actors' dimension, can help assess actors such as governments, NGO's or companies to improve their role within the policy process. through the 'actors' dimension all other dimensions get materialized. Analyzing the 'actors' perspective starts by identifying all relevant actors involved and their influence in the policy process. Usually, some of those actors are more prominent than others and do actors fulfill different roles in the policy process (Liefferink, 2006).

The analysis of *power relations* and *resource dependencies* is central to theoretical approaches in political theory. *Power* refers to the mobilization and use of available *resources* and influence refers to who determines policy outcomes (Arts et al., 2006). The general thought behind this dimension is that actors are on dependent upon each other for *resources* on different levels. By "mapping" *resource dependencies*, *resource coalitions* will arise; some actors will start working together, as they share control over similar resources (Liefferink, 2006).

The 'rules' of the game are mutually agreed formal procedures and informal routines of interactions with institutions. The 'rules' of the game are usually strongly tied to the 'actors' dimension, when focusing on this dimension.

Discourses are relevant at two different levels within the policy arrangement. The first level refers to general ideas about the organization of society, mainly focused on the relationship between market, state and civil society. The second level concerns concrete visions towards policy problems (Liefferink, 2006). The PAA defines (policy) discourses as interpretative schemes that range from formal policy concepts and texts to shared narratives and storylines (Arts & Buizer, 2009). It is generally assumed that policy arrangements involve more than one discourse, which may differ and compete; these differences and competitions usually result in actor coalitions to support one discourse and oppose another discourse (Arts & Buizer, 2009).

Appendix 2. The Global Value Chain typologies

As this research aims to examine policy arrangements within an value chain, it is important to first define the concept of a global value chain as understood within this thesis. The Global Value Chain (GVC) typologies developed by Gereffi et al. (2005) provides relevant insights into how different actors coordinate and control various value chain activities and will thus be used as a leading definition in this thesis. However, this theory is only used to define and elaborate on the concept of GVCs and will not be used in any analytical sense in the empirical chapters of this thesis. The typologies help conceptually understanding value chain governance, however, analyzing the governance arrangements within the value chain will be done through the PAA.

In the 1990s, Gereffi (1994) developed a widely known theory of global commodity chains (GCCs). GCCs can be described as the process of organizing activities along a value chain and is rooted in production systems that act on constructing patterns to coordinated trade. A production system, according to Gereffi, *“Links the economic activities of firms to technological and organizational networks that permit companies to develop, manufacture and distribute specific commodities.”* (Gereffi, 1994, p. 96). A GCC has multiple dimensions characteristics, such as an input-output structure, a certain concentration of production or distribution networks and a governance structure, to coordinate the production system. However, in later work, Gereffi et al. (2005) noted that these GCCs could be further specified, resulting in a typology, identifying five value chain governance types. A GVC is a production system with geographic fragmentation and functional integration of various fragments in spatially (production) systems (Ponte & Sturgeon, 2014).

Gereffi et al. (2005) identified five generic ways in which firms establish and manage linkages in value chains. The linkages can basically be explained as follows:

- (1) simple market linkages, governed by price;
- (2) modular linkages, where complex information about the transaction is codified and digitized before being passed on to highly competent suppliers, governed by standards;
- (3) relational linkages, where tacit information is exchanged between buyers and suppliers with unique capabilities, governed by trust and reputation;
- (4) captive linkages, where less competent suppliers are provided with (detailed) instructions by dominant buyers, governed by buyer power; and
- (5) linkages within the same firm, governed by management hierarchy.

Gereffi et al. (2005) claim that these linkages can be associated with a combination of three variables:

- the complexity of the information exchanged between value chain task;
- the codifiability of that information;
- and capabilities present in that chain node that are needed for the requirements of that transaction (Gereffi et al., 2005; Ponte & Sturgeon)

Appendix 3. Definitions of ontology and epistemology

The concept of ontology is basically the 'study of being'. Defining an ontological perspective is relevant as it helps to question what is perceived as 'real'. Who decides what the ultimate 'truth' is? Which worldview is 'real'? And which worldview is not 'real' (Moon & Blackman, 2014)? These are important elements in defining human-nature relations. There are different positions on what is perceived as real, ranging from understanding a phenomenon as the one and only truth, independent of our knowledge, to understanding a phenomenon as socially constructed, based on the collected knowledge about the phenomenon (Bryman, 2016).

The concept of epistemology is the study of 'knowing'. Epistemology can be seen as a theory of knowledge about a phenomenon; how can someone identify 'objective' or 'real' relationships about a phenomenon? Epistemology is thus related to ontology (Bryman, 2016). Defining an epistemological perspective is relevant as it helps to question how one frames their truth in attempt to acquire knowledge (Moon & Blackman, 2014). Depending on how one perceives a phenomenon as real, epistemology can be explained by this ontological belief (Bryman, 2016). There are different epistemological forms of belief, ranging from the belief that there is only one reality about a phenomenon, independent of our knowledge, to the understanding of a phenomenon as how societies and their underlying cultural, historical, and social values relate to this truth about a subject.

Appendix 4. Definition of validity and reliability

According to Yin (2003), construct validity and internal validity pertain to the identification of appropriate operational measures and the determination of causal relationships between the studied concepts. In other words, does the data accurately reflect reality? External validity, on the other hand, concerns the extent to which the findings of the case study can be generalized. Specifically, it questions whether a general theory can be developed based on the study's conclusions. The final concept, reliability, pertains to the consistency of observations made by the researcher and whether these observations are free from bias (Yin, 2003). A key aspect of reliability is the replicability of research findings: if the study were to be repeated under similar circumstances, would it yield the same results?

Van Thiel (2014) acknowledges the challenges of achieving consistency in social science research. Given that social science often focuses on human subjects, repeating a study with the same group of people does not necessarily guarantee identical results (as individuals might change opinion or gain more insight on the research topic)—a limitation that applies to this research as well. As Van Thiel (2014) emphasizes, it is essential to "develop a sound set of measurement instruments that can be tested in a pilot to ensure sufficient validity" (p. 50).

Appendix 5. Detailed explanation of case selection and data collection

Establishing a local network in Pará and gaining insight into safe and accessible locations was essential for conducting the fieldwork. After weeks of correspondence with various cooperatives, researchers, and companies, I successfully built a network. One key connection was a cooperative in Abaetetuba, which collaborates with the local community to harvest and process açai. This cooperative was located approximately a two-hour drive from Belém. Additionally, I established three more contacts in Belém. As the largest city in the Amazon, Belém served as our "base camp," where we returned after each field visit. I arranged interviews with a research institute and an NGO, both of which work closely with local and indigenous communities in the Amazon and monitor deforestation. Furthermore, through a UFMG network, I was able to connect with an employee of the Pará State Environmental Secretariat. She facilitated contact with a community leader in the municipality of Curralinho, a small town known for açai production, located about ten hours away from Belém by boat. Building a relationship with the community leader in Curralinho proved to be crucial in gaining access to the local communities residing in and around the area. I had various conversations with other professors regarding the establishment of these relationships and how to approach the local community.

In the weeks preceding the fieldwork, I carefully prepared a travel schedule, budget, and a comprehensive list of necessary clothing and materials to ensure the safety of both myself and the accompanying student while conducting research in the Amazon. After extensive communication and network-building in the region, I was able to develop a detailed day-to-day itinerary, which is included in Appendix 10.

During the initial four days, we conducted research in Belém, where we completed four interviews. The first two took place in Abaetetuba, a neighboring town approximately two hours from Belém by car, at a processing plant where açai is processed. Following this, we returned to Belém for two additional days of interviews. One interview was originally scheduled with an employee of the Environmental Secretariat of the State of Pará; however, it was canceled at the last moment and had to be rescheduled. The other two interviews were successfully conducted with a researcher from a research institute and a communications manager from an local NGO, both located in downtown Belém.

After four days of research in Belém, we commenced our journey into the Amazon. We traveled overnight on a boat that navigated through the Amazon waters for ten hours, passing by Curralinho in the middle of the night. Upon arrival, we were greeted at the dock by the brother of the community leader, who welcomed us into his family home, where we spent the remainder of the night. Although the community leader was not present in Curralinho at the time, his family ensured that we boarded the correct boat the following morning to reach our final destination: a Ribeirinho family in the Boa Esperança community at the Amazon rivers.

For the next three days, we immersed ourselves in the daily lives of the Ribeirinho family, sharing meals, sleeping arrangements, and daily routines. To minimize interference with their way of life, I refrained from scheduling formal interviews in advance. Instead, I allowed the family to determine who I could speak with, when, and where. Throughout this period, I engaged in numerous conversations with family members, açai producers, middlemen, and other community members in Curralinho about their lives and the role of açai within their community. Some of these discussions were recorded, while others remained

informal and unrecorded. I always sought explicit permission before recording, sometimes not even considering recording, as some of these conversations were personal. My presence usually had an impact on the community, as many members were unaccustomed to a foreign woman who did not speak Portuguese visiting their village. As a result, some individuals were initially reserved and had to take some time to get used to my presence. After four days, we returned to Belém. During our final days in Belém, we planned a visit to the Ver-o-Peso market. This market starts around 3:00 a.m., with most açaí sold by 7:00 a.m., thus requiring an early arrival. Prior to visiting this market, I established contact with a Ph.D. student from the State University of Pará, who invited us to visit together for safety reasons. During this visit, I primarily observed, took photographs, and engaged in informal conversations with vendors about their sourcing and selling practices regarding açaí.

Appendix 6. Detailed Botanical Description of the Açaí Berry

The genus *Euterpe* comprises 28 different species distributed across Central and South America, with populations scattered throughout the Amazon basin. However, only two species are commercially used: *Euterpe oleracea* and *Euterpe precatoria* (Heinrich et al., 2011; Yamaguchi et al., 2015). The primary distinction between these species lies in their growth patterns. *E. precatoria*, commonly referred to as "Açaí-do-Amazonas," is native to the state of Amazonas. In contrast, *E. oleracea*, known as "Açaí-do-Pará," is predominantly found in the Amazon estuaries of Pará, as well as in the states of Maranhão, Tocantins, and Amapá, extending into Guyana and Venezuela and is thus the discussed species during this research (Heinrich et al., 2011; Yamaguchi et al., 2015).

E. oleracea is a multi-stemmed palm that can reach heights of up to 25 meters. Its fruit develops in green clusters during the early stages of growth and matures into a deep purple color, resembling the size of a grape when fully ripe (Heinrich et al., 2011). The berry consists of a thin, hard purple outer layer, while the seed constitutes the majority of the fruit, accounting for approximately 85–95% of its total volume (Pompeu et al., 2009). The fruit is typically consumed in the form of processed pulp, which is mixed with water to produce a thick, purple liquid known as *vinho*, commonly sold by the liter (Weinstein & Moegenburg, 2004). In addition to the consumption of açaí berries, the palm heart (*palmito*) of *E. oleracea* is also considered a delicacy. However, harvesting the palm heart requires cutting down the stems, leading to significant losses of the original palm population. Since the increased commercialization of açaí, local communities in the Amazon have shifted their primary focus toward fruit harvesting rather than palm heart extraction (Weinstein & Moegenburg, 2004).

Appendix 7. Interview guides

Interview guide for the Environmental secretariat of the state of Pará, department of sustainability and environment

Introduction

Muito obrigado por seu tempo para responder a algumas perguntas.. Sou um estudante de mestrado da Holanda e meu foco de pesquisa são as cadeias de valor sustentáveis do açaí na Amazônia. Nathalia está me ajudando com minha pesquisa, ela é estudante da UFMG e me ajuda a traduzir.

Explaining my research

Explicarei um pouco mais sobre minha pesquisa. Há dois segmentos de mercado de frutos do açaí no estado do Pará. A primeira sistema es uma cadeia que cultivo em terra firme e exploração manejada da área de várzea - manejo intensivo e este sistema apresenta baixa sustentabilidade social e ambiental.

O outro sistema é o extrativista natural. Este sistema é sustentável, que preservação da biodiversidade e não desmatamento, assim como na forma de respeito à cultura, tradições, distribuição dos ganhos. Este sistema, juntamente com a produção do açaí em sistemas agroflorestais integra as dimensões econômica, social e ambiental, que denominamos de cadeia de valor inclusiva e sustentável.

Há um debate sobre qual sistema deve predominar e qual é o melhor para a conservação da Amazônia. Meu objetivo é investigar como os diferentes atores da cadeia entendem o valor do açaí e como eles podem diferir uns dos outros. Em seguida, quero analisar como os atores poderiam interagir melhor uns com os outros. Tentarei comparar essas diferenças de valores por meio de três pilares: Valor econômico, social e Ambiental.

Set of the questions

Antes de começarmos. Tudo bem para você se gravarmos a conservação? É apenas para a pesquisa e não farei mais nada com ele

Sei que você trabalha no Departamento de Meio Ambiente e Sustentabilidade. Você poderia explicar um pouco mais sobre seu trabalho no departamento?

What policies do you use to protect the local forest (and communities)?

- Que políticas você usa para proteger a floresta local (e as comunidades)?

What is the role of local government in supporting local communities in Pará?

- Qual é o papel do governo local no apoio às comunidades locais no Pará?

Can you tell us what policies or influence governments have on how Amazon products should be harvested?

- Você poderia informar quais são as políticas ou a influência dos governos sobre como os produtos amazônicos devem ser colhidos?

What are the key environmental concerns regarding the extracting/cultivating, processing and distributing of Amazonian products (açai) (e.g., deforestation, biodiversity, use pesticides)?

- **Quais são as principais preocupações ambientais relacionadas à extração/cultivo, processamento e distribuição de produtos amazônicos - açai - (por exemplo, desmatamento, biodiversidade)?**

what is the role of the government in regulating the (açai) market in Pará?

- **Qual é o papel do governo na regulamentação do setor de açai?**

What do you think about the possibility of upscaling açai practices (or other Amazonian products) ?

- **O que você acha da possibilidade de aumentar a escala das práticas do açai (ou de outros produtos amazônicos)?**

How do you see the future production of açai/Amazonian products and what role could local actors in Para play ?

- **Como você vê a produção futura de açai/produtos amazônicos e que papel as empresas locais do Pará poderiam desempenhar?**

How do you think that açai/Amazonian products can be sustainable be produced, processed and exported?

- **Como você acha que o açaí pode ser produzido e processado de forma sustentável?**

Doorvraag vraag (kunt u dat verder uitleggen?) Você poderia comentar i

Interview guide local communities

Before interviewing locals from the community, we will first spend time on location and visit different sites. Hopefully in this way, we'll be able to familiarize ourselves with the community and build some sort of relation with the local people.

Thank you for welcoming us into your community. We really appreciate it.

I'm an international student from the Netherlands, I'm studying environmental science and I'm doing research on the value of açaí. Unfortunately, my Portuguese is not very good. Therefore, my friend will help me translate so that I understand. I'm interested in how açaí can protect the Amazon, but also how it can sustain local livelihoods. There is a growing demand in the açaí market and I'm wondering how this might affect local açaí production.

Everything we discuss will be confidential and anonymous. I have no intention of harming your work or your community in any way. And if I ask you questions you'd rather not answer, that's fine. There is no right or wrong answer. I can share my research later if you like. If there's any way I can do something to give back to the community, I'd really like to do that.

I'd like to ask you a few questions about how you harvest açaí and how you use it in the community, if that's okay?

Obrigado por nos receber em sua comunidade. Agradecemos muito.

Sou um estudante internacional da Holanda, estou estudando ciências ambientais e estou fazendo uma pesquisa sobre o valor do açaí. Infelizmente, meu português não é muito bom. Portanto, meu amiga me ajudará a traduzir para que eu entenda. Estou interessado em saber como o açaí pode proteger a Amazônia, mas também como ele pode sustentar os meios de subsistência locais. Há uma demanda crescente no mercado de açaí e estou me perguntando como isso pode afetar a produção local de açaí.

Tudo o que discutirmos será confidencial e anônimo. Não tenho a intenção de prejudicar o seu trabalho ou a sua comunidade de forma alguma. E se eu fizer perguntas que você prefere não responder, tudo bem. Não há resposta certa ou errada. Posso compartilhar minha pesquisa

mais tarde, se quiser. Se houver alguma maneira de eu fazer algo para retribuir à comunidade, eu realmente gostaria de fazer isso.

Gostaria de lhe fazer algumas perguntas sobre como você colhe o açaí e como o utiliza na comunidade, se não houver problema?

1. Is there anything you want to ask me before we start?
- Há algo que queira me perguntar?

2. *Could you tell us what you do on a daily basis during a workday?*
- Poderia nos dizer o que faz diariamente durante seu trabalho?

How do you do it? Why do you do it? What tasks are most important?

Como você faz isso? Por que você faz isso? Quais tarefas são mais importantes?

3. *How do you sell your açaí?*
- Como você vende seu açaí?

To whom do you sell it? When do you sell it?

Para quem você vende? Quando você o vende?

4. *How is açaí used within your community?*
- Como o açaí é usado em sua comunidade?

Do you eat it on a daily basis? Do you only sell it?

Você o consome diariamente? Você só vende?

5. *How does (the harvesting and processing of) açaí determine your day?*
- Como o açaí (a colheita ou a produção) determina seu dia?

Where do you harvest? How do you harvest?

Onde você faz a colheita? Como você faz a colheita?

6. Are there challenges you experience when selling or distributing açaí?
- Existem desafios que você enfrenta ao vender ou distribuir o açaí?

What challenges? How do you think these challenges could be solved?

Quais são os desafios? Como você acha que esses desafios poderiam ser resolvidos?

7. *What do you think about the possibility of upscaling açaí practices?*
- **O que você acha da possibilidade de aumentar a escala das práticas do açaí?**

8. *What is your relation with (açai and) the forest?*
- **Qual é sua relação com (o açai e) a floresta?**

9. *What is the role of açai in the forest?*
- **Qual é o papel do açai na floresta?**

Do animals eat açai? is açai important for other forest species?

Os animais comem açai? O açai é importante para outras espécies florestais?

10. *How do Amazonian products provide for your income?*
- **Como os produtos amazônicos proporcionam sua renda?**

11. *How do you see the future production of açai?*
- **Como você vê a produção futura de açai?**

12. *Are there any other things you would like to address?*
- **Há algum outro assunto que você gostaria de comentar?**

Interview guide Processing Factories

Introduction

Thank you very much for taking the time to answer a few questions. I'm an international student from the Netherlands, I'm studying environmental science and I'm doing some research on the value of açai. Unfortunately, my Portuguese is not very good. Therefore, my friend will help me translate so that I understand. My research focuses on sustainable açai value chains in the Amazon. Nathalia is helping me with my research, she's a student at UFMG and she's helping me translate.

Explaining my research

Let me explain a little more about my research. As I understand it, there are two market segments for açai in the state of Pará. The first system is a cultivation chain, in which the açai is grown and harvested on plantations. This açai is more geared towards industrial production.

The other system is natural extraction. Within this chain, the açai comes from local communities in the Amazon. People harvest it when it's ready and sell it in local markets.

My aim is to research how the different actors in the chain understand the value of açai and how the growing demand for açai is affecting the value chain.

Everything we discuss will be confidential and anonymous. I have no intention of harming your work or your community in any way. And if I ask you questions that you'd rather not answer, that's fine. There is no right or wrong answer. I can share my research later if you wish. Is it OK if we record the conversation and/or if I take some notes?

Introduction

Muito obrigado por seu tempo para responder a algumas perguntas. Sou um estudante internacional da Holanda, estou estudando ciências ambientais e estou fazendo uma pesquisa sobre o valor do açai. Infelizmente, meu português não é muito bom. Portanto, meu amiga me ajudará a traduzir para que eu entenda. Meu foco de pesquisa são as cadeias de valor sustentáveis do açai na Amazônia. Nathalia está me ajudando com minha pesquisa, ela é estudante da UFMG e me ajuda a traduzir.

Explaining my research

Vou explicar um pouco mais sobre minha pesquisa. Pelo que entendi, há dois segmentos de mercado para o açai no estado do Pará. O primeiro sistema é uma cadeia de cultivo, em que o

açaí é cultivado e colhido quando estiver pronto. Esse açaí é mais voltado para a produção industrial.

O outro sistema é a extração natural. Dentro dessa cadeia, o açaí vem de comunidades locais na Amazônia. As pessoas colhem quando o açaí está pronto e o vendem nos mercados locais.

Meu objetivo é pesquisar como os diferentes atores da cadeia entendem o valor do açaí e como a crescente demanda por açaí está afetando a cadeia de valor.

Tudo o que discutirmos será confidencial e anônimo. Não tenho a intenção de prejudicar seu trabalho ou sua comunidade de forma alguma. E se eu fizer perguntas que você preferir não responder, não tem problema. Não há resposta certa ou errada. Posso compartilhar minha pesquisa posteriormente, se desejar. Tudo bem se gravarmos a conversa e/ou se eu fizer algumas anotações?

1. *What is your function and what does that entail? (if not already stated)*

- **Qual é a sua função e o que ela implica?**

2. **Poderia explicar um pouco mais sobre Cofruta?**

- *Could you explain something more about Cofruta?*

3. *Where does the açaí come from that you process (cultivated/extracted)? And how do you process the açaí (are there pesticides, etc. used in the process?)*

- **De onde vem o açaí que você processa (cultivado/extraído)? E como você processa o açaí (há pesticidas, etc., usados no processo?)**

Are there pesticides used? How do you package the product?

Há uso de pesticidas? Como você embala o produto?

4. *Could you elaborate on the açaí supply chain that you operate in?*

- **Poderia explicar mais sobre a cadeia de suprimentos do açaí em que você opera (Quem são os outros atores envolvidos?)?**

*Which other actors are involved? Who do you work with closely? **Which actor is important in the chain?***

Quais outros atores estão envolvidos? Com quem você trabalha de perto? Qual ator é importante na cadeia?

5. *Who do you distribute to? (who are your customers?)*
 - **Para quem você distribui? (quem são seus clientes?)**

What do your customers expect of your product?

O que seus clientes esperam de seu produto?

6. *Are there challenges in processing or distributing the açai?*
 - **Existem desafios no processamento ou na distribuição do açai?**
7. *Could you describe how you relate the producing and harvesting of açai to the Amazon rainforest?*
 - **Você poderia descrever como relaciona a produção e a colheita do açai com a floresta amazônica?**
8. *What role does açai play in the forest?*
 - **Qual é o papel do açai na floresta?**
9. *What do you think about the possibility of upscaling açai practices?*
 - **O que você acha da possibilidade de aumentar a escala das práticas do açai?**
10. *How do you see the future production of açai?*
 - **Como você vê a produção futura de açai?**
11. *How do you think that açai can sustainable be produced and processed?*
 - **Como você acha que o açai pode ser produzido e processado de forma sustentável?**
13. *Are there any other things you would like to address?*
 - **Há algum outro assunto que você gostaria de comentar?**

Interview guide for NGO's

Introduction

Thank you very much for taking the time to answer a few questions. I'm a master's student from the Netherlands and my research focus is sustainable açai value chains in the Amazon. Nathalia is helping me with my research, she is a student at UFMG and helps me translate.

Explaining my research

I'll explain a little more about my research. There are two market segments for açai fruit in the state of Pará. The first system is a chain of cultivation on terra firme and managed exploitation of the floodplain area. There is intensive management and this system has low social and environmental sustainability.

The other system is natural extraction. This system is sustainable in terms of preserving biodiversity and not deforesting, as well as respecting culture, traditions and the distribution of profits. This system, together with the production of açai in agroforestry systems, integrates the economic, social and environmental dimensions, which we call an inclusive and sustainable value chain.

There is a debate about which system should predominate and which is best for the conservation of the Amazon. My aim is to investigate how the different actors in the chain understand the value of açai and how they may differ from each other. I will try to compare these differences in value through three pillars: Economic, Social and Environmental Value.

Everything we discuss will be confidential and anonymous. I have no intention of harming your work or the community in any way. And if I ask you questions that you'd rather not answer, that's fine. There is no right or wrong answer. I can share my research later if you wish. Is it OK if we record the conversation and/or if I take some notes?

Introduction

Muito obrigado por seu tempo para responder a algumas perguntas.. Sou um estudante de mestrado da Holanda e meu foco de pesquisa são as cadeias de valor sustentáveis do açai na Amazônia. Nathalia está me ajudando com minha pesquisa, ela é estudante da UFMG e me ajuda a traduzir.

Explaining my research

Explicarei um pouco mais sobre minha pesquisa. Há dois segmentos de mercado de frutos do açaí no estado do Pará. A primeira sistema es uma cadeia que cultivo em terra firme e exploração manejada da área de várzea - manejo intensivo e este sistema apresenta baixa sustentabilidade social e ambiental.

O outro sistema é o extrativista natural. Este sistema é sustentável, que preservação da biodiversidade e não desmatamento, assim como na forma de respeito à cultura, tradições, distribuição dos ganhos. Este sistema, juntamente com a produção do açaí em sistemas agroflorestais integra as dimensões econômica, social e ambiental, que denominamos de cadeia de valor inclusiva e sustentável.

Há um debate sobre qual sistema deve predominar e qual é o melhor para a conservação da Amazônia. Meu objetivo é investigar como os diferentes atores da cadeia entendem o valor do açaí e como eles podem diferir uns dos outros. Tentarei comparar essas diferenças de valores por meio de três pilares: Valor econômico, social e Ambiental.

Tudo o que discutirmos será confidencial e anônimo. Não tenho a intenção de prejudicar seu trabalho ou sua comunidade de forma alguma. E se eu fizer perguntas que você preferir não responder, não tem problema. Não há resposta certa ou errada. Posso compartilhar minha pesquisa posteriormente, se desejar. Tudo bem se gravarmos a conversa e/ou se eu fizer algumas anotações?

1. *What is your function and what does that entail? (if not already stated)*
- **Qual é a sua função e o que ela implica?**

2. *Could you explain a little more about your work at Imazon/Peabiru?*
- **Você poderia explicar um pouco mais sobre seu trabalho no Imazon/Peabiru?**

3. *How would you describe the way that Imazon/Peabiru operate in the protection of the Amazon and its indigenous communities?*

what kind of tools do you use? Finance, knowledge, policies, etc.?

- **Como você descreveria a forma como o Imazon/Peabiru atua na proteção da Amazônia e de suas comunidades indígenas? (que tipo de ferramentas vocês usam? finanças, conhecimento, políticas, etc.)**

- 4. *How do you support local communities through your 4 pillars? (Peabiru)*
 - **Como vocês apoiam as comunidades locais por meio de seus 4 pilares? (Peabiru)**

- 5. *What role does açai (Amazonian products) play in the forest? (Peabiru)*
 - **Qual é o papel do açai (produtos amazônicos) na floresta? (Peabiru)**

- 6. *What is the impact of deforestation (and the increased export of Amazonian products) on local communities in Pará?*
 - **Qual é o impacto do desmatamento (e o aumento da exportação de produtos amazônicos) nas comunidades locais do Pará?**

- 7. *Is there any kind of policy, subsidy or governmental support that your organization can make use regarding conserving the Amazon and protecting local communities? (Imazon)*
 - **Existe algum tipo de política, subsídio ou apoio governamental que sua organização possa utilizar para conservar a Amazônia e proteger as comunidades locais? (Imazonia)**

- 8. *What are challenges that you face, while working with/supporting the local communities? (Peabiru)*
 - **Quais são os desafios que você enfrenta ao trabalhar com/apoiar as comunidades locais? (Peabiru)**

where do you think that these challenges come from? How could they be solved?

De onde você acha que vêm esses desafios? Como eles poderiam ser resolvidos?

- 9. *Which actors in Pará have influence on the regulation on the export of Amazonian products?*
 - *Quais atores no Pará têm influência sobre a regulamentação da exportação de produtos amazônicos?*

- 10. *What do you think about the possibility of upscaling açai practices (or other Amazonian products) ?*
 - **O que você acha da possibilidade de aumentar a escala das práticas do açai (ou de outros produtos amazônicos)?**

11. *How do you see the future production of açai/Amazonian products and what role could local actors in Para play ?*

- **Como você vê a produção futura de açai/produtos amazônicos e que papel as empresas locais do Pará poderiam desempenhar?**

12. *How do you think that açai/Amazonian products can be sustainable be produced, processed and exported?*

- **Como você acha que o açai pode ser produzido e processado de forma sustentável?**

13. *Are there any other things you would like to address?*

- **Há algum outro assunto que você gostaria de comentar?**

Appendix 8. Initial Research Development at UFMG and Subsequent Fieldwork Preparation (January - June 2024)

Part 1: Informal Research Development and Conversations at UFMG

Date	Contact Person & Role	Type of Interaction	Location/ Medium	Purpose
Jan-March 2024	Richard van der Hoff (Visiting Professor, UFMG Production Engineering) & Nathalia Clark	Informal preparatory meetings	Microsoft Teams	Initial research topic development and fieldwork planning

	(Bachelor Student)			
April-July 2024	Sonia Carvalho Ribeiro (Head of Geoscience Department) & Richard van der Hoff	Regular informal discussion	In-person at UFMG	Refining research focus, fieldwork methodology, and budget allocation
April 18, 2024	Geoscience Department Team	Research Seminar	In-person at UFMG	Presentation and feedback on research proposal

Part 2: Preparatory Conversations and Correspondence for Fieldwork

Date	Contact Person & Role	Type of Interaction	Medium	Purpose
May 2024	Prof. Eliane Superti (Federal University of Paraíba)	Research consultation	Email	Discussion regarding her research of Amazonian açai value chains
May 2024	Prof. Antônio Santana (Federal Rural University of Amazonia)	Academic correspondence	Email	Correspondence about analysis of dual açai value chains in Pará
May 8 &	Carlos Roberto (President, Sementes do Marajó)	Planning meetings (2 calls)	Phone calls	Site visit arrangements and value chain insights in Currálinho

30, 2024				
May	Multiple emails, phone calls and whatsapp conversations with agrocompanies such as Sambazon, Frooty, Ecofresh	No response or no follow up, one scheduled phone call was cancelled last minute.	Phonecalls, emails	Arranging a visit regarding corporates selling açai.
Early June 2024	Nilsa (Cofruta Cooperativa)	Visit coordination	Email	Processing factory visit planning in Abaetetuba
May 9, 2024	Instituto Peabiru	Visit arrangements	Instagram DM	NGO visit coordination in Belém
May 10, 2024	Imazon Research Institute	Visit planning	Email	Visit arrangements in Belém
May 20, 2024	CAMTA	Factory visit inquiry	Email	Site visit coordination (unsuccessful)
May-June 2024	Environmental Secretariat Representative (SEMAS)	Safety briefing & networking	Email & Teams	Field safety protocols and community introductions
May 29, 2024	Multiple stakeholders including SEMAS, academics, and community leaders	Strategic planning	Microsoft Teams	Research scope and safety protocol meeting
June 7, 2024	Marília (Community Leader, Curralinho)	Visit coordination	WhatsApp video	Local stay arrangements in Curralinho
June 6, 2024	Prof. Cristina Inoue (Radboud University) & Nathália Tavaresce (PhD Candidate)	Methodology discussion	Microsoft Teams	Community engagement strategies
June 2024	Nathália Tavaresce	Local coordination and correspondence (in Belém)	WhatsApp	Local orientation and meeting arrangements about a possible meet up at the Vér-o-Peso

Appendix 9. (In)formal conversations, observations and interviews during fieldwork (11-06-2024 / 21-06-2024)

Part 3: (In)formal conversations, observations and interviews during fieldwork

Date	Participant(s)	Interview type	Location	Description	Recording?
June 12, 2024	Environmental Secretariat Representative (SEMAS)	Scheduled Interview	Belém	Cancelled - pending reschedule	N/A
June 13, 2024	Administrative Staff (2)	Semi-structured	Cofruta Processing Factory,	Interview about Cofruta's daily operations	Yes

	employees), Cofruta	interview (1,5 hours).	Abaetetuba, Pará		
June 13, 2024	President, Cofruta	Semi- structured Interview (1.5 hours)	Cofruta Processing Factory, Abaetetuba, Pará	Interview about Cofruta's history and açai's regional development	Yes
June 13, 2024	Factory Employee, Cofruta	Cofruta Facility Tour	Cofruta Processing Factory, Abaetetuba, Pará	Walkthrough of processing operations	Photo's
June 13, 2024	Yago (Local driver)	Informal conversations	Various locations during travel	Discussions about local life and açai culture in Belém	No
June 14, 2024	Communications Manager, Instituto Peabiru	Semi- structured interview (1 hour)	Instituto Peabiru, Central Belém	Discussion about NGO's role in supporting Amazonian communities	Yes
June 14, 2024	N/A	Personal Observation	Ver-o-Peso Market, Central Belém	Field observation (Informal visit) of traditional market focusing on açai-related commerce	No
June 14, 2024	Senior Researcher and Biologist, Imaflora	Semi- structured interview (1 hour)	Imaflora, Central Belém. Research institute for monitoring deforestation and degradation of the Brazilian Amazon	Discussion about deforestation monitoring and extractive community pressures in the Brazilian Amazon	Yes
June 15, 2024	Marília's Family (Community	Informal conversation	Kitchen table of their family	Informal conversation during	No

	Leader's Parents and Brother)		home, Curralinho	breakfast. They told us about their life in Curralinho and how they eat and use açaí on a daily basis.	
June 15, 2024	Marília's Brother	Informal tour of Curralinho	Village of Curralinho	tour of town and açaí establishments	No
June 15, 2024	██████ Family (Ex-president of Sementes do Marajó)	(informal) Family introduction	Boa Esperança community, Amazon rivers	Initial meeting with Miguel's family	No
June 15, 2024	██████ (Ex-president of Sementes do Marajó)	Informal conversation	Boa Esperança community, Amazon rivers	Informal conversation during dinner, about their life in the Amazon, the forest behind their house and his family.	No
June 16, 2024	██████ (Ex-president of Sementes do Marajó)	Semi-structured interview (1 hour)	Boa Esperança community, Amazon rivers	Interview about the establishment of Sementes do Marajó, the rising açaí demand, and the forest	Yes
June 16, 2024	██████ (Ex-president of Sementes do Marajó)	Field observation - Going into the forest.	Forest area, Boa Esperança community, Amazon rivers	Demonstration of natural açaí extraction and immediate processing of the product	Photo's
June 17, 2024	██████ (Executive producer Sementes do Marajó)	Semi-structured interview (1 hour)	Kitchen table of their family home, Boa Esperança, Amazon rivers	Interview regarding Sementes do Marajó and Sambazon	No

				certification system	
June 17, 2024	Miguel (Ex-president of Sementes do Marajó)	Informal conversation	Dinner table of their family home, Boa Esperança, Amazon rivers	Informal conversation during dinner about the current situation in the Amazon and how illegal deforestation takes place.	No
June 18, 2024	Wife and mother of producer family (sells açai to Sementes do Marajó)	Semi-structured interview (1 hour)	At the porch of her home at the Amazon river, Boa Esperança	Interview about her forest life and açai's role in her family life	No
June 18, 2024	Husband and wife - producer family (husband: former middleman)	Semi structured interview (1 hour)	At the porch of their home at the Amazon river, Boa Esperança	Interview about forest life, açai's role, and middleman experience.	No
June 19, 2024		Personal observation – Field observation	Ver-o-Peso, center of Belém	Night visit to açai market; photographed boat arrivals with açai baskets	Photo's
June 19, 2024	Various middlemen at the açai market	Informal conversations	Ver-o-Peso, center of Belém	Various conversations about açai trading, pricing, and sourcing	No
19-06-2024	Nathália Tavaresce and UFRA professor with two students	Informal conversations	Ver-o-Peso, center of Belém	Group discussions about market observations with university representatives	No

12-08-2024	Environmental Secretariat Representative (SEMAS)	Semi-structured interview	Online	Interview about SEMAS's role in açai value chain	Yes
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Appendix 10. Itinerary Fieldtrip

Itinerary Fieldtrip Pará 11-06-'24 / 21-06-'24

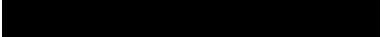
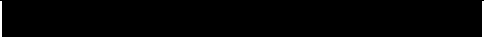

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Richard van der Hoff +55 (31) 99454-1340

DATE	LOCATION	TRANSPORTATION	CONTACT
11-06-'24	Arriving in Nazare, Belém (airbnb) – 12.00	Yago (local guide) is picking is us up from the airport.	

	<p>Address: Travessa Benjamin Constant, 1185, Apartment 100, Suite Belém, Belém, Pará 66035-060</p>		
12-06-'24	<p>Visit [REDACTED] 10.00</p> <p>(Office advisor for the environmental dept. of the state gov. of Pará)</p> <p>Address: Tv. Lomas Valentinas, 2100 – Marco, Belém, PA, 66093-671</p>	Uber/taxi	[REDACTED]
13-06-'24	<p>Visit Cofruta - full day</p> <p>(Processing factory of açai)</p> <p>Address: Rod. João Miranda – Abaetetuba, PA, 68440-000</p>	<p>Yago will pick us up in the morning and will guide us to and from Belém to Cofruta and back.</p> <p>It is about a 2 hour drive to the neighboring village outside of Belém.</p>	[REDACTED]
14-06-'24	<p>Visit Instituto Peabiru (NGO) – 10.00</p> <p>NGO that supports local communities in the Amazon</p> <p>Address: Rua ó de Almeida, 1083 Belém</p>	Uber/taxi	[REDACTED]
14-06-'24	<p>Visit [REDACTED] Imaflora – 14.00</p> <p>Research institute for monitoring deforestation</p>	Uber/taxi	[REDACTED]

	<p>Address: Tv. Dom Romualdo de Seixas, 1698 – Umarizal, Belém – PA, 66055-200</p>		
14-06-'24	<p>Taking the night boat to Currealinho from the port of Belém – 18.00</p> <p>Arriving 16.00 to reserve tickets by one of the local companies</p>	Uber to the port	
15-06-'24	<p>Arriving in Currealinho – 04.00/05.00</p> <p>Arranged with Marília that some community members will welcome us and pick us up</p> <p>We will stay for 4 days at the house of Marília (community leader)</p>		
15-06-'24	<p>Visit the Sermentes Do Marajó Corporativa</p> <p>Our contact is Carlos Roberto, He is the president of the cooperative and will show us around during our visit</p>	Boats, watertaxi	
16-06-'24	<p>On Sunday nobody works, etc.</p> <p>We'll probably do some data processing</p>		
17-06-'24	<p>Visit communities in the forest</p> <p>Carlos will introduce us to families and farmers</p>		

	in the forest, if possible we'll also spend a night with one of the families in the forest		
18-06-'24	Returning from the forest / doing some extra interviews if necessary Returning to Belém by boat at 19.00		
19-06-'24	Arriving in Belém at 05.00/06.00 Returning to Airbnb	Uber to airbnb	
19-06-'24	Free time Visit açai market, local stores, etc.		
20-06-'24	Free day		
21-06-'24	Returning to the airport – 10.30 Flying back to Belo Horizonte	Uber/taxi to airport	

Appendix 11. Proposed plan of action

Research context

Through a lot of literature study over the past couple of months, I discovered that there are two markets for the consumption of açai and therefore 2 different value chains, which both produce for their own market in different ways. The first value chain can be described as a 'traditional' value chain. Local communities in the Amazon harvest the açai in a natural and extractive way and sell it to middlemen who then bring it to destinations to get locally processed or sold. This chain is characterized by informal contracts, knows low innovation and investments, and operates in a traditional way, mostly on regional basis to sustain local economies. The second chain is a more 'commodified' chain that cultivates açai, often harvested on mono plantations. This chain is mostly dominated by (inter)national companies that have strict contracts with suppliers (if not produced on their own plantations), have high certification standards and package their own products. This chain is characterized by its innovation and investments from outside Brazil, formal contracts and its' focus on national and international markets. There seems to be little interaction between the two chains. There have been proposals to innovate traditional value chains but without big success. It seems as if local communities are lacking technical/financial support or do not feel the necessity to innovate. It appears as if actors within the different chains have different understandings surrounding the concept of the value of açai – thus also how to innovate; is it an economic product? a cultural embedded product? Can it sustain the conservation of the amazon? I'm proposing to do a discourse analysis where I combine multiple frameworks to understand the economic, social and environmental value regarding açai, within the different value chains and how these actors might or might not interact with each other.

Fieldwork

Proposed date of fieldwork: 11-06-2024 / 21-06-2024

Our proposal is to visit various actors within the two supply chains, to unravel discursive conflicts. Focus area is Belém and its' surroundings, due to Pará being the main producer (extractive and cultivating, culturally embedded). The first days are used to interview the intended actors/respondents situated in Belém as also to visit the local açaí market and some local açaí vendors. After gathering the data needed in Belém, we plan on visiting neighboring cities and places to connect to local farmers, communities and processing factories.

Means of transportation

- Hiring of vans & (tourist) guides to take us to further destinations such as Tome-Açu and Curralinho;
- Use of Ubers and/or taxi's to get around in Belem to visit different actors;
- Reserving an Airbnb/hotelroom in Belém as our 'basecamp' which will be our place to return to after each visit.

Safety regards

- Every visit and interview agreed on, guides and places reserved before arriving in Belém;
- A day-by-day 'playbook' with all confirmed visits, locations, contact details and means of transportation, etc;
- Contact on daily basis with Richard, informing when we arrived at the planned destination.

Informed network

Name	Organization	Function	Contact	Status	Location
	Instituto Peabiru		Main contact through Instagram [REDACTED]	Invited to come over to the HQ in Belém to have an interview. Wants to know when we arrive.	Belém
	Unidade de Turismo	Owner (?)	Instagram	Invited us to come to Ilha do Marajó. Can/wants to connect us to the local	Ilha do Marajó, Salvaterra

	Rural Açai Nativo			communities they work with, since they have an eco- tourism business. Wants to know when we arrive in Belém, so she could help set us up with the connections	
	Sementes do Marajó	President of cooperation		Has invited us to come over (yet its' far away). He knows very much about the local value chain and has close connections with the local communities and farmers	Ilha do Marajó, Currallinho
A	Imazon	Adjunct Researcher		Has agreed to schedule a conversation once we know when we will arrive in Belém	Belém
A	Government of Pará – Environmental secretariat	Office Advisory		Connected us to another professor and leader of the community of Currallinho. Has connections with possible people that can guide us on local grounds.	Belém / Currallinho
Marcio	CAMTA	Employee		Has agreed to a visit to the processing factory in Tome Açú, did not share much information though. Need to reach out to again.	Tome-Açu
Alfred Homma	EMBRAPA	Researcher of Embrapa		Did not reach out to him yet.	Belém (?)
	COFRUTA			No response through email, although there was some contact over the phone.	Abaetetuba
Antônio Santana Cordeiro	UFRA	Research focus on local communities		Had some contact over email about processing factories to reach to that	

				are important within the region	
Horta da Terra?					

Appendix 12. Code systems in Atlas.ti

The screenshot displays the ATLAS.ti software interface. At the top, the menu bar includes: ATLAS.ti, Project, Edit, Document, Quotation, Code, Memo, Network, Analysis, View, Window, Help. The toolbar contains icons for New, Delete, No Grouping, Grouping, List, View Mode, Export, Filter, Search, and Help. The main window shows a code system for a thesis titled "Code Manager THESIS".

The code system list includes the following codes and their counts:

- Buyers from Cofruta: 0
- Açaí can generate value for the fores...: 4
- Alternative so...: 1
- açaí comes from the Abaetetuba regi...: 1
- Organization...: 1
- açaí gets washed, cleaned and pack...: 1
- Organization...: 1
- Açaí is a seasonal product: 3
- Logistical diffi...: 1
- Açaí is a staple food: 4
- Views on açaí: 1
- Açaí is a strong economic family pro...: 2
- Views on açaí: 1
- açaí is being extracted for the fruitp...: 1
- Organization...: 1
- Açaí is fundamental for the economy...: 2
- Views on açaí: 1
- Açaí is more present in the Amazon t...: 1
- Views on açaí: 1
- Açaí is the identity of Pará and is clo...: 3
- Relation betw...: 1
- Açaí is the main NTFP that generates...: 2
- Views on açaí: 1
- Açaí needs to be valued as the identi...: 2
- Relation betw...: 1
- açaí oil is still being tested: 1
- Organization...: 1
- Açaí supports local communities: 0
- Organization...: 0
- Açaí will dominate the market in the f...: 1
- Views on açaí: 1
- Agro forestry is getting more popular...: 3
- Reasons for U...: 1

Below the code list, a distribution chart titled "Code Distribution by Document" shows the frequency of each code across various documents. The documents listed are: Corutã Interview 1.docx, Interview Pearlbu.docx, Interview Cofruta 2.0 - Translat..., Interview Imazon.docx, Miguel.docx, Interview Andreia Coelho.docx, and Interview with Marlon.docx. The chart uses colored bars to represent the count of each code within each document.

At the bottom of the interface, a list of code groups is visible, including:

- Alternative solutions to structur...: 74
- Challenges in supporting comm...: 28
- Effects of climate change: 5
- Effects of increasing açaí mar...: 123
- Interdependencies on certificati...: 27
- Logistical difficulties in the açaí...: 48
- Negative effects of regulation i...: 41
- Organization structure of Cofruta: 36
- Organization structure of Imazon: 16
- Organization structure of Pearibu: 16
- Organization structure of Serme...: 8
- Positive regulation in the Amazon: 25
- Power relations within the suppl...: 96
- Reasons for documenting açaí: 54
- Reasons for practicing natural e...: 58
- Reasons for using agroforestry: 22
- reasons for using monoculture: 27
- Reasons for why obtaining certi...: 26
- Relation between agro-industri...: 47
- Relation between communities...: 37
- Relation between government a...: 62
- Relation between industries and t...: 4
- Relation between NGOs/Resea...: 41
- Relation between State gov. an...: 14
- Reseller of açaí demands certifi...: 6
- Role State Secretariat of Enviro...: 20

