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The juçara countermovement in Brazil: agroecology and the (en)countering of commodification

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ABSTRACT

Brazil is a leading producer of global food commodities following a corporate model that prioritizes profit maximization through industrial monocultures and cost externalization. This model disembeds foods from their social and ecological contexts, resulting in exploitation. Drawing on an empirical case study using ethnographic and reflexive methods, we examine small-scale enterprises in Brazil that produce and commercialize juçara, a fruit from a palm species ecologically vital to the Atlantic Forest. Once endangered due to the commodification of heart of palm (*palmito*), juçara fruit is being commercialized through agroecological principles. We argue that this is contributing to the palm's ecological resurgence in the forest and as a cultural symbol. We explore the multiple social and ecological dimensions of juçara, emphasizing how they could be eroded by commodification. This case illustrates how agroecology creates openings for resistance against the commodification of food.

KEYWORDS

Juçara(*Euterpe edulis*); açaí; *palmito*; Atlantic Forest; commodification; commodity; embedding; disembedding; cultural erosion; agroecology; resurgence; countermovement

1. Introduction

During the opening statements of the "1st Brazilian Seminar of Juçara Palm in Agroecological System" in May 2025 (Embrapa 2025), an Embrapa representative told the audience that the commodity route for juçara was inevitable. Embrapa, the National Agricultural Research Corporation, linked to the Ministry of Agriculture, Livestock and Food Supply, has been central to Brazil's agricultural modernization, historically focusing on intensive export-oriented crops, and is responsible for the expansion of agricultural frontiers since the 1970s (*Embrapa – Portal Embrapa*, n. d.). The representative was referring to the commodification of the fruit of *juçara* (*Euterpe edulis)*, a palm native to the Atlantic Forest Biome. In the past century, this palm was already commodified for its stem (heart of palm or *palmito*), a process that led to its near extinction (Silva Matos and Bovi 2002). In the past

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two decades, juçara has resurged ecologically in the forest as well as culturally as a conservation symbol (Borges et al. 2015), and local communities are commercializing its fruit as opposed to its stem. This article addresses these transformations: from the predatory exploitation of juçara for *palmito* to the commercialization of its fruit based on more sustainable agroecological practices.

A large body of literature focuses on the ecological aspects of juçara palm, centering conservation debates and raising awareness as the palm was being rapidly decimated for the *palmito* market. Research also demonstrates the fruit's financial viability over its stem, and its nutritional benefits, highlighting processing techniques and encouraging the development of new markets.[1] Less attention is given to the social processes that have led to both the decline and resurgence of the species, the social consequences of *palmito* commodification, and critical debates on possible commodified futures and their symbolic and material consequences are almost absent.

Drawing on an empirical case study, we address this gap by examining the practices of production and commercialization of juçara fruit as formal and informal small-scale enterprises[2] in the Atlantic Forest (Figure 1) that navigate different market pressures. We build upon the

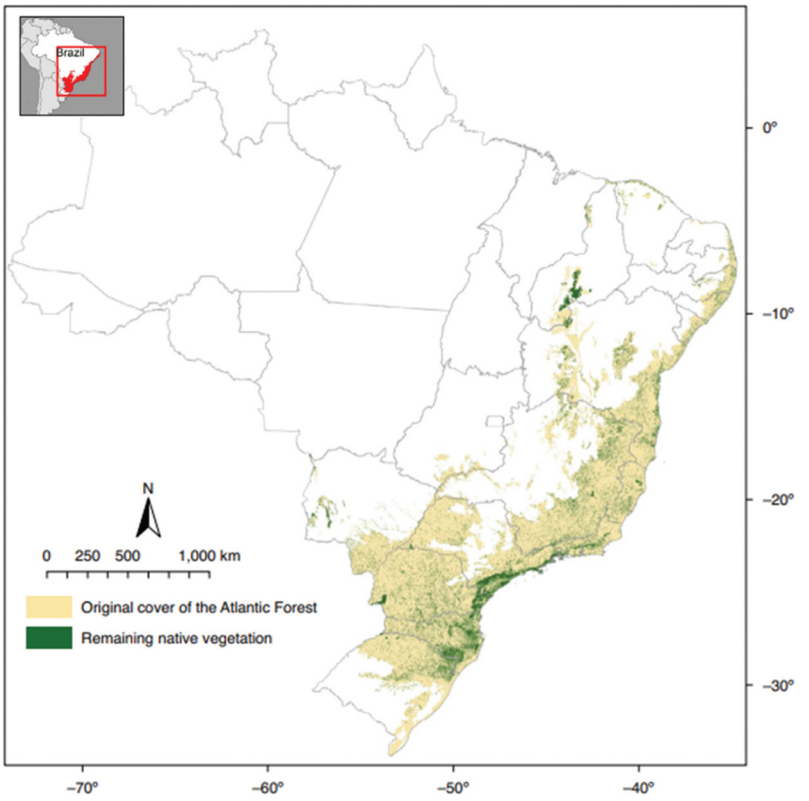


Figure 1. Brazil's Atlantic Forest[3] (Guedes Pinto and Voivodic 2021).

argument that commodification, a process that prioritizes profitability, hides and erodes the multiple dimensions of food (Tsing 2015). We highlight juçara's cultural and ecological significance, showing how agroecological practices become sites of political contestation that center place-based historical and ecological struggles and promote the multiple dimensions of food.

Brazil is well-suited for studying commodity markets and agroecology. The country is one of the leading producers of agricultural commodities, with the 10% largest estates occupying 73% of agricultural land (Pinto et al. 2020). Nevertheless, reacting to the negative effects of the Green Revolution,[4] alternative food production has evolved across the country (Da Costa et al. 2017), and small family farms operating on less than 25% of the land produce over 70% of the food consumed domestically (CONTAG 2023). Despite variable political landscapes, Brazil has a prominent agroecological movement (Mier Y Terán Giménez Cacho et al. 2018) and with challenges in implementation and governance, its policy construction process for agroecology is emblematic (Ferrerira de Moura et al. 2017; Schmitt et al. 2017). Our study aims to reinforce the argument for safeguarding agroecology to prevent the loss of social and ecological fabric that occurs through commodification processes (Tsing 2015).

We employ a critical lens to approach food commodification, parting from the ecological economic understanding that economic systems are not separate from other systems; they are deeply embedded in webs of socio-ecological relationships (Polanyi 1944). As such, economic activities either weaken, maintain, or strengthen these relationships. Modern, market-based agrifood systems treat foods as commodities: disembedded units to be bought and sold for profit (Ament et al. 2022), allocating food to those with higher purchasing power (Farley et al. 2015) while failing to meet basic needs for everyone (FAO, IFAD, UNICEF, WFP, WHO 2024). In the absence of embedded relationships, the modern agrifood system prioritizes profit-maximization at the expense of society and the environment, posing one of the greatest threats to ecosystems globally (Steffen et al. 2015; Campbell et al. 2017; IPCC, Shukla et al. 2022).

We begin by problematizing food commodification, exposing the effects of profit-driven markets, and exploring commodification through the "*embedding-disembedding*" lens. We then contextualize agroecology as a countermovement to commodification. We follow with our methodology, drawing on historical analysis and fieldwork to present the previous commodification of juçara for *palmito*, its social and ecological resurgence through agroecological markets for its fruit, and the symbolic importance for local communities. We discuss agroecology as a re-embedding mechanism and juçara as a mobilizing social force. We conclude by proposing political pathways and alerting of possible commodified futures.

2. Food commodification

Commodities are generically defined as goods produced for exchange in markets for an economic return (Appadurai 1988). Food commodities traded on the highest volumes in global markets are mass-produced, standardized, and considered fungible (interchangeable or replaceable) (Radin 1996), with little difference, for instance, between palm oil produced in Indonesia and that produced in Colombia. The goal of commodity production is the maximization of monetary profit, which leads to the disregard of social and ecological costs whenever possible (Kapp 2015) via large-scale industrial monocultures that rely heavily on petrochemicals,[5] genetically modified seeds, intensive energy and irrigation, and contingent upon the precarization of labor (Zerbe 2018). In economic terms, these costs are referred to as externalities: the unintended and uncompensated impacts of economic activities onto others and the environment (Pearce and Turner 1989). Typical of economies of scale and corporate production, this practice is reflected when the full cost of producing a good isn't included in its market price, instead, it is externalized (Kapp 2015). In food commodity production, cost externalization includes greenhouse gas emissions and climate change, pollution, soil infertility, ecosystem destruction, biodiversity loss, precarious labor conditions, cultural erosion, and diminished animal welfare, among others (Kapp 2015; Chaudhary and Kastner 2016; Campbell et al. 2017; Clark et al. 2020; Crippa et al. 2021; Ray 2023; Almeida et al. 2024; Benton et al. 2024).

Large-scale food commodities are traded on national and international markets through commodity exchange platforms. These are centralized marketplaces, primarily electronic, where traders agree on a price to buy or sell commodities at a future date. This system works similarly to a financial market, trading food as opposed to company shares, where investors and speculators buy commodities not primarily because they want the goods, but because they aim to make a profit from price fluctuations and arbitrage. Traders often do not obtain the food itself; rather, they buy and sell the contracts. This financialization of food (Clapp and Isakson 2018), which has intensified over the past two decades, turns commodities from foods primarily intended to feed people into items to be exchanged for profit, a "transformation from a vital component of life into an instrument for speculative investment and profit at any cost" (Zerbe 2018, 155). Since the market functions by directing goods toward those who can pay the most and away from those with lower purchasing power, commodity markets also contribute to food insecurity, wealth concentration, and inequality (Khoury et al. 2014; Farley et al. 2015).

The global commodity food system is dominated by a small number of transnational agribusiness corporations that exert strong lobbying power and control production, processing, trading, and distribution of the main food

commodity sectors (Howard 2016; Clapp 2021). Moreover, the expansion of commodity plantations is supported through corporate and state-backed land appropriation, as well as by the enforcement of extractive logics among local cultures to view land as a market opportunity (Chao 2022; Del Giorgio 2024). Thus, the commodity-based food system is hegemonic,[6] producing ecologically unequal exchange and reifying colonial and imperial relations (Falconí et al. 2017; Giraldo 2019; Deconinck 2021; Rivera-Basques et al. 2021; Hickel et al. 2022; Infante-Amate et al. 2022; Hernandez et al. 2023).

Food has become increasingly commodified through complex historical and geopolitical processes stemming from the Green Revolution and through the dominance of the market as an exchange mechanism.[7] Nevertheless, commodification can be conceptualized as a spectrum, never fully complete (Radin 1996), and highly contextual, where foods might be commodified for some and not for others (Zerbe 2018), and where producers may engage with commodity markets to sell some of their harvests or crops, and with non-commodified practices such as subsistence or gifting for other parts of their production (Flachs and Stone 2019).

2.1. Embedding, disembedding, and countermovements

In The Great Transformation, Polanyi (1944[2001]) argued that in pre-market societies and before the dominance of markets, economic exchanges were governed by social relationships, through principles of reciprocity, redistribution, gifting, and household self-sufficiency. These economic practices are embedded in social norms such as trust, mutual obligations, and cultural traditions. With the rise of capitalism and the centrality of markets in 19th-century societies, this embedded structure was radically altered, and economic activities became increasingly organized around market mechanisms. The price mechanism, the only measure of value for the market which realizes the profit maximization motive, became the dominant principle of exchange, independently of social norms (Ament et al. 2022), leading to the subjugation of different aspects of life to the logic of the market, and resulting in the commodification of things that were previously not for sale. This dynamic is referred to as the *disembedding* of the economy from society, whereby economic activity becomes detached from social norms.

In response to the expansion of market-driven commodification, Polanyi observed the emergence of different forms of organizing in which communities push back, demanding social protections. This leads to the *re-embedding* of economic activities back into their social contexts. He referred to this dynamic as a *double movement* or *countermovement* with examples such as the rise of labor unions and social welfare programs, which emerged as reactions to the exploitation of workers as labor became commodified. Complete disembeddedness isn't possible since economies are inherently social

activities. Instead, embeddedness is understood as a spectrum, "the extent to which economic systems like markets are governed by non-economic systems such as culture and social cohesion" (Ament et al. 2022, 02). In contemporary economies, however, largely de-regulated neoliberal markets based on the production of commodities for the maximization of profit represent a highly disembedded system.

Food commodification is then defined as a perverse process that disembeds economic activities from their social and ecological interrelatedness, invisibilizing and eroding food's multidimensionality, hiding the impacts of economic transactions, and leading to exploitation in the geographies of origin, and frequently affecting consumers as well (Tsing 2015).

2.2. Countering food commodification: agroecology

McMichael (2023) reframed the Polanyian "disembedding-re-embedding" dialectic for the agrarian context, extending it to the transnational constitution of globalized food systems. He argues that ongoing alternative foodways around the world are reacting to the shortcomings of profit-driven food systems, acting as protectionist countermovements against the increased commodification of food, and, in addition to social embeddedness, these movements are centering territorial and ecological matters.

Alternative food movements embody diverse economic practices that are more embedded in sociocultural norms, positioning firms not just as rational profit-seeking entities or people as self-interested consumers but rather as ethical economic subjects who base their production and consumption practices on social and environmental values beyond profit alone. "Territorial markets," for instance, are thought of as localized and community-rooted systems that offer greater food security than global corporate value chains (IPES-Food 2024). These can be achieved by including rural actors in the construction of market structures (Hebinck and Ploeg 2015), or as fully movement-led projects where moral economies and autonomy are built around agroecology (Meek 2014). These fall under the umbrella of "nested markets" (Van Der Ploeg 2018), conceived as segments of larger markets but operating under diverse place-based values that decenter profit alone. Conceptually, "Food Citizenship" highlights how individuals and communities engage in food systems through rights, responsibilities, and collective action (Gómez-Benito and Lozano 2014). Likewise, emphasizing the political significance of everyday economic practices, as well as the diversity of these practices, "Alternative Food Networks" conceptualize alterity in food systems (Rosol 2020). Theorized differently, diverse economic dynamics embedded in social relations center food's ecological and cultural dimensions, and challenge dominant profit-driven paradigms that treat food as a profitable market unit (Schneider and Cassol 2020).

In the Declaration of the International Forum for Agroecology (Nyéléni 2015), agroecology was positioned as an alternative to displace control of global markets by prioritizing solidarity economies, an ethics of shared responsibility among producers and consumers, and fair supply chains. Beyond sustainable farming, agroecology includes multiple context-based dimensions encompassing ecological, technical, economic, and ethical principles, which range in practice from access to land, seeds, technology, knowledge, credit, and healthcare, to political participation (Nicholls et al. 2016; CIDSE 2018; FAO 2018; HLPE 2019).

As an academic discipline, agroecology engages with multiple sciences. In his foundational and most influential texts, Altieri (1983, 2018) outlines three pillars of agroecology, often represented as a framework for the study, design, and management of agroecosystems. These consist of: 1) Ecological/Environmental, which focuses on biodiversity, soil health, nutrient cycles, and biological pest management; 2) Economic Viability, ensuring that the system is productive to reduce dependence on external inputs and markets, and provide decent income; and 3) Cultural Dimensions and Social Justice, to value traditional knowledge, equity, food sovereignty, and the strengthening of rural communities and local economies.

These pillars reinforce the idea that agroecology is not merely a technical approach or a discipline, but rather the integration of practices, sciences, and social movements' cultural and political stances, which can be placed along ecological sustainability, social equity, and food sovereignty (González De Molina and Lopez-Garcia 2021), and which decenter profit maximization alone, potentially leading to foodways that are more democratic and diverse in market logics beyond the price mechanism. This leads to more inclusive value chains, closer producer–consumer relationships, and forms of exchange outside of corporate marketplaces (Hebinck et al. 2014; Meek 2014; Rover et al. 2020; González De Molina and Lopez-Garcia 2021; Van Der Ploeg et al. 2023). With agroecologists ranging from farmers and farm workers to activists, researchers, artists, and politicians, the construction of agroecological markets catalyzes cross-class alliances, opening spaces to challenge the hegemony of profit-seeking markets (Rosset et al. 2021; Ajl and Sharma 2022; Giraldo and Rosset 2023).

In Brazil, different factors have favored the construction of agroecological foodways, including civil society engagement, grassroots mobilization, and political will to construct policy and legislation frameworks (Ferrerira de Moura et al. 2017). Notably, is the role of social movements in the institutionalization of agroecology (Da Costa et al. 2017) and the importance of multi-actor coalitions for the territorial implementation of policy (Schmitt et al. 2017). Mier Y Terán Giménez Cacho et al. (2018) identified key drivers that enable agroecology, including favorable markets. These are embedded in local territories and are not just economic spaces. Instead, these systems of

exchange (Anderson et al. 2019) act as political and cultural arenas for agroecology to flourish (Van Der Ploeg et al. 2023).

Darolt and Rover (2021) examine the challenges and opportunities in constructing agroecological markets, arguing for the Brazilian context that "when a consumer buys something from an agroecological producer, they know that in this transaction, money is not only exchanged for a product. It is about, overall, of an exchange based on human values, on things that have an origin, have a name, a food biography"[8] (15).

Likewise, Magnanti (2022) assert:

> Markets socially constructed with agroecological food amplify relations between producers and consumers, where the place of supply becomes also a space of dialogue and knowledge sharing. This allows consumers to learn the origin of food, who produces it and how these were produced. In this way food is more than a commodity. Food and the ways in which it reaches those who consume it enable the reinforcement of identity and self-esteem of family agriculture, who see their production valued and the results of their daily efforts being accepted and recognized by society.[9] (15)

Across societies, food holds multiple cultural and political meanings beyond a commodity or a physiological necessity (Vivero-Pol 2017, 2019). For Szymanski (2016), food is the embodiment of networks of relationality that include humans, non-humans, histories, policies, beliefs, and ideologies, and when "seen exclusively as a commodity, moral obligations towards the different parts of the food system are, at best, relegated to being optional and, at worst, not even a part of the landscape of our interactions" (11). Agroecology promotes the multiple dimensions of food through practices rooted in goals beyond solely profit-maximization, such as the regeneration of species and ecosystems, the protection of small producers' livelihoods, and the promotion of local economies. As such, agroecological foodways constitute a countermovement, re-embedding food in territories and creating openings to resist the logics of market-driven food systems.

3. A reflexive methodology

Understanding science as a collective process, we acknowledge that this work would not have been possible without the communities in the field that welcomed this research. We follow the ethical imperative to not just study communities, but to support the causes being studied. This involves a commitment to reflexivity, accountability, and sustained engagement (Fals Borda 2015; Fine et al. 2021). We build on Escobar's (2007) invitation to challenge the idea of the detached and objective scholar. Conversely, knowledge production is understood as situated, co-constructed, and reflective of positionality. In Brazil, Harari et al. (2025) advance this approach, in which the researcher, alongside the participants, analyze, interpret, and actively

transform the social reality being studied. These lines of methodological thinking have foundations in Latin American scholars such as Paulo Freire, Orlando Fals Borda, Ignacio Martín Baró, among others.

As a Colombian mestiza and migrant conducting research from the United States, the lead author engaged in reflection on her position as a researcher in Latin America. This evoked a sense of responsibility to perform research differently, by challenging extractive data collection paradigms through critical and embodied methods (Bryant 2015). Specifically, we employ elements from critical ethnography (Madison 2020) and *sentipensar* (Fals Borda 2015). These approaches draw attention to place-based lived experiences both as sites and tools of knowledge production, emphasizing the relationship between academic inquiry and community members, as a coalescence in the construction of knowledge. This requires a relationship built on mutual learning and solidarity with participants. Furthermore, recognizing herself as a political subject, her feelings and opinions served as resources for analysis (Braun and Clarke 2022), and her actions were intentional in fostering transformative practices (Gibson-Graham 2008).

We also take up Gibson-Graham's (2008) invitation to explore creativity in the production of "discourse of economic difference" (615), thereby simultaneously studying and constructing alternative economies. These epistemic considerations are transversal to this research. For instance, the intentionality of using the term juçara, as opposed to the species name or the multiple popular ways to refer to it,[10] follows those at the forefront of agroecological market construction, who advocate for using the name juçara to differentiate it from *palmito* as well as from açaí.[11]

3.1. Data collection and analysis

Fieldwork took place between 2023 and 2024, when the lead author spent 6.5 months in the states of Santa Catarina (SC) and Rio Grande do Sul (RS), a region with active production of juçara fruit and agroecological initiatives. Data collection combined ethnographic fieldwork, including semi structured interviews, informal conversations, a questionnaire, and document and historical analysis. Fieldwork included visits to family farms, small family enterprises, processing facilities, farmers' and consumers' cooperatives, farmers' and agroecological markets, specialized stores, schools, as well as participation in community-organized events such as juçara harvests, producer meetings, and a regional seminar dedicated to the development of agroecological value chains of juçara fruit.

During fieldwork, the lead author participated as an exchange student in the Graduate Program in Agroecosystems at the Federal University of Santa Catarina, partaking in political advocacy events, educational activities, and organizational meetings hosted by NGOs, such as CEPAGRO and the Centro

Ecológico, both local organizations focused on urban, periurban, and rural agroecology.

After participating in the harvest season in the south of SC and north of RS, the authors, together with an agroecological small family enterprise of juçara pulp,[12] developed and sent a questionnaire via communication platforms and social media, targeting people and collectives involved with juçara fruit across the Atlantic Forest, with the explicit purpose of gathering both perceptions about juçara and challenges related to consuming and commercializing products from juçara palm. The secondary purpose of this questionnaire was to sample for potential interviewees, allowing people to self-select for interviews. The questionnaire asked respondents about their consumption practices of juçara, including their suppliers (e.g., specific formal or informal enterprises), their motivations to consume it (e.g., health, social, ecological), how long had they consumed it or been aware of it, how frequently they consumed it in their household, and invited reasons why they don't consume less or more. It asked about recipes and other derived products and invited participants to share their perceptions of the price of juçara pulp. It also included demographic questions such as region or municipality, profession or occupation, and age. Lastly, since this market is largely small-scale many consumers of juçara are also producers, or their suppliers are within their close communities or geographic regions, the questionnaire asked explicitly: "if you are a producer or entrepreneur and would like to have a conversation/interview about your experience, write 'Yes' in this space and include your WhatsApp number. The principal researcher will contact you."

The responses ($N = 43$) provided valuable information that complemented the lead author's experience during harvest, as well as contact information for subsequent interviews. The lead author then conducted 34 semi-structured interviews: 27 with people who work directly with juçara, and the rest with individuals involved in food security policy. Interviews were conducted in Portuguese, lasted between 40 and 70 minutes, and some were conducted in person while others took place online (Figure 2). Recruitment also included snowballing, as interviewees recommended additional potential participants. Fieldnotes were written daily, documenting observations, conversations, and reflexive insights.

The interviewees included family farmers,[13] neorural producers, and formal and informal small-enterprise owners and workers, who all have in common that they plant and/or harvest juçara using different agroecological principles, and commercialize pulp, formally in alternative markets and governmental programs (outside mainstream supermarket chains) and informally in informal local marketplaces.

An *extrativista* is a person who gleans forest products of animal, plant, or mineral origin for economic purposes and subsistence.

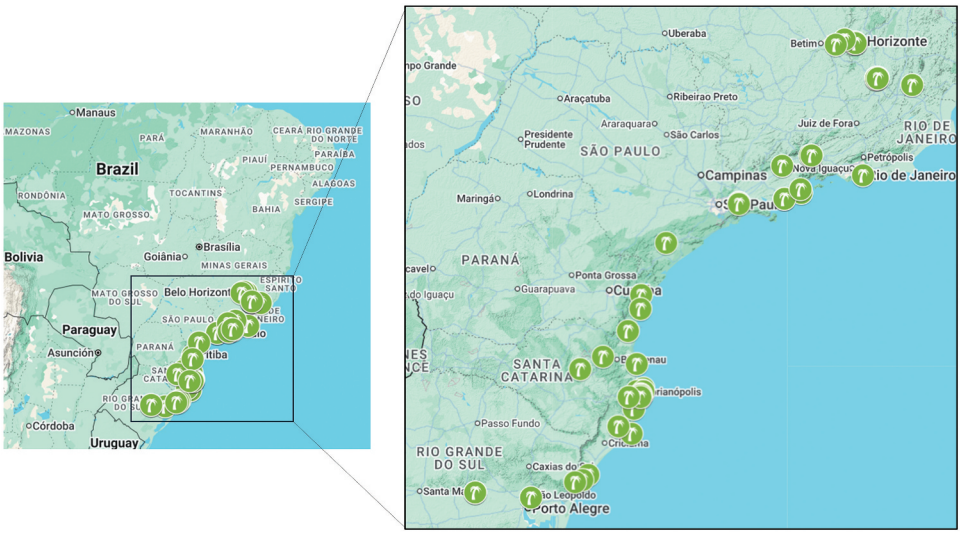


Figure 2. Approximate locations of 60 survey respondents and interviewees (created by authors in Google Maps).

According to the Brazilian Ministry of Environment and Climate Change (*Povos e Comunidades Tradicionais* date unknown), it is a historical practice carried out by traditional communities, including farmers, with distinct place-based knowledge systems. Although neither the questionnaire nor the interviews asked if participants identified as *extrativistas*, Marcelo, a key informant to this research, is an *extrativista*, as are many of the family farmers he works with. Three of the farmer *extrativistas* who work with Marcelo were observed and interviewed informally for this work. Three more interviewees identified as *extrativistas*, and five more made references to this practice in their lives and work with juçara. Furthermore, a *juçareiro/a*, is an identity claimed by people who work with juçara, in contrast to that of a *palmiteiro*. The majority of interviewees identified themselves as *juçareiro/a.*

Data analysis followed Reflexive Thematic Analysis (Braun and Clarke 2022), a reflexive approach to conceptualize "patterns of shared meaning underpinned by a central organizing concept" (Braun and Clarke 2021, 39). All interviews and fieldnotes were transcribed using Transkriptor software, followed by an initial immersive reading of the transcripts and collected materials. During this stage, analytic notes were written with attention to themes that emerged during fieldwork as well as a priori codes derived from the research questions (e.g., alternative market dynamics; symbolic relationships to juçara and place; agroecological practices; challenges and opportunities for small enterprises). Transcripts were then uploaded to NVivo, where coding proceeded through multiple iterative rounds of refinement, moving

from initial descriptive codes to more interpretive and conceptually organized themes.

All research activities complied with ethical standards for studies involving humans, and the research protocol received approval through the authors' institutional ethics review process. All participants provided informed consent, either written (for interviews) or verbal (for informal conversations during fieldwork) after being informed of the study's objectives and the voluntary nature of participation. To protect confidentiality, this paper uses pseudonyms for all participants.

The findings presented in the following section draw from five complementary data sources: (i) 6.5 months of ethnographic inquiry; (ii) a questionnaire directed at juçara consumers, producers, and merchants across the Atlantic Forest; (iii) 34 semi-structured interviews with people involved with juçara fruit markets and public policy; (iv) documents shared among the juçara community; and (v) historical analysis of juçara's market past for *palmito*. These materials provide a multi-layered understanding of juçara's past exploitation, its ecological and cultural resurgence, and the emerging dynamics of its agroecological commercialization.

4. Findings: commodified past and resurgence

4.1. Palmito

Palmito (heart of palm) is a food product extracted from the stem of mature juçara palms as well as from other palms. Around the mid-20th century, *palmito* from juçara became a desirable ingredient in gourmet cuisine, with growing demand from Brazilian urban centers and international markets (Tabora et al. 1993). In the backdrop of the Post-War industrialization era, canning facilities were established across the Atlantic Forest, and the commercial extraction of *palmito* grew rapidly. In the 1960s, Brazil became the number one producer globally, most of it coming from juçara palm (Quast and Bernhardt 1978; Orlande et al. 1996; Galetti and Fernandez 1998).

Juçara has only one stem, thus, *palmito* extraction kills the tree. Moreover, it takes over a decade for the stem to mature. Thus, the *palmito* industry drove once abundant juçara populations to the edge of extinction (Ferreira De Siqueira 1994; Reis et al. 2000). When juçara was declared endangered and extinct in some regions, regulations were passed to control overharvesting (Silva Matos and Bovi 2002). Seeking fewer regulations and faster economic returns, the industry shifted from single-stemmed to multi-stemmed palm species, and in the 1990s, *palmito* was listed as a commodity (UNCTAD, May et al. 1997; Galetti and Fernandez 1998; Mourão 2010).

Palmito extraction from juçara became illegal in 2008 (MMA 2008), yet, the decades of market expansion that led to the commodification of this product

threatened the health of Atlantic Forest ecosystems as well as local livelihoods. Juçara palm is a keystone species, which means it has high ecological importance, such as the source of food for several dozen birds and mammals, crucial for seed dispersal and pollination (Galetti and Aleixo 1998). Moreover, *palmito* has been historically consumed by traditional and local communities, such as indigenous, *quilombola*,[14] and agrarian reform settlement farmers, and other parts of the palm for construction, thatching, fiber, and cultural expression (Cunha de Souza Pereira et al. 2023). With growing demand, factories purchased chopped palms from farmers and traditional communities, creating a market dependence and leading to illegal markets when juçara was regulated, putting *palmiteiros* (palmito farmers and gleaners) at risk of legal repercussions (Bartaburu 2021).

Furthermore, when *palmito* extraction was made illegal, those who benefited from this activity on small and sustainable scales became criminalized. Fearing local authorities that prohibited the use of the palm, as well as the robbing of adult palms by clandestine traders, many farmers would chop the palm as they saw it emerging in their lands before they were noticed, which further affected the recovery of the species. Davi[15] and his son, both family farmers and *extrativistas*, remembered a time when the palm was perceived as a plague because "no one knew what to do with it."[16] This dynamic results in exotic palms occupying juçara niches, further affecting an already threatened ecosystem.

The commodification of *palmito* in the past century continues to have social consequences affecting farmers in the present. Discussions surrounding *palmito* in events related to juçara fruit turn into contentious debates. In the region of Joinville, SC, for instance, organized farmers demand that local authorities allow them to extract *palmito* for self-consumption and small-scale commercialization, with a system in place to renew the species as part of their Agroforestry Systems (SAFs in Portuguese). They argue that through their management since legislation was passed, the palm population has recovered in the region. As a farmer put it, "they punished us and not the industry." In the past, the industry incentivized the development of hybrids between Amazonian açaí and juçara for increased *palmito* productivity. But these hybrids fail to produce fruit and pose an ecological threat to an already degraded biome. Farmers recognize this threat and actively avoid cross-pollination.

Endangered species regulation varies by state, with some allowing the extraction of *palmito* under specific certification (SDA 2018). However, certification paths are highly bureaucratic and difficult to access. More isolated farmers who still illegally extract *palmito* for subsistence stay away from juçara fruit-focused workshops, fearing repercussions for their activities. This affects them since these events often include information on the economic viability of extracting fruit yearly instead of a one-time harvest of the stem. These events

also include SAF management and the social and ecological benefits of agroforestry, which could open eligibility for Payment for Ecosystem Services (PES) initiatives. In Brazil, there are several public and private PES schemes. With varying degrees of success, they offer an opportunity for income generation for smallholders that potentially benefits agroecosystems as well (Ruggiero et al. 2019; Monteiro Dos Santos et al. 2020). As a consequence of *palmito's* commodified market past, farmers become excluded from participating in these opportunities.

4.2. Resurgence

In the mid-2000s, reacting to the decline of juçara palm due to *palmito* market, several organizations, family and traditional farmers, small-scale producers, and consumers from the Atlantic Forest articulated a social movement called the Rede Juçara (REJU – rede means network). Collaborations captured public and private funds to shift the focus away from *palmito* and develop community-based value chains for its fruit (Ball and Brancalion 2016; Felizola 2022; Correia et al. 2025).

Although the species' conservation status from indicators such as the IUCN is unclear,[17] juçara remains protected by legislation as a vulnerable species (MMA 2022). However, *juçareiros/as* agree that over the past decade, the palm's population has been recovering, due in part to regulation, but mainly to a grassroots-led shift from killing the tree to extract palmito to harvesting its fruit once a year following agroecological principles. In Minas Gerais, for instance, "Palmital" is the neighborhood where *juçareiro* Bernardo lives,

> it carries that name because of juçara, but because of the crueler part of the history, the heart of palm, not the fruit. So now within this community, we've been doing this management, this re-signification of the fruits, you know? So we go to people's homes and collect. We didn't even have a de-pulping machine, we used a little laundry tub improvised for the job. And then we started becoming more committed to this, developing the production more, now with a de-pulping machine, a sealer. And then we took part in some events, harvesting every year, and we are reshaping that meaning [of the palm] by valuing the fruit.

The work of Bernardo and his nearby community, is contributing to the resurgence of the palm socially. Juçara produces fruit bunches (Figure 3). Due to the necessary processing and need for freezing due to quick spoiling, REJU funds were primarily invested in the construction of infrastructure, namely, small commercial kitchens (*agroindustrias*).[18] Efforts also focused on promoting local marketplaces and accessing governmental food procurement programs, including the National School Lunch Program (PNAE) and the Food Acquisition Program (PAA), which acquire food from local family farmers to supply public institutions. These programs include recommendations to prioritize historically marginalized producers, financial incentives for



Figure 3. Bunches on the palm (left) and fruit being stripped (right) (photo by lead author).

organic and agroecological production, and guaranteed fixed prices throughout the season, despite market price fluctuations. The REJU's gains in infrastructure continue to benefit short, decentralized supply chains rooted in local communities, many of which supply food to PNAE and PAA, consumer co-ops, and other alternative marketplaces.

During this decade, the Workers' Party governments (since 2003) supported increased incentives for family agriculture and strong engagement with rural social movements, mediated by agencies such as the Ministry of Agrarian Development and the National Council for Food Security, which implemented the public programs PNAE and PAA. In the following decade, however, the REJU partially dissolved, weakened by political and economic instability, including the impeachment of Dilma Rousseff in 2016 and the presidential terms of Michel Temer (2016–2018) and Jair Bolsonaro (2019–2022). During this period, Brazilian rural welfare policy was significantly set back, including reduced credit, financial support, technical assistance, and rural extension programs for family and traditional agriculture (Niederle et al. 2023). Additionally, alongside the strengthening of policies that support large agribusinesses specializing in export commodities, food acquisition programs were dismantled or drastically reduced, land reform processes were halted, and civil society participation in public policy was limited (Mendes Motta and Hauber 2023). Exacerbated by the COVID-19 pandemic, these periods shrank small businesses and halted the development of local economies, fueling poverty and food insecurity in Brazil (Pinho 2021; FAOSTAT 2025).

In recent years, although minor and still under scrutiny by social movements, the current administration (since 2023) has made adjustments to unfreeze budgets and relaunched food security programs that were previously dismantled. Some of these measures, paired with grassroots-led post-pandemic recovery efforts, have enabled the network to rearticulate around juçara sustainable markets. Several key members of the former REJU have

reorganized, reconnecting people across the Atlantic Forest primarily through messaging platforms, social media, and events. They agree that the recovery of the palm's population, its ecological resurgence, has been hand in hand with the steady growth of sustainable markets for its fruit (Trevisan et al. 2015; de Souza et al. 2016). Shared goals regarding the ecological protection of the biome, sustainable agricultural practices, fair labor, and the economic sustainability of small enterprises are often articulated through agroecology.

5. Ecological and cultural dimensions: agroecology across the supply chain

Discursively, different actors in the juçara community articulate agroecology as their guiding principle. In practice, agroecology manifests as specific social and ecological practices, such as more sustainable agricultural techniques, inclusivity in decision-making, knowledge sharing, and price negotiation, among others.

Presently, juçara grows spontaneously in forested areas and cities across the Atlantic Forest under various property regimes (e.g., conservation units, public parks and spaces, private properties). It is also cultivated mainly in small farms as part of SAFs (e.g., with banana, cacao, and coffee). Juçara palm requires shade in its early years, making it well-suited for diverse agroecosystems. *Juçareiros/as* often map the palm's presence and harvest fruit from public lands, or form partnerships (*parcerias*) to harvest fruit in delimited areas. They produce pulp for self-consumption, and some sell or exchange surplus formally or otherwise. Many produce seeds and seedlings, and either engage in reforestation themselves, donate, or sell them.

Harvesting is usually a collective endeavor, and harvest season varies by region and altitude. *Juçareiros/as* spend much time in the forest during harvest, identifying ripe fruit and the optimal palms to climb. Mature palms are usually 5–20 meters tall, although there are different harvesting technologies, many prefer to climb palms using *peconha*, a traditional method to harvest both açaí in the Amazon and juçara in the Atlantic Forest (Nascimento et al. 2015). A *peconha* is essentially a loop made of fabric or dry leaves that functions like a foot strap to grip the tree trunk with both feet (Figure 4).

Peconha is a culturally valued skill that is learned popularly and transmitted intergenerationally. Some report that holding onto the palm, hugging it, as if their lives depended on it, gives them a sense of respect toward the tree. Others mention that looking at the forest from above gives them a sense of connection with nature. And others praise the stamina it brings.

When we arrived in Itati, RS, Danilo, a *juçareiro* and teacher who hadn't climbed a palm in a while, couldn't contain his excitement. He quickly made a *peconha* from a grain sack and climbed the first palm he saw, even knowing its fruit wasn't ripe.



Figure 4. Aldo (left) and Danilo (right) using a peconha to climb (photos by lead author).

Tatiana, from the *coletivo juçareiras*, which is "nothing official, just a matter of heart," reported that when she learned to climb, she was thrilled. She felt that through this process, the force of the palm was passed on to her. She named her daughter Juçara.

Although Rodrigo, in Paraty, Rio de Janeiro, has a harvesting machine, he prefers to do it manually. He can get more bunches in a single climb, and for him, it is a choice rooted in his family and ancestors. He has been training younger people in his community, "so the culture doesn't die."

Harvesting with *peconha* is often complemented by other devices innovated by the juçara community, such as belts and ladders, due to widespread recognition of the risks of palm climbing. Marcelo, who started as an *extrativista* a decade ago and now runs a small family business that collects and sells pulp between SC and RS, conducts workshops on the use of harvesting machines, especially for older farmers who cannot climb, and often shares his own device for farmers to try. He recently negotiated a deal with a toolmaker to sell machines directly to farmers at a discount through interest-free payments. He always collects together with farmers and negotiates compensation for fruit and labor, which often includes frozen pulp that he processes in his family's *agroindustria.*

Marcelo sells pulp via social media and to restaurants and stores committed to local agroecological products. He shares a storage space with other small businesses, where they exchange products and knowledge on the food industry. When a corporation offered to purchase a large amount of his pulp at a low price, Marcelo consulted with partner farmers and, after weighing the long-term benefits, decided not to sell. His efforts in promoting agroforestry, organic production, and fair and inclusive value chains are reflected in his agroecological certification by the Ecovida Network, a bottom-up Participatory Guarantee System in southern Brazil that operates with economic, social, and ecological dimensions of agroecology.[19]

Tatiana and her collective also engage in reciprocal exchanges of food and knowledge when they collect fruit from private lands,

> We have that desire, to make juçara prosper, to talk about juçara more, right? It is about resignification, for example, when people collect in someone's place, then after we go to their house, bring pulp for them to learn about the product, for them to understand themselves as a guardian of this plant, right? It's not just about going there collecting and then leaving.

Although in some regions the price of fruit is being formalized, price negotiation remains common for both formal and informal enterprises, and ensuring fair prices is central to agroecological practices. Many people are unaware that juçara produces edible fruit. Apart from *palmito*, juçara is also commonly known as a source of slat or strip (*ripa*) for construction. Thus, formal and informal pulp exchange is often accompanied by what Lucas, a *juçareiro* and agronomist, referred to as "the mantra." This includes mentions of the history of exploitation and endangerment for *palmito*, its ecological importance to the local biome, the transition to a more sustainable fruit harvest, its economic benefits to small and local producers, and its health benefits to consumers. This narrative is recurrent among this community because juçara fruit is similar to Amazonian açaí and sometimes confused with it or called açaí-juçara or the local or southern açaí.

However, the differentiation from açaí is important to the juçara community. With the expansion of the açaí industry, there is growing evidence of significant social and ecological consequences in the Amazon, such as diminished quality for local consumption, reduced access for traditional and local consumers, and increasing pressure from growing monocultures and economies of scale, among others, indicating a transformation from a local staple to a global commodity (Freitas et al. 2015; McCoy 2021; Neves Fonseca and Lima 2024). While some think of juçara as a type of açaí, others argue açaí is the fruit and juçara is the palm. Yet, most foresee a future in which the two are differentiated, and some are actively constructing narratives that include only juçara in their labels, and in event and marketing discourse. Marina, for instance, a *juçareira* and organizer, is a firm promoter of juçara discourse,

> this thing about 'Atlantic Forest açaí,' and whatnot, I try to cut that out when people bring it up. Let's talk about *Euterpe edulis*, about juçara. Yes, it's similar to açaí, but let's call it juçara, right? I'm very militant in that sense, to promote it and to try to repair that portrait that people have around 'southern açaí.'

The juçara community agrees that harvesting fruit is more sustainable than harvesting *palmito*, as it does not kill the palm. They also advocate that harvesters leave a portion of fruit on the tree to prevent the species' overexploitation and to allow the forest to reproduce by providing food for birds and rodents and by natural reseeding. Agroforestry is also a common agroecological practice and part of the narrative differentiating

juçara from the growing açaí monocultures in the Amazon. Agroforestry techniques, the ecological, economic, and productive benefits as opposed to monocultures, and PES opportunities are often shared via communication platforms and social media, as well as in workshops, events, and work brigades (*mutirões*). Presently, whether managed or otherwise, juçara only grows in the presence of shade species, and there is no known monoculture plantation of the palm. As a result of grassroots mobilization, many farmers have incorporated juçara in their SAFs. Marcelo, for instance, has formed over 80 partnerships with family and *quilombola* farmers who previously did not harvest fruit from existing palms nor planted it because of its past and legal status. The Centro Ecológico has also been fundamental to this transition in the northeastern region of RS. Specifically, the insertion of juçara within banana and other crops on family farms has been central to its ecological resurgence, and the inclusion of pulp in school meals through PNAE has been an important driver of its cultural embeddedness.

Once collected, fruit must be sorted, sanitized, pulped, and frozen immediately to prevent spoiling, or frozen before pulping. Best practices, once adapted from the açaí industry and now specifically for juçara, are widely circulated among enterprises. Since access to infrastructure is essential, many of the participants reported accessing nearby *agroindustrias*, for example, through farmers' or consumers' cooperatives, in indigenous villages, and from neighbors. Collective labor, price negotiation, and sharing of infrastructure are common practices among this community.

Juçara pulp is primarily commercialized outside mainstream chain supermarkets, typically in farmers' and solidarity markets, specialty stores, and restaurants, as well as via social media, word of mouth, and governmental programs (PNAE and PAA). Some enterprises, both formal and informal, produce sorbet, juice, and other value-added products from juçara, including baked goods, cosmetics, tinctures, liquor, and crafts. Non-monetary currency is also common, and transactions do not always happen on the spot, with usual practices of *fiar*, meaning buying something on trust and paying for it later.

While hanging out at Valéria's family business in the south of SC, she welcomed a couple of tourists looking to purchase a kilogram of açaí. She gave them a tour of her facility and explained how their pulp differed from what consumers are accustomed to with Amazonian açaí.[20] Warning them about the natural, unsweetened flavor and unprocessed texture, she convinced them to purchase smaller 100 ml packages instead of a kilo and to return if they liked it. She explicitly expressed how her business was about creating a place of inspiration for people to return home with juçara, "be it in their minds or their hands, spreading it through relations."

In SP, Marina takes part in a farmers' market from the local agroecological network every week,

> I sell seedlings, bring juçara, bring seeds. Teachers often reach out to me because they want to do some kind of project with children. So they come looking for native species and we try to guide them on uses of juçara, right? That if they want to work with her [the palm] here, they should know it's a species that needs to be replanted. I also promote juçara, I organize experiential activities, women's gatherings where we do yoga classes, teach how to climb the tree, and we taste juçara.

Over the course of this research project, more than 35 events with "juçara" in their title took place across different Atlantic Forest regions, organized popularly and in collaboration with institutional actors. These encounters are rich in popular education and foster political action. Agroecology is transversal through specific techniques as well as in discourse and images, positioned as an alternative to agribusiness and large corporations.

In farmer Rodrigo's region, "every year, in several nearby communities, there's a juçara gathering, a 'juçara fest.' So, at these gatherings, there are debates. We exchange ideas, how each one of us works in their own way, we trade tips, you know?"

Mutirões, or work brigades, a practice of mutual aid rooted in indigenous traditions, are common among the juçara community and are mainly centered around agroforestry conversions. These are joyful community encounters where relationships are built through voluntary labor and the exchange of food, skills, knowledge, and tips.

Knowledge sharing also occurs through communication channels. Opportunities to access funding and regulatory changes are often circulated among groups, which catalyze collaborations and network building. When Embrapa published a climate delineation for Amazonian açaí that included the north of the Atlantic Forest, people organized through a WhatsApp group to gather resources and push back against the science of this policy, as it threatened juçara populations through hybridity. Scientific articles and experiments, for example, on compostable packaging and the uses of seeds (the main byproduct) are widely shared among groups. The Rede Juçara Viva, for instance, is a WhatsApp group comprising hundreds of diverse juçara enthusiasts from across sectors of society that fosters cross-class organizing and facilitates political action.

Francisco, a family farmer who has been working on the territorial development of his 150-family community in SP for the past two decades, reports that,

> today we have a better quality of life. We distribute income more fairly. We have more respect, culturally speaking, and a stronger ecological awareness. And juçara is a symbol of this, juçara became a banner of our struggle. It is clear that juçara means biodiversity, water, forest. Juçara means solidarity economy, right? All these connections come through juçara.

Among the juçara community, visions of the future of juçara markets do not exclude commodity paths, yet many people are critical of this possibility. Some wish to grow in scale enough to focus solely on this activity and have a dignified life. João, for instance, does not want his business to grow large. Instead, he envisions a future where small *agroindustrias* proliferate across the biome rather than the growth of just one. Danilo, likewise, has been working on connecting small enterprises across the Atlantic Forest and thinks of the future of this market as a network, "if one cannot meet demand in one region, another one steps in" ensuring the growth of all together and not of just one or a few, as he has seen happening with açaí in the Amazon.

Nevertheless, small enterprises face significant challenges, especially those navigating fairer and more sustainable practices, as capitalist market logics increasingly dominate food systems. One of the main challenges reported is the difficulty of competing with the price of industrial Amazonian açaí, which is significantly cheaper (at the time of field work in the south of Brazil at approximately 9 R$ per kilogram; compared to juçara's price between 36 R$ and 55$/kilogram) due to cost externalization and the economy of scale. Both fruits are over 90% seed, requiring large quantities to extract a relatively small amount of pulp. Juçara enterprises remunerate farmers and workers fairly and produce thick pulp (high fruit-to-water ratio). This increases juçara's value compared to more diluted concentrations of açaí products, which are also mixed with processed ingredients. Thus, for smaller and informal enterprises, selling juçara pulp alone usually does not generate sufficient revenue to sustain operations without other income sources.

Other challenges include the risky nature of harvesting; the labor intensity of manual fruit sorting and immediate processing; the need for infrastructure and vehicles; seasonality; low demand; low incentives; high bureaucracy for formalization and certification; difficulty accessing governmental and alternative markets; the prevalence of the fungal disease anthracnose; and overall unequal competition with corporate economies of scale.

Furthermore, in the social imaginaries of many *juçareiros/as*, one growing company is already leading the commodity path in terms of scale, wages, and its export orientation. In the State of Espírito Santo, the largest known production of juçara pulp hitherto is destined for one firm, which was recently purchased by a large corporation that claims to be sustainable by keeping the palm alive (as opposed to harvesting its stem). Yet, their operations are growing, including a new large factory and an export focus for its products. Specific details about their facilities, such as productive techniques, size, exact location, processing capacity, export volumes, and workforce numbers, have not been disclosed publicly.

Lastly, as the açaí industry continues to expand, corporations with high export demand sometimes purchase juçara from small enterprises to sell as

açaí, offering extremely low prices. However, because they purchase in large quantities, small producers feel economic pressure to sell to these corporations, which they report as frustrating due to a loss of identity for their products.

Nevertheless, after discussing the various challenges small enterprises face, participants responded passionately to the closing question in both the survey and the interviews, which asked them to define what juçara meant to them.

> "I wouldn't know how to put it into words, juçara, but for me, it's my life. My life is before juçara and after juçara. Since I was already into environmental education, I've always liked doing environmental work focused on the forest issue in my region (. . .). It's a very intimate relationship I have, it's really love for the palm tree, all the potential it has." Célia, public environmental educator and *juçareira*.

> "The things I like most are living from it, you know? Living juçara, I live it. Juçara, for me, is something that's really meaningful in my life, because she represents life in every sense, from my personal life, to life in the forest, and also as this food, you know? That represents abundance, right? In our Atlantic Forest, we have, you know, 70 species that feed on its fruit, so I think that's just amazing. I love being in the forest, especially now, with the developments in the farmers' production chain (. . .). One of the things I love most is seeing myself truly as part of a movement, you know? And seeing farmers talking about the movement, you know? Being part of a cycle, being an active player in this transformation too, right? Of a forest element. That's what makes me happiest. That's what fulfills me the most." Marcelo

Juçara has multiple meanings beyond a strictly instrumental one. It occupies obvious political and ecological categories, for instance, as an endangered species vital to the Atlantic Forest Biome. Materially, it is a source of food and resources, and it represents an income opportunity for small producers. And culturally, it has been a symbol of conservation for over a decade (Figure 5).

Separated into cultural/symbolic and ecological/material categories for analytical purposes, these dimensions are woven together politically, and some, such as food sovereignty and resistance, extend across and beyond the two categories, representing, for instance, transformation as well. We do not

Pre-analytical Categories	Meanings of Juçara
Cultural/symbolic	identity; banner of struggle; love; hope; joy; beauty; life philosophy; connection; past, present, future; guardian; Brazilianship; dancer of the forest; named my daughter Juçara; Mother of the Atlantic Forest.
Ecological/material	agroforestry; subsistence; conservation; nutritional possibility; health; food sovereignty; superfood; socioenvironmental impact; ecological consciousness; pillar of the Atlantic Forest; regeneration; balance; abundance; richness; resilience; resistance; innovation; tool to bring significant change; business; possibility; source of rent; recovery; innumerous potentialities.

Figure 5. Responses to the question: "What does juçara mean to you".

mean to delve into an analysis of the different categories that emerged for participants; we aim to highlight the multiple meanings beyond a market opportunity that people ascribe to juçara, which get eroded when profit maximization dominates.

It is worth noting that juçara and açaí are "sociobiodiversity" products, a political category in Brazil that interrelates biological and cultural diversity (ICMBio 2019). These products are derived from native species, managed by traditional communities, and are central to cultural heritage and sustainability (MDa 2009). Although relevant in food sovereignty and social movement debates, and having emerged as an effort to decentralize value chains, promote traditional farming, and protect cultural identities (Motta and Teixeira 2022; Silva et al. 2022), this political category has been insufficient in preventing the commodification path of açaí, and many native foods from the Atlantic Forest present multiple challenges in the construction of their sociobiodiversity markets (Ramos et al. 2017).

6. Discussion

We do not mean to romanticize rural labor nor to idealize an alternative. In fact, during the writing of this document, at least two participants ceased operations, and others sold pulp to a corporation due to the challenges outlined previously. What we propose is that emerging economies, especially of juçara's fruit, constitute a Polanyian-McMichael countermovement: in reaction to the negative consequences of the commodification of juçara for palmito, as well as the apparent commodification of açaí, social organizing through alternative market dynamics re-embeds economic activities into place-based socioecological relationships, thereby acting as a protective mechanism toward people and the biome.

Agroecology, manifested in practices that are more sustainable and fairer than conventional industrial agriculture and market-based mechanisms, underpins these relationships. The result is the resurgence of an endangered species, the sustenance of small enterprises and family farm livelihoods, and a shared cultural identity that reproduces alternative economic values regarding ecosystems, relationships, and profit.

The work with juçara, specifically, the grassroots-led agroecological production and commercialization of its fruit, embodies practices such as collective labor, mutual aid, price negotiation, knowledge sharing, narrative and goal alignment, inclusive decision-making, democratization of technology, alternative currencies, reciprocal exchanges, and cultural celebrations, among others. These social dynamics cultivate connection and trusting relationships over consumption and create a culture of exchange that goes beyond profit-driven monetary transactions. Agroforestry and other specific ecological

techniques are interwoven within these social practices, making embeddedness a socioecological phenomenon.

The mobilization of knowledge about the history of a local biome, traditional and small-scale agriculture, territorial struggles, the complexities of the food system, and health[21] and the processed food industry politicizes production and consumption. For instance, shared recognition of corporate greed led to the circulation of information and support on formalization pathways for small enterprises, strengthening networks, and fostering cross-class and cross-sector solidarity and political action. For consumers, the politicization of transactions that prioritize relationships and sustainability over profit maximization enables risk-sharing and accountability, thereby strengthening decentralized, local, and agroecological foodways.

When economies are more embedded, the profit-maximization motive is easily identified when practices trump workers' long-term well-being and ecological sustainability, and undermine the cultural value of food. Thus, it is more difficult for power to become consolidated in a few actors because profit is not the sole motive. Although the reproduction of unbalanced power dynamics, for instance, in terms of gender, race, and class, continues to be disputed along alternative supply chains, agroecology mobilizes resistance to growth toward large-scale industrial production through cost externalization, a characteristic of a commodification path. Agroecology also promotes the multiple dimensions of food, protecting its intrinsic value and serving as a repository of cultural and ecological diversity. Hence, agroecological foodways are sites of counter-hegemony in confronting corporate pressure seeking to monopolize markets and commodify foods.

Nevertheless, we continue to raise questions on the possibility, or impossibility of food decommodification in a system where land, labor, culture, and other bases of food production continue to be commodified. Specifically, whether self-managed alternative economic models that are more socially and ecologically embedded can succeed while existing within or alongside a profit-driven system (López García and López López 2003). With this in mind, we propose that, as juçara markets reach a critical juncture, agroecology must be safeguarded via strict regulatory frameworks that limit corporate control over supply chains and enforce transparency and accountability schemes for just labor and sustainability. It is essential to substantially increase public funding to support small-scale local food markets that prioritize cultural value and ecological sustainability. Governmental markets such as PNAE and PAA should also be significantly strengthened through budget improvements, legal protections, and amendments to beneficiaries.

Many small-scale agroecological producers do not fall under political categories (e.g., family farmers) and therefore lack access to government programs. Overall, in the face of imminent market growth, supply chains must be democratically constructed, prioritizing small agroecological enterprises.

7. Conclusion

We problematize the process of market-based food commodification, showing what disembedding looks like when food becomes a unit of exchange for the maximization of profit: agricultural landscapes undergo transformations, ecosystems are destroyed, culture is eroded, and livelihoods are threatened.

We illustrate the violent effects of this process, showing the consequences of the commodification of juçara palm for heart of palm (*palmito*). Juçara was overharvested almost to extinction, threatening the Atlantic Forest Biome, family farmers' livelihoods, and local economies. We hint at the apparent commodification of açaí in the Amazon, a palm in the same genus as juçara that produces quite similar fruit. We argue that in response to the negative consequences of commodification, a social movement mobilized through the agroecological production and commercialization of juçara fruit is re-embedding the emerging economies of this palm's products into social life and ecological boundaries.

We illustrate different practices that embody socioecological embeddedness across the juçara fruit supply chain, which have led to the resurgence of juçara ecologically in the Atlantic Forest and culturally as an important symbol and an identity marker associated with a particular place. This cultural relationship leads to caring networks of small enterprises that prioritize sustainability and relationships over profit maximization. These supply food to procurement programs (PNAE, PAA) and other decentralized and alternative marketplaces. Despite political instability and marginalization by a hegemonic food system, embedded agroecological foodways continue to be constructed, mobilizing knowledge and power in the food system.

In the following decades, if cultural and biological diversity are to be protected, the commodity food system must be radically transformed. This paper contributes to the argument that agroecology should underpin the future of just, sustainable, and joyful food systems. The case of juçara presented here is among countless foodways facing the pressures of capital-driven food systems. We warn that if the corporate model comes to dominate juçara and other native fruit markets, commodification, as we describe it, will likely lead to the loss of culture and ecosystems, further threatening the ecological and cultural diversity of the Atlantic Forest Biome in Brazil.

Notes

1. For an overview of consolidated research, see, among others, the World's Resource Institute's video at https://www.youtube.com/watch?v=Xc40NuIpV3E; the Nova Mata's conservation program article at https://novamata.org/en/iniciativa/programa-de-conservacao-da-palmeira-jucara/; and the Forest Foundation's conservation program information at https://www.infraestruturameioambiente.sp.gov.br/fundacaoflorestal/programas-e-campanhas/programa-jucara/.
2. Refers to both formal and informal initiatives that correspond to the smallest firm sizes defined by legislation as: nano-entrepreneurs (low revenue and not staff), microentrepreneurs (one employee and maximum revenue of R$81,000), and micro-businesses with up to nine employees and revenue of R$81,000 to R$360,000) (Sebrae 2020).
3. The Atlantic Forest Biome is the largest biosphere reserve in the world spanning about 100 million hectares, housing major cities in 17 of the 27 states, and over three-fourths of the population (>125 million people). It's a top biodiversity hotspot (the area has lost over 70% of its primary vegetation) (De Lima et al. 2024). The estimated forest cover is 7–28% of the original vegetation (Rezende et al. 2018; Rosa et al. 2021). Below 30% forest cover, Atlantic Forest ecosystems may undergo rapid decline (Banks-Leite et al. 2014). Despite conservation efforts (Guidotti et al. 2021) deforestation in Brazil continues to rise, in part due to the expansion of commodity-based monocultures (Global Forest Watch 2025).
4. A U.S.-led response to postwar hunger crises, which advanced throughout Latin America and Asia, an industrial agricultural model focused on high yield and efficiency, largely replacing traditional farming practices.
5. Brazil is the world's largest consumer of synthetic pesticides (Konchinski 2024).
6. A system in which those in power create and enforce norms, which become "naturalized" or normalized through various mechanisms, yet favor mostly the elites (Rose and Lourival 2019).
7. See Zerbe (2018) for a detailed overview of this process.
8. Translated from Portuguese by authors.
9. Translated from Portuguese by authors.
10. *Içara*, *jiçara*, *palmiteiro*, *palmito-juçara*, *ripa*, *ripeira*, *açaí*, among others.
11. Açaí is an Amazonian palm in the same genus as juçara.
12. Co-owner Marcelo's lived experience is fundamental to the construction of knowledge in this work.
13. Defined under Lei nº 11.326/2006 as someone who manages their own rural establishment, primarily uses family labor, has limited land size (up to four fiscal modules [20–100 hectares depending on municipality]), and derives most of their income from agricultural activities(Estabelece as Diretrizes Para a Formulação Da Política Nacional Da Agricultura Familiar e Empreendimentos Familiares Rurais 2006).
14. Descendants of escaped enslaved people. In this research, one *quilombola* farmer was interviewed. Since the research was designed for interlocutors to select themselves for an interview if they identified as engaging in small-scale, agroecological farming practices with juçara fruit, ethics processes for working with traditional communities were not followed. We recognize that *quilombola* culture is unique and holds particular significance in Brazil's historical and cultural context. Yet, this analysis is beyond the scope of this paper.
15. Names have been changed to protect anonymity.
16. All quotes translated by authors.

17. "Least Concern" in the IUCN Red List, which assesses the likelihood of extinction in the near future (IUCN 2018). "Largely Depleted" in the IUCN Green Status List, which assesses the impact of conservation in actual or potential recovery (IUCN 2025).
18. Has a different connotation in English than in Portuguese. At smaller scales, an *agroindustria* is a simple adapted kitchen with processing equipment (for sanitizing, pulping, sealing, freezing, etc.).
19. See www.ecovida.org.br.
20. Açaí in the Amazon is traditionally consumed in the form of juice or as a gravy-like dish, often mixed with cassava flour and fish. However, it has entered the rest of Brazilian diets as a sweet ice-cream-like product, often mixed with sweeteners and emulsifiers since its natural taste isn't sweet and its texture is coarse.
21. Some people refer to juçara as a superfood, which is potentially problematic as this narrative increases prices and creates niche markets, turning food into elite products and limiting access. Critical scholars contest the "superfood" category, arguing it is not a nutritional group, rather a marketing narrative that exaggerates benefits, increasing consumer demand, prompting market allocation toward purchasing power, and resulting in agricultural simplification and access issues (McDonell and Wilk 2020).

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Author contributions

CRediT: **Juliana Neira:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Visualization, Writing – original draft; **Joshua Farley:** Funding acquisition, Supervision, Validation, Writing – review & editing; **Abdon L. Schmitt Filho:** Conceptualization, Supervision.

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Data availability statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request. Restrictions may apply to the availability of certain data due to privacy or ethical considerations.

Ethics approval statement

This study was conducted in accordance with ethical standards and approved by the Comitê de Ética em Pesquisa com Seres Humanos (CEPSH-UFSC), under the Certificado de Apresentação de Apreciação Ética number 79,024,424.40000.0121. Informed consent was obtained from all participants prior to their involvement in the study.

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