




Article

Food Systems and Access to Healthy Food in an Amazonian Context

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Abstract: The article aims to identify how systemic, multi-scale dynamics influence access to adequate and healthy food and eating and how food is produced and circulated in the Amazonian context of the Metropolitan Region of Santarém (PA). We conducted a literature review, qualitative interviews with key actors, discussion groups and visits to food retailers to address the following research questions: how do socio-economic and political dynamics, especially those related to the soy-meat agroindustrial complex, create or reproduce social inequalities, injustices and inequities, and how do they affect the access to adequate and healthy food? Our findings suggest that the expansion of large-scale soybean growing and livestock, forming the industrial soy-meat complex, contributes to the impoverishment of certain social segments of the local population, accompanied by the erosion of the base for food production. Smallholder farmers and Indigenous and traditional people are among the main affected groups, while violence in rural areas contributes to restricting access to adequate and healthy food. The novelties of our study lie in approaching food systems, taking access to food as the entry point and linking adverse effects of the soy-meat complex to inequalities in access to healthy food. The study also discusses value conflicts between “traditional” and “modern food” (e.g., ultra-processed food), reflecting intergenerational disputes between ways of life and culture, which are also nurtured by the expansion of the soy-meat complex. These multi-scale dynamics have significant repercussions on how food is produced and circulated and highlight the relations between local food politics and conflicts, as well as their connections with processes beyond the local scale. Finally, the article calls for advancing integrated and multi-scale analysis of food production and access to address challenges of social injustices in food system transitions, fostering sustainability, human health and climate change mitigation and adaptation.

Keywords: access to food; food systems; social inequalities; sustainability; Amazon



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1. Introduction

Access to adequate and healthy food stands out among the key issues of food and nutrition sovereignty and security. It is central to the public agendas of countries with high levels of poverty, social inequalities and injustices. Continued growth in food production worldwide coexists with limited access to adequate and healthy food and an increase in hunger [1]. The percentage of hunger among the population in Latin America and the Caribbean (28%) is above the global average (21%), and so is the incidence of overweight and obesity [2]. In Brazil, the average national hunger rate, measured by severe food insecurity, soared from 4.2% of the population in 2013 to 15.5% in 2022 and affects 33 million people [3].

Unsustainable food systems are among the main determinants of the global syndemic of obesity, malnutrition and climate change [4,5]. These include monocrop farming, concentration in land ownership, expanding use of agrochemicals, increasing deforestation and environmental degradation with the consequent loss of biodiversity, restricted access to adequate and healthy food, diet-associated chronic diseases and erosion of traditional cultural practices [6,7]. Our research contributes to understanding how different population groups are unequally affected by these issues, depending on the degree of social inequalities, injustices and inequities. It highlights the required changes in food systems and eating based on the concept of just transitions to support climate mitigation [8–10] and to promote the United Nations Sustainable Development Goals [11]. In previous research [12,13], we pointed out false or partial solutions, such as low-carbon agriculture or carbon market instruments that emerged along the so-called “new consensus of decarbonisation” [14].

The present article is aligned with the concept of sustainability that goes beyond environmental sustainability by incorporating intersectional approaches to socio-economic, human health, climate, cultural and justice dimensions [7,12]. Food systems are at the centre of international debates precisely because they express the interrelationship of socio-economic, environmental, human health and climate issues.

The expansion of the industrial soy-meat complex has turned Brazil into one of the world’s largest producers and exporters of soybeans and meat. The focus on this complex has to do with its role in fuelling social inequalities, injustices, inequities and violence in rural areas [12], the paradoxical and even contradictory connections to the country’s food security [15], significant deforestation in the Amazon and Cerrado biomes [16], and the erosion of the base for food production for smallholder farmers and Indigenous and traditional communities. The weakening government regulation and the dismantling of instruments to control deforestation, agrochemicals, and illegal land use have encouraged this growth [12,17]. The field research was carried out in the Santarém Metropolitan Region (SMR) in the State of Pará. This has been one of the centres of the conflictive expansion of the soy-meat complex within the Amazon Biome since the late 1990s [18,19] and was also at the centre of negotiations related to the Amazonian soy moratorium in 2006 [20].

The combination of worsening trends in social–nutritional and environmental–climatic aspects is especially prevalent in the Amazon, alongside intense disputes of interests that echo in oscillating government activities. The reduction in deforestation that began in 2006 was interrupted when the federal government assumed a new direction in 2016, and a far-right administration took office in 2019. This development resulted in an alarming resumption of deforestation and an upsurge in violence associated with conflicts over land and illegal mining, which was not only done openly but also grew unchecked [12,21]. Growing food insecurity since 2017/18, worsened by the COVID-19 pandemic, has reached an alarming 25.7% in the Northern states of Brazil and 30% in the state of Pará, which is twice the national average [3].

Our article addresses the following research questions: How do systemic, multi-scale dynamics, especially those related to the soy-meat complex, influence access to food, and how is food produced and circulated? We pay special attention to the constraints in access to adequate and healthy food and eating while focusing on social inequalities, inequities and injustices present in the Amazonian context of the SMR. We observe local processes and their connections to dynamics in the regional, national, and international arenas, particularly those linked to the soy-meat complex.

Our main contribution to the literature is the novelty of our approach that takes food access at the level of localities and territories as the entry point to describing and analysing food systems at multiple scales. This perspective unfolds in the composition of meal menus that change towards inadequate and unhealthy food. It made it possible to demonstrate how different types of determinants (commercial, socio-economic, and cultural) nurtured by the expansion of the soy-meat complex affect social inequalities in the access to healthy food. It enables us to trace the dynamics emanating from food systems and the changes observed in eating habits, analysed here with the notion of “menus”.

The article is organised into seven sections, including the introduction. In Section 2, we present the methodological approach and the context of the field research. Considering that access to food is the entry point to analyse food systems, Section 3 shows what a typical Santarem menu with its variations looks like. Most of these changes in menus may be associated with the format of food systems, as highlighted in Section 4, based on the proposed multi-scale approach applied to the SMR. The conflictive context of this region and the various political aspects involved are brought into the picture in Section 5, with a particular focus on how they reflect distributive, procedural and recognition injustices. Section 6 discusses the main analytical results, bringing together the multi-scale approach, actions of economic agents, food access and supply issues, and some implications of contrasting orientations of Brazilian food policies. The concluding Section 7 returns to the main question that guided the research and outlines implications for the current debate on food system transitions.

2. Methodological Approach and Field Research

This section introduces the methodological approach with the conceptual and analytical framework, and the context of the field research and data collection.

2.1. Conceptual and Analytical Framework

The conceptual framework was organised in two major analytical dimensions: (i) the connections between food systems and access to food (Sections 3 and 4) and (ii) the social-political determinants of this process (Section 5). The first analytical dimension was oriented by the concepts of decentralised, multi-scale food systems and access to food. We apply the concept of decentralised food systems (i.e., how food is produced, circulated, and consumed in localities) as an intersection with dynamics at subnational (local, territorial), national, or international levels. [21]. Therefore, the concepts of territory and locality are the base of the socio-spatial reference of the analysis.

Access to food is considered first, as well as the profile of eating habits and the composition of meal menus in the study area. Second, considerations of the ways of supplying and accessing food (production for self-consumption, markets, and governmental programs) are provided. Access to food was taken as the entry point to analysing the dynamics of food systems with multiple coexisting scales (local/territorial, regional, national, and global), their complementarities, conflicts, and disputes. These coexisting and intersecting multi-scale dynamics affect both access to and the consumption of food, as well as the ways how food is produced and traded, considering its territories, socio-economic dynamics, and national and global policies. Taking access to food as the entry point of a multi-scale analysis of food systems leads to both a “bottom-up” approach from spatial anchoring in localities to systemic dynamics at national-global levels and a “top-down” assessment of the repercussions of these multiple dynamics on food access and production at a local-territorial level.

The concept of locality is defined as a place and an imagined social space where events and situational encounters occur, mirroring the character of the means of subsistence and social life within the region [22,23]. Localities correspond to socio-spatial units in which social actors and activities related to food and eating interact through relations of complementarity, substitution, and conflict. These relationships are determined or permeated by systemic dynamics of different magnitudes operating in the respective socio-spatial unit. From the urban nucleus as an empirical and analytical entry point to food systems, the focus of observation expands to encompass relevant rural surroundings or distant rural areas to capture social actors and activities linked to food, eating and food provisioning in the localities in order to delimit the territory to be researched. Treating localities as empirically referenced universes of specific social relations with identity components that materialise in the relationship with a space and a set of cultural symbols helps to overcome the urban/rural dichotomy [22]. Therefore, with the urban area of the municipality of

Santarém as the socio-spatial entry point of the analysis (the “locality”), the SMR was chosen as the territory for the field research.

A multi-scale food system approach that starts from access to food in localities and territories results in less precise, malleable borders compared to approaches that define systems based on pre-established spatial limits (such as local or territorial food systems), product types (agro-industrial or artisanal systems or value chains), or according to social profile (Indigenous food systems). Although they do not have fixed spatial demarcations, food systems always have some socio-spatial reference in the analysis, for example, in the dynamics of food production, power relations, cultural identity configuration, etc. The use of systems in the plural in this article results from the assumption of multi-scalarity while preserving elements of the food-based approach.

The profile of eating habits and the composition of the respective menus observed in the field, the changes underway, and the possibilities of accessing adequate and healthy nutrition in localities and territories are linked to the presence of food systems with multiple interconnected scales, as it will be shown for the Amazon and the SMR. This analytical procedure differs from and even reverses the direction adopted by the analyses of agri-food systems and chains that commonly start from agriculture and rural areas. The focus on access also helps to evaluate the context in which family-based agriculture can assist the provision of the localities and considers existing inequalities.

The analysis is based on the idea of “menus” instead of diets, which allows for the characterisation of predominant eating habits in the localities and highlights that individuals, families, and social groups make choices when composing their meals at home or outside. These choices depend on access conditions that result from the confluence of systemic dynamics and combine determinants of different natures (economic, cultural, generational, regional, health, environmental, behavioural, and advertising). This article only addresses the outcomes of the choices (the menus) without specifically analysing the underlying food choice processes made by individuals and families. Research in the field made it possible to define a “Santarém menu” in terms of the predominant composition of foods and the main recent changes. In any case, menus have been changing in recent decades in the Amazon region in connection with changing access to food and food system transformations at the local and territorial levels, which is in line with national and global dynamics.

The second analytical dimension addresses the social and political determinants based, in one hand, on the concepts of food politics [24] in order to take into account the political dimension of food and eating reflected in the relationships between social actors. Their convictions, interests, actions and political practices generate tensions and conflicts in the private and public spheres, especially (but not only) in the State and in public policies. To paraphrase Mouffe’s distinction between politics and “the political” [25], we highlight the antagonisms that pertain to the political dimension of food and eating (the political) and the set of practices and institutions that organise human coexistence in the context of conflictuality provided by the political (politics). On the other hand, we mobilize the concepts of social inequalities, inequities and injustices. Social inequalities are concerned with unequal or lack of access to resources, employment and income, political power, education, and health, with intersecting relationships of class, gender, ethnicity/race, age and space. Inequities concern the social structure that determines social inequalities and arise from the appropriation of power and wealth, leading to discrimination; in this sense, inequities imply unfair and avoidable differences in distribution, access and processes that lead to discrimination and generate injustices [26]. The processes and transformations described in this paper contain various manifestations of inequalities and inequities. Justice is, therefore, a fundamental component of the analytical framework of the present research. In Section 6, systemic dynamics that promote inequality and inequity are pointed out in their connections to the three dimensions of justice proposed by Fraser and Honneth [27], namely distributive justice, procedural justice, and cognitive or recognitive justice.

2.2. Field Research

The field research took the urban area of the city of Santarém as the locality, providing the entry point for analysing access to food. The city of Santarém plays a central role in structuring the region's food provision. Following the methodological approach, the field research and corresponding analysis expanded from the observation of the locality to broader territorial levels—SMR—that are important for production dynamics, food supply and public policies.

The city of Santarém is located at the confluence of two great rivers, where the Tapajós flows into the Amazon (Figure 1). It is one of the largest urban centres in the Amazon, with an urban population of around 250,000 inhabitants, plus 57,000 in the rural area. SMR embraces three municipalities: Santarém, Belterra, and Mojuí dos Campos (Figure 1). In spite of converging and complementary dynamics, important distinctions require separate considerations [24]. Strong socio-environmental conflicts have a long history in the region, including those associated with the construction of infrastructure in the border state of Mato Grosso to export the growing production of soy from the savannah (Cerrado Biome).

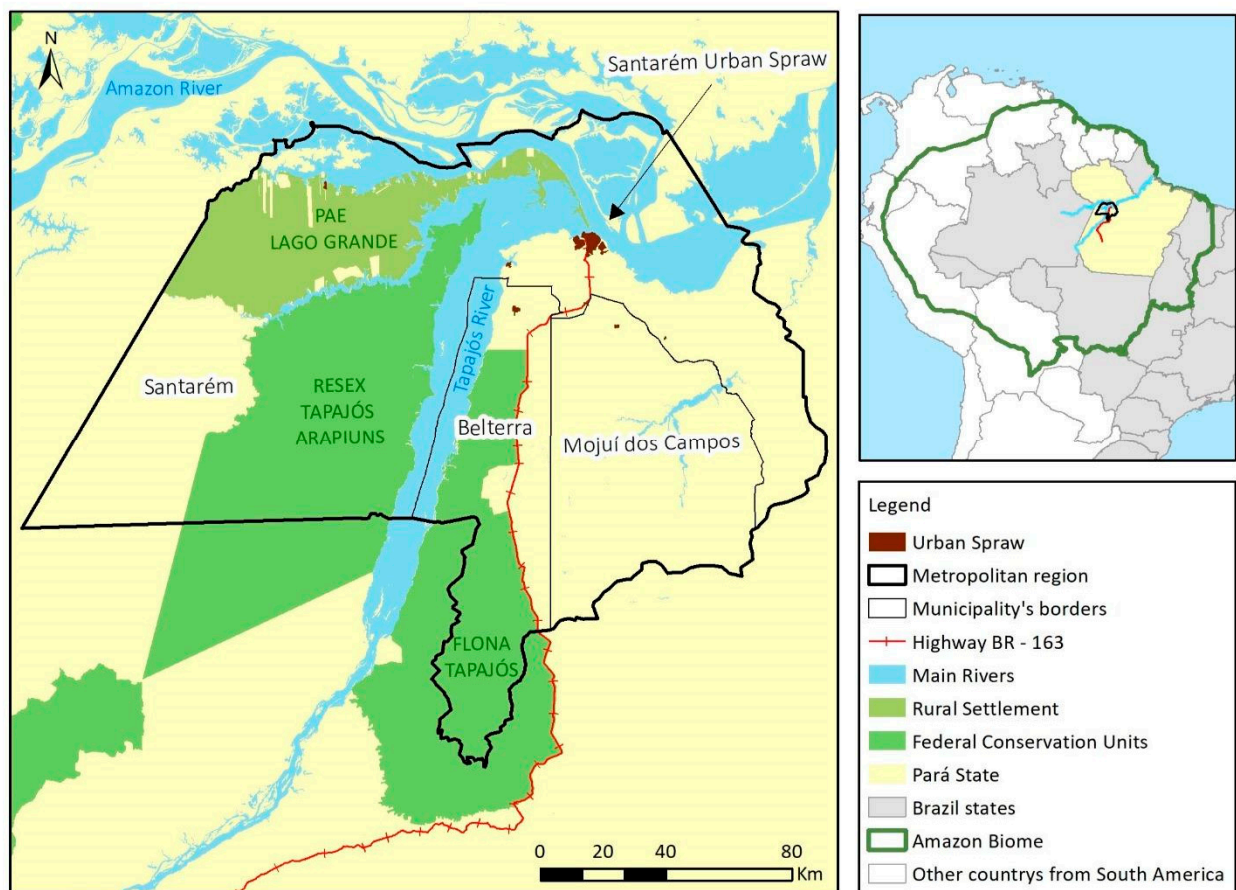


Figure 1. Santarém Metropolitan Region—Municipalities of Santarém, Belterra, and Mojuí dos Campos) and respective urban sprawl. Source: Authors' elaboration based on [28].

Mobilizations of social and environmental movements have led to distinct forms of land regularisation and environmental protection, such as Sustainable Use Conservation Units (UC) that can be implemented by federal or state governments. The main UCs in the Santarém region are (i) Tapajós-Arapiuns Extractive Reserve, one of the most important reserves in the Amazon resulting from a large-scale social mobilisation; (ii) the Tapajós National Forest (FLONA), originally used for logging has around 30 years of conflicts between river dwellers and governmental bodies; and (iii) Lago Grande Agro-Extractive Settlement Project (PAE) (Figure 1; Table 1). These territorial spaces belong to the public

authority, and their use is granted to segments of the population officially classified as “traditional peoples and communities”. The spaces are divided into individual lots and common-use areas. They are intended to protect the livelihoods and culture of these populations based on extractivism, small-scale diversified agriculture and livestock, and sustainable use of natural resources. They reflect recognition of how the lifestyles of these populations help preserve rivers, forests, and socio-biodiversity.

Table 1. Sustainable Use Conservation Units (UC)—Metropolitan Region of Santarém.

UC	Year of Creation	Area	Population-Families-Communities
Tapajós-Arapiuns Extractive Reserve (RESEX)	1998	650,000 ha	18,291 persons 3076 families 65 communities (20 Indigenous)
Tapajós National Forest (FLONA)	1974	549,000 ha	11,000 persons 20 communities
Lago Grande Agro-extractivist Settlement Project (PAE)	1980, reviewed in 1995	250,000 ha	Around 35,000 persons 8500 families 144 communities

Sources: ISA—Unidades de Conservação no Brasil (available at: <https://uc.socioambiental.org/arp/653>; accessed on 25 February 2024). FIOCRUZ/NEEPES, Mapa de conflitos—injustiça ambiental e saúde no Brasil (available at <https://mapadeconflitos.ensp.fiocruz.br/conflito/>; accessed on 25 February 2024).

Since the late 1990s, there has been a process of emergence and affirmation of the ethnic identity of Amazonian populations, generally defined as caboclas. They started to publicly identify themselves as Indigenous people and to demand the demarcation of their territories as Indigenous lands. Intense political, economic, and cultural disputes surround these territories’ defence by social movements of family farmers and Indigenous and Quilombola people (Quilombolas are the descendants of enslaved people in Brazil who formed settlements known as Quilombos) [29,30].

The research methodology for data collection, analysis, and evaluation is essentially qualitative, but we use quantitative data where appropriate. Prior to fieldwork, fifteen online interviews were conducted with key informants with comprehensive knowledge of the region. The objective was a preliminary identification of the main components of the local menu, the ways of supplying and accessing food, the actors involved, policies and decision-making spaces with regard to food. The choice of these informants sought to encompass different social segments. They include four social movement leaders (rural workers, Indigenous, popular urban residents), five researchers from the local university, four members of non-governmental organisations operating in the region, and two public managers of the municipality. The interviews followed semi-structured scripts with a small number of questions to characterise the interviewee and their activities, together with open questions on the specific topics of the respective interview. They were recorded and transcribed by the team in order to provide an overview of the region and basic information for organising fieldwork.

The fieldwork took place in the urban areas of Santarém, Belterra, and Mojuí dos Campos in August 2022 with a multidisciplinary team of five researchers for 12 days in total. Meetings, discussion groups, and in-person interviews were the main procedures used to collect information about eating habits and meal composition. This allowed us to identify what we characterise as “the Santarém menu”, as well as food purchasing habits and the changes occurring in them. A broad spectrum of actors preliminarily mapped in previous online interviews was covered, including family farmers, Indigenous people, NGO employees, participants in social movements and rural workers’ unions, university students and teachers, public servants, public advisors and managers. The fieldwork comprised: (i) two one-day seminars (with 45 to 50 attendants each); (ii) seven discussion groups (12 to 15 attendants each); (iii) a conversation session with a group of women participating

in an Indigenous open fair; (iv) a focus group with residents of a poor neighbourhood on the outskirts of the city; (v) in-person interviews with local public agents and NGO advisers; and (vi) visits to food retail establishments. In order to gather information about actors, policies, and decision-making spaces in relation to food, an additional seminar was organised in which public advisors and managers were invited to talk.

Additionally, an exploratory qualitative survey was carried out with customers from different retail establishments, including two large central public markets, two supermarkets linked to national networks and, two from municipal networks, three small markets in peripheral neighbourhoods, producers, and Indigenous fairs. The customers were asked about the diversity of their food in terms of supply, types, and origin (focusing on the main menu items). These activities were recorded, transcribed, and analysed by the research team.

3. Access to Food: Menus and Food Systems in the Amazonian Context

There are multiple menus and food systems in Pará as well as in the Amazon. They mirror similarities and differences between these regions' various localities and territories and the ways of processing and preparing food, trade channels, and local repercussions of national and global systemic dynamics. This section characterises these menus and the changes in their composition based on both interviews and discussion groups, as well as the corresponding literature, while pointing out inequalities, inequities, and injustices associated with food system trends at multiple levels.

By multiple menus, we mean either distinct meal combinations coexisting within a single locality or territory or variations in the meal composition from individual preferences without greater meanings, all of them significant enough to indicate different menus. Thus, there is a range of variations of what we identify as the Santarém menu described below, while some do not habitually eat this menu at all. We identified region of origin, social class, cultural heritage, population group, and residence in urban or rural environments as the main determinants of these variations. However, the lack of studies or surveys on food consumption in the region does not allow for a detailed description of menus, much less the measurement of the variations among them. We have been unable to collect this information directly from a representative population group, which would also have to record the composition of their meals over a period of time. Therefore, we are limited to giving an approximate description of the composition of the Santarém menu and pointing out the coexistence of menus where the phenomenon of "hybridism" is expressed.

We first identified the items that reflect strong cultural traits of the locality and represent the "organising core" of the main meals, though these food items are not present in all meals, or they occur in varying proportions. The organising core is joined by "sides" and beverages whose diversity is one of the main manifestations of the hybridization phenomenon mentioned below. In the interviews and focus groups, members of various social groups frequently asserted that "our diet is based on fish with cassava flour", allowing us to say that there is a "Santarém menu", whose organisational core is composed of fish and cassava flour, often accompanied by beans and rice as in the rest of the country. (A participant in one of the focus groups said that "beans and rice are never missing from the plate"). The most common side dishes are açaí. Along with the frozen açaí often sold abroad as a dessert, in the Amazon, the unsweetened, ground pulp of this fruit is often consumed as part of savoury meals, similar to a porridge or polenta, vegetables, sweet potatoes, purple yams, tapioca, chicken (free-range or factory-farmed), pasta, porridge, tucupi (a sauce-like porridge extracted from wild cassava root), other soups, and coffee (Table 2).

"Hybridization", according to Goodman et al. [31], results from the overlapping of the flows and circuits through which both conventional and alternative foods travel. This overlapping of flows makes it possible to assess the corresponding existence of "hybrid menus" [32]. Expanding the meaning of hybridisms, Graham et al. [33] show how everyday food-related practices in New Zealand are intimately interwoven with familial

relationships and hybrid ways of being while connecting the present, past, and future. Transformations in menus are strongly influenced by national trends led by the predominant agro-industrialization in Brazilian development. However, our special interest is to highlight one type of hybridization, which is the mixing of food practices “rooted” in Amazonian cultural heritage (e.g., fish with cassava flour or more consumption of roots than grains) with more affordable foods “imported” from central and southern Brazil (wheat, rice, beans, coffee, sugar, factory-farmed chicken, and processed meats) and even the replacement of traditional options. This is one of the links between local, national, and global food systems.

Table 2. The “Santarém menu” and its variations since the late 1990s.

Santarém Menu	
Core Components	Common Side Dishes
Fish and cassava flour Rice and beans	Açaí, vegetables, sweet potatoes, purple yams, tapioca, chicken, pasta, porridge, tucupi, soups, and coffee
Ongoing changes in menus’ profiles	
Replacements	Roots by grains (e.g.,: cassava flour by rice; roots by wheat bread)
	Local fish and free-range chicken by frozen industrialised chicken from abroad
	Fishes caught in the region by fish raised in captivity from abroad
National trends	Local fruits by tropical ones from outside Amazon (bananas, mangoes, pineapples, citrus, and coconuts)
	Tropical by temperate fruits (apples, grapes, and pears)
	Wheat derivatives, sugar, frozen chicken, processed meats, snacks, and ultra-processed food
	Lifestyle changes

Source: Field research and literature review.

In addition to more general socio-economic determinants such as employment, income and food prices, regional changes in food access and new patterns of food consumption have also been driven by (i) land tenure and use, (ii) relationships between artisanal/traditional, extractive and industrial food production and practices, and (iii) consumption of traditional local foods vis-à-vis large scale industrialised, processed or ultra-processed foods from Brazil’s Centre-South region (modifications between social segments, which are certainly distinct, could not be captured). Local interviewees identified a “lifestyle modernization” process currently underway in the SMR and throughout nearly all of the Amazon. This implies looking at transformations at the cultural level and social practices that go far beyond the modernization of agriculture and land use that is usually highlighted in approaches to food systems (the importance of fresh fish in the Santarém menu can be seen in the introduction of sea fish and frozen fish in supermarkets).

Statements by participants in the field research, as well as observations of the foods available in the supermarkets of Santarém indicate increased consumption of frozen chicken and other items offered by supermarket chains, largely coming from large-scale agro-industrial production in far-off regions of the country and almost always sold at relatively lower prices. Tropical fruits from outside the Amazon are also present, such as bananas, mangoes, pineapples, citrus and coconuts. Typical Amazonian fish (like the *tambaqui*) raised in captivity in the states of Mato Grosso and Rondônia are introduced into the local market (traditional fairs and markets). They are favoured because of their lower price stemming from soy-based feed, thus linked to the soy-meat industrial complex, like frozen chicken. Contamination of rivers with mercury from illegal mining reduces the consumption of local fish and compromises fishing activity.

The lower price of soy-based animal feed improved infrastructure for commodity exports through long circuits and highways. The growing role of supermarket networks as a result of economic concentration in food provisioning activities facilitates the integration

of different regions into the Brazilian national food system. The expansion of industrialised livestock production influences local beef and fish consumption and impacts typical short-circuit products such as free-range chicken, eggs and beef from small-scale non-industrial farming. The “import” of factory-farmed chicken and eggs at relatively lower prices affects local farming of free-range chicken. The local menu further reflects the national trend of widespread consumption of wheat products, especially bread and pasta. Estimates for the 2022/23 harvest state that over 50% of domestic consumption of wheat is imported [34], which presents another important link between national and global food systems.

Substitutes for the fish/cassava flour pair are mentioned not without criticism, such as the reduction of flour consumption with deep cultural roots and a cornerstone in the Amazonian habits or its replacement with rice. It is worth citing that the participants in the discussion groups recalled controversial recommendations from doctors and nutritionists to restrict their consumption of cassava flour. These recommendations are based on the argument that they are associated with diseases such as intestinal cancer, obesity, diabetes and gastritis, which are usually associated with ultra-processed foods. Replacing fish with chicken and eggs relates to its availability, lower prices, diminished fishery stocks, health risks from contaminated rivers, and intensified urbanisation in recent decades. Higher beef prices were not widely mentioned during our research, but depending on its relative price, beef could be substituted, for instance, with game meat. For many, coffee with plenty of sugar is the first meal of the day, and even in rural areas, both of the home production has been replaced with products from the Central South purchased in supermarkets. As mentioned, one of the main manifestations of hybridization is the coexistence of traditional production and consumption profiles associated with agro-industrial chains. Nonetheless, one should note that sanitary regulations aimed at large-scale industrial production make it difficult to register cassava flour produced in artisanal processes or to directly market fish caught with artisanal methods.

The changes that have occurred in the Santarém menu described above are seen in both the core components of main meals as well as the “sides.” Furthermore, the advancement of supermarkets is associated with the increasing consumption of processed and ultra-processed foods such as sandwiches, biscuits, snacks, soft drinks, processed meats (sausage, mortadella), and canned products (tinned sardines). In the island of Itiqui in Santarém, fish and cassava flour are two central foods of the diet, with rice, beef, pasta, and beans orbiting them. Foods relegated to the peripheral “non-food” (or non-meal) category include spices and vegetables, fruit, coffee with sugar, and crackers [35]. Finally, the full use of the menu concept requires us to include not only the type of food consumed but also the modes of preparation; this is undoubtedly an important aspect, but one we cannot go into greater depth with the data we collected in the field.

To a large extent, the elements of the “Santarém menu” express what we could consider part of an “Amazonian menu” resulting from eating habits in which typical Amazonian components, such as the fish/cassava flour pair, coexist with products or preparations derived from systemic dynamics with national and global reach. The Amazon, more than any other region in the country, is home to traditional peoples and communities who have an intense relationship with the land, the forest itself, and the rivers. Their culturally entrenched eating and production practices help maintain their very identity and social existence to a greater extent than in other social segments.

Despite differences in Amazonian food systems, we see a widespread strong Indigenous heritage of food cultures and their interaction with the biome in the menus. The central position of ‘fish and cassava flour’ in the Santarém menu is a testimony of this culture and is mentioned in both the interviews and focus groups and in the bibliography on food in the Amazon [36–38]. Indigenous heritage manifests in the presence of extractive products from rivers (fish) and forests (palm fruit, nuts, Amazonian fruits) and the cultivation of cassava. Nevertheless, the statements from Indigenous people and rural families highlight differences between the countryside and the city; Indigenous people consider eating in the city more of a burden because it is less natural than food in the Indigenous villages.

They note that in rural areas, they still have access to free-range chicken, local flours and beans; they catch fish and eat some game, but hunting and fishing are affected by several interconnected environmental imbalances. These imbalances include industrial fishing and overfishing, illegal mining (leading to mercury pollution), larger mining initiatives, water pollution (from pesticides, urban and industrial waste, and plastics), deforestation, and large-scale construction projects (dams and ports).

A reported decrease in production for self-consumption among rural families led to more purchasing of products from agro-industrial origins in supermarkets, boosted by access to monetary income such as retirement payments, social benefits (income transfer), or from local occupations (teachers, health agents). Changes are occurring in the eating habits of children and young people, who consume more industrialised products and reject foods made by their parents or grandparents, which they said to be “foods that made us healthy and kept us standing” in the words of one interviewee. The contribution of changes in school meals was also mentioned, such as the introduction of processed foods from distant regions, as stated by a local manager of the school meal programme, or the use of packaged products due to the lack of electricity in communities. Since 2009, the reorientation of the National School Meal Programme has stimulated the active search for local production (e.g., *cará* yams and sweet potatoes), reinforcing the importance of local food procurement strategies.

Relationships between urban and rural spaces have been under the impact of intense urbanisation in the Santarém region since the 1980s, which reconfigured territories and impacted food in different ways. The increase in the urban population results in greater demand for more “traditional” food in the region while also favouring the commercialization of industrialised food and transformations in eating practices. Additionally, the consolidation of a set of institutions, services, public policies, leisure activities and educational training in the cities affected living conditions in the region. On the one hand, cities have attracted young people to urban centres where they have more access to industrialised foods; at the same time, paradoxically, they broadened the food diversity of social groups affected by the expansion of agro-industrial chains and the hegemonic development model. Territorial conflicts and environmental degradation have compromised access to food based on production practices for self-consumption and extractivism while also encouraging those who felt suffocated by their living conditions and practices to migrate to urban centres. The Santarém region seems to be experiencing swift and intense processes related to urban–rural migration that are different from those that have already occurred elsewhere in the country. It should be noted, however, that in the Amazon region, conservation units establish an important counterpoint for this process, even though they are not immune to it.

4. Confluence of Multi-Scale Food Systems in the Amazon Biome

In this section, we examine the intersection of food systems of multiple scales in the context of SMR and the specificities of this particular site of the Amazon Biome. We apply this approach to decentralised food systems and characterise a ‘Santarém food system’ by analysing access to food as an entry point.

SMR is a geopolitical territory with significant disputes between international, national and local economic interests. It is an important and densely populated commercial centre and maintains a strong heritage from Amerindian civilizations with their own cultures and social organisations for thousands of years. Their productive arrangements and ways of living are closely related to the forest and waters and their regional cultural identity in which food culture stands out [36–38]. Access to food and eating and the shaping of what we describe as the “Santarém food system” reflect socio-economic, political, and cultural dynamics with multiple amplitudes, as well as different forms of relating to the land, ecosystems and territorial geopolitical space. Three ecosystems of the Amazon Biome (the plateau, riverine and floodplain) are influential for local food systems in different

ways due to the modes of production, land use and access to means of transport they each contain, among other specific qualities.

The occupation of the “Santarém Plateau” began in the 1940s and 1950s and intensified in the 1970’s, reflecting development strategies that involve colonisation projects around the BR-163 federal highway. These projects separated the land into lots and led to an initial process of deforestation with the arrival of settlers from other regions of Brazil that gave rise to family farming, which currently plays an important role in providing food to local fairs and markets in Santarém. The main crops are cassava, black pepper, pineapple and palm oil, but some communities also produce green vegetables [19]. Being a land area that permits mechanised planting, the Santarém Plateau has been the main area where soybean monoculture, alternating with corn and rice, has expanded since 1990. This region suffered the most from the intensive use of pesticides, deforestation, logging, and extensive cattle grazing and livestock farming in connection with illegal land use, land markets and expansion of the agricultural frontier. Even family farmers in the plateau region have moved toward greater specialisation and less production for self-consumption, with the use of chemical inputs, pesticides and mechanisation that intensified with the arrival of soybeans [39].

In the riverine and floodplain areas accessed by boat, a “mixed economy” predominates, integrating agriculture, fishing, hunting, extractivism, and small-scale breeding of domestic animals. Parts of this production are traded. Since the floodplain is covered with water for six months of the year, planting is restricted to the remainder, although crops are highly productive, particularly watermelon and corn. However, the lack of transport and storage infrastructure affects both trading and self-consumption during the flood season. This environmental condition makes it difficult for families to be self-sufficient in producing their food unless they can successfully grow cassava in time to produce flour that can be stored. As a result, those who live in these territories tend to consume fish and cassava flour in those parts of the year when the risks of food insecurity are higher. This, in turn encourages families to move to the cities, where they sell fish and buy non-perishable industrialised products, resulting in an unvaried and nutritionally deficient menu. “Buying and selling is a strong feature here”, said one interviewee. Cattle and buffalo are produced in the floodplain, but part of the beef supply comes from the Trans-Amazonian Highway.

The “Santarém food system” therefore includes a regional food trade circuit comprising of fish, flour and other cassava products, root vegetables (yam, sweet potato, and cassava), cultivated fruits (pineapple, watermelon, bananas, and citrus), Amazonian fruits (various, which are also sold in pulp form), pumpkin, squash and other products of extractivism (fruits and nuts from the Amazon). Several of these products are strongly seasonal and mainly circulate in traditional trade fairs and markets or through informal spaces for sale and trade. Transportation within the municipality or to other municipalities in the Amazon region takes place via boat for the riverine and floodplain populations or by road on the plateau. The relevance of rivers (and boats) in food provisioning as a means of transport as well as a food source (from fishing) is limited by the time involved in river travel and higher costs than road transport, which is the most common modality for shipping goods nationwide. The construction of highways for soybean exports has changed local provisioning flows, reducing the costs of importing food from other regions and favouring the establishment of large supermarket networks. The logistical difficulties are significant: transport can take several days; electricity is expensive or non-existent; public transportation is lacking. The high cost of transporting food is not always passed on in prices. For this reason, one demand from producers is to establish spaces where they can sell directly to consumers to add value to the work involved in production, such as farmer’s fairs and to supply the school meal program.

Food systems within the localities and territories in the Amazon are marked by the significant share of smaller-scale production, minimally processed foods or those in their natural state and artisanal processes associated with the great socio-biodiversity of the Amazon Biome. They also include catch from small-scale fisheries, artisanal flours, and

other cassava-derived meals. Part of this production can be considered “agroecological”, although local populations do not classify them as such. Urban and rural “productive backyards” also stand out as a valuable source of access to fruit and other foods (including poultry and eggs) and connect to commercial activities of establishing an agroecological fair in the city of Santarém and creating a cooperative to provide ingredients for school meals.

There is a regional trade circuit for foods such as pineapple, pumpkin, squash, fruit pulp in general (including açaí), cassava flour, tapioca, and watermelon. In many cases, logistical challenges in shipping production drive the work of middlemen. Access to food beyond that produced for one’s own consumption comes from exchanges (between family members, friends, and neighbours), itinerant sellers, and from “doorstep” sales where farmers deliver their produce directly to their clients. There is strong informality in production and circulation activities in terms of being “legal” and in compliance with sanitary inspections, tax documentation, etc. Below, we shall see the impacts of transformations in traditional retail with the arrival of supermarket networks in line with a national-scale dynamic.

Cultivation of cassava and production of flour and other derivatives from this plant (such as tucupi and tapioca) are common activities, though they are under differentiated methods of production and are essential parts of local menus. There is also decentralised and less mechanised production using a wide variety of traditional techniques with deep cultural roots that are specific to each locality; these products circulate in rural communities through relationships of kinship and informal markets. Meanwhile, in Santarém’s plateau region, some communities closer to the city with highway access have specialised in producing cassava flour. They invested in more automated facilities to supply the Santarém markets at two main selling points (Mercadão 2000 Market and Airport Fair). Some participants reported that cassava flour made with machinery has a different flavour than hand-made flour, which impacts its acceptance. Cassava originated in the Amazon and is one legacy of the Amerindians, who not only domesticated this species and selected a wide range of varieties but also developed sophisticated (though simple) technologies to process it, with different derivatives and forms of preparation. There are many different types of cassava flour, and each locality has its favourite with an element of cultural identity; see, for example, [29].

In terms of fish (a core component of the Santarém menu and in the Amazon in general), local statements indicate a set of socio-environmental conflicts related to the construction of ports and dams directly impacting local fishing. Constructing infrastructure has also favoured the expansion of soybean cultivation on the Santarém Plateau, causing deforestation and displacing other crops, including cassava. On the other hand, national and global expansion of the soy-meat industrial complex drives transformations at the local level in the same direction as changes worldwide with greater consumption of animal proteins derived from large-scale industrial production using soy-based feed (especially chicken but also farmed fish). Meanwhile, the riverine and floodplain areas are most directly impacted by the ports and pollution in the rivers.

For this reason, the spatial unit of analysis needs to expand outward from the localities (in this case, the city of Santarém) to incorporate more significant territorial levels in terms of the dynamics of production, food provisioning and public policies. When this focus is extended to the regional scale, it can refer to the Tapajós River Basin, with its own specific characteristics, contexts, and socio-environmental conflicts [36], or to the state of Pará when considering state public policies that affect the territory of Santarém. These levels (Tapajós Basin, Lower Tapajós, (This appears in mobilizations to defend “living rivers”, for example [30]) and Amazonia) also seem to be important in terms of identity and political articulation of social movements, which is also true for Brazil’s broader use of the Amazon region. Historical and environmental characteristics common to the Amazon result in a territoriality that does not necessarily coincide with the political and administrative units of the Brazilian federation.

National and global processes that affect the locality and territory in question are driven by large corporations, traders, and supermarket networks. Intersections with the national and global food systems are composed of several links, primarily the soy-meat complex, all with strong economic concentration and power at all stages of the integral food system chains, from the farm level to distribution in supermarket networks. They are characterised by monocultures spanning large areas, homogenization with very low biodiversity and commoditization and financialization of foods, among others, aspects highlighted by the food regime approach [40]. They are linked to long value chains favoured by the construction of infrastructures for this objective, while infrastructure that favours local production is lacking.

An effort to synthesise and make clearer the processes and dynamics described in this section can be found in Table 3.

Table 3. Multilevel dynamics and food systems in SMR.

Levels of Observation	Sociopolitical Processes and Economic Dynamics	Food Goods
Local-territorial City of Santarém; SMR; Santarém Plateau, riverine and floodplain areas; Conservation Units (RESEX, FLONA, PAE); Tapajós and Amazon rivers	Fishing Local food production Traditional fairs and markets Informal sales and exchanges Land and water transportation Municipal policies (Food and Nutrition Security and others) Amazonian food crops Social organisations of production Grocery stores and small neighbourhood supermarkets; Local supermarket chains Territorial socio-environmental conflicts	Fish (artisan fishing) Cassava flour, and cassava derivatives (tucupi, gums, etc.) Roots (yams, sweet potatoes, cassava) Fruits, oils and nuts (from forest extraction) Cultivated tropical fruits (pineapple, watermelon, citrus, bananas) Local vegetables and seasonings
Regional/Subnational Baixo Tapajós; Bacia do Tapajós; Oeste do Pará; Estado do Pará; Região Amazônica	Export infrastructures (BR 163 highway, ports, waterways, railways) Soybean expansion, mining Territorial and socio-environmental conflicts Pará state-level policies Policies for the Amazon region	Regional fruits and pulps
National Brazil Great Regions	Food consumption national patterns and trends Industrial food production in the Centre-South Relations between major regions: industrialised South and Southeast, soy growing in Cerrado Expansion of agribusiness and the soy-meat complex Supermarket National Chains National Policy for Food and Nutrition Security Economic and political power of agribusiness	Rice, beans, bread (wheat), pasta Coffee, sugar Industrially produced chickens and eggs Farmed fish Temperate and tropical fruits (large-scale productions) Processed and ultra-processed foods (biscuits, soft drinks, packaged snacks, sausages, mortadella, canned sardines, etc.)
International	Global expansion of the soy-meat complex and foreign demand Climate change, demands on the Amazon International consumption trends and patterns Technological production standards Influence of large input and food corporations International Supermarket Chains	Wheat Agricultural production inputs (fertilisers-machinery-pesticides)

The region is experiencing an intense process of multiple transitions in the modes of production, trade, and consumption, marked by the coexistence of traditional and culturally rooted profiles with “new” food profiles, resulting from greater availability and

access to industrialised products. This is partly due to the presence of large retail units offering goods from larger-scale agro-industrial production in the Central-South region of the country, which are cheaper than locally produced products. Intensified urbanisation also results from the installation of new ports and industries, expanding soy cultivation, land purchase and sale, environmental degradation that directly impacts the population's living and health conditions, and changes in the provision of public and private services (in the areas of education and leisure, for example).

The city of Santarém experiences the same retail transformations as the national level (with some specific characteristics) through the expansion of the supermarket modality. A medium-sized local supermarket network and, more recently (since 2016), two large "wholesale/retail" supermarkets exemplify this development and link to national and international networks supplied almost exclusively with products from the Central-South region of the country. This model exists (if unevenly) alongside local forms of retail, competes in price and partially displaces local food production. Nevertheless, reports and interviews indicated that Santarém residents still continue to buy fresh fish and cassava flour (along with fruit and other fresh products) at local fairs and markets, especially the Mercado 2000 and fairs at the Old Airport and COHAB (state-built housing complex). In these fairs and markets, rural worker organisations have successfully won spaces to sell their products in the city, although they do not offer exclusively local products, and small wholesalers are also present in the region.

Diversification of the supply of goods in urban areas occurs simultaneously with the abandonment of rural areas due to degraded living and health conditions, which also affects intergenerational relationships. The distinct food profiles between generations of Indigenous peoples were notable in the focus group discussions with an emphasis on young people's consumption of industrialised and fast food associated with a certain social status (We noted efforts by the Indigenous movement to raise awareness among Indigenous people living in the city around consuming indigenous products as a way to strengthen the income of these groups). Some factors catalyse these transformations, such as the association of ultra-processed foods, supermarket networks and fast-food chains with the demands of practicality and the image of "development" (in contrast with a stereotypical view of the "backwardness" of the region), as well as the cost and satiety ratio of ultra-processed foods. Diverse production and consumption profiles still persist because the very mobility of population segments from rural to urban areas causes distinct situations. Some interviewees reported losing their productive practices when they left their own land and migrated to cities, but some families maintained these practices when living in spaces with a small bit of land, even in urban areas. Even in regions that cannot produce food during flood season, the need for stored food is increasingly being met by industrialised products.

The very definition of boundaries between the urban perimeter and the rural is the subject of political disputes around the territorial planning of municipalities as the soybean sector demands demarcating areas for plantations and port constructions. These disputes involve the interests of social movements linked to small producers and Indigenous and Quilombola groups on the one hand and the "agribusiness" segment on the other. One point of dispute in the Santarém Master Plan was installing a large port near the city centre on Maicá Lake, a nursery for fish and shrimp. Disputes over territories can be identified in more "rural" spaces as well as urban areas and involve infrastructure of ports and hydroelectric power plants, as well as activities such as invading loggers, illegal mining, predatory fishing, etc. These socio-environmental conflicts extend to the basin of the Tapajós River, considering that in the district of Miritituba (300 km from Santarém, in the state of Pará), there are five ports already operating, and there are plans to construct another 20. Fishermen report bans on fishing near ports and polluted rivers by soy and corn husks (the fishermen state that the husks form a slime that reduces their catch: "It makes a green, stinking, rotten, sticky mud: what fish can survive this?"); the vessels that carry soybeans make fishing difficult, and the installation of fuel storage ports generates waste that also pollutes the rivers.

The reports also indicate that climate change and alterations in rainfall have damaged production in the floodplain, with greater intensity and variations in drought and flood periods. Traditional production practices like saving bean and corn seed from one year to the next are being replaced among some farmers who purchase seed from specialised stores, along with pesticides, machinery, and fertilisers. The weakening of the productive autonomy and self-consumption faced by different segments of producers and Indigenous peoples is reflected in the changes in eating reported by different interviewees and members of the focus groups. Because of different factors, this relative autonomy has been compromised by the intensification of practices predating these biomes, which are nothing new (illegal mining, deforestation, etc.) and are part of the historical difficulties related to the profiles of these biomes.

There are recognized health risks related to the use of pesticides and the consumption of food produced by agro-industrial chains. Political action movements thus provide evidence for the health impacts of pesticides, where soy and other grain monoculture farming have expanded [39].

5. Production and Access to Adequate and Healthy Food in a Context of Conflict, Inequalities, and Injustices

This section delineates a wide range of social inequalities and inequities, as well as a matrix of distributive, procedural and recognitive injustices identified in the region. These can be associated with food systems and value chains at their multiple scales, based on the socioeconomic dynamics and changing processes addressed in Sections 3 and 4. They are integral parts of a territorial geopolitical context that attracts significant disputes between international, national, and local economic interests. These are intensified with the expansion of the soy-meat complex, the urbanisation process, and also with large-scale mining, illegal small-scale mining, and logging.

We start by assessing the agro-industrial modes of production that mobilise the interests of transnational companies selling agrochemicals, seeds, and ultra-processed foods. These companies have national and global connections driven by large corporations, traders, and supermarket networks through the multi-scale integration flows of goods. Urban population growth impacts consumption demands and modes of producing the region's more "traditional" foods while, at the same time, favouring the trade in industrialised foods that contribute to changes in eating habits. The coexistence of different forms of food circulation and the penetration of national dynamics into local contexts leads to economic and symbolic domination over the local or territorial food systems considered to be more "backward". The latter is clearly contradictory to claims of Indigenous and peasant movements, who see their way of eating as "more natural", and highlights disputes over different ontological understandings of a "good nutrition".

Disputes in the Amazon context involve large-scale soy and livestock producers and national and multinational corporations on the one hand and, on the other, a broad array of family farmers, peasants, Indigenous peoples, and traditional communities that face repercussions on their relationship with the land, forests, and water. They can be characterised as two socio-economic and political fields facing tensions and conflicts. This does not mean that they are separate worlds, but they coexist in hybrid forms in localities and territories. Instead of idealising the local sphere, Goodman et al. [41] suggest reflexive localism, or reflective politics of localism, as a condition for a democratic, procedural, and open local food policy in order to reveal the politics, differences, inequality, and social injustice that manifest in the local sphere. Escobar [42] argues that social movements make an important contribution to the democratisation of commercialization in localities. Strategies that bring production closer to consumption and ensure fairer, more socially equitable and healthy food production from diversified family-based agriculture and small-scale distribution of food need to be assessed and evaluated. The possibility for consumers to purchase food from this type of agriculture depends on the context of disputes over social control of food provisioning, which has an important local dimension [31,41].

At the same time, local reproduction of the highly unequal national urbanisation pattern (e.g., substantial socio-spatial inequalities in the provision of public services) have been accompanied by concentration in the wholesale and retail markets, with the arrival of large regional, national, and even global supermarket networks. These transformations reinforce inequities. Those segments of the population that make their living from artisanal practices, family labour, and small-scale traditional extractivism (e.g., family farmers, peasants, fishermen, and Indigenous peoples) are the ones who suffer most because they can no longer survive on the means and type of knowledge that they historically accumulated. Paradoxically, these segments form the foundation of local or territorial food systems with the greatest potential to produce and sell healthy foods suitable for local socio-biodiversity and cultures.

Statements from local actors picture a new phase in the colonisation of the region, with the image of Brazil as “the granary of the world”. This expanding globalisation involves multiple aspects, such as a higher degree of commoditization and changes in the technological base of family agriculture. The construction of logistical corridors required for the free flow of commodities and goods has driven the expansion of the agricultural frontier in the region, such as paving the BR-163 highway linking Cuiabá (in the state of Mato Grosso) to Santarém and the installation of the Cargill port in the city centre.

Since 2016, a widespread reshaping of alliances between government sectors and private commercial segments has gained more strength in Brazil and is connected to the export of agricultural and non-agricultural commodities. It comprises companies producing agrochemicals, equipment, and ultra-processed foods and drives broad-scale monocultural expansion and agro-industrial practices of the soy-meat complex [12,17,21].

The analysis of the main actors involved in the soy-meat complex mapped in a previous study [13] is an important element in understanding how food policy is manifested in the localities and respective territories. Agribusiness is organised in national associations and confederations, and its interests are represented by the influential ruralist caucus in the national congress. This caucus is the most important opponent to the political activity of civil society organisations defending social justice and the rights of traditional and Indigenous peoples. Among civil society, national and international policy networks stand out and connect different non-governmental organisations to lobby the national congress and government institutions and raise funds. Advances like the soy moratorium, although critiqued by civil society organisations for its effectiveness, reflect the potential joining of forces in a given historical situation. On the other hand, demands from civil society are often discouraged, sometimes by violent means, as could be seen in a series of assassinations of political leaders after 2016 who advocated for Indigenous causes and traditional peoples and communities.

The processes and transformations described in this paper contain various expressions of inequalities and inequities that lead to injustices whose identification is part of the objectives of our research. For this reason, to finalise this section, Table 4 below synthetically organises the connections of those processes and transformations with the three dimensions of justice proposed by Fraser and Honneth [27], namely distributive justice, procedural justice, and recognitive justice. Our aim here is to summarise our findings on access to food (as expressed in the unique characteristics and recent changes in the “menus” present in the Santarém region) and the interactions of local food systems with systemic dynamics of distinct amplitudes and relate them to different justice dimensions.

Table 4. Multi-scale food systems and dimensions of justice.

	Locality Territory	Subnational Scales	National	Global
Distributive justice	Variations in menu composition according to the socio-economic conditions of individuals, families, or social groups Restrictions on food access in terms of quality and quantity Typical situations of social exclusion in accessing land and other resources	High concentration of land ownership Deforestation and illegal mining cause harm to the region's populations and/or rural exodus. Regional factors adding to national causes of food insecurity	Access to national programs according to local implementation Impacts of national policies on local access and production Repercussions of food prices on consumption patterns	Impacts of the expansion in commodity cultivation on local food production and access to resources Repercussions of international prices on the formation of domestic food prices
Procedural justice	Asymmetries in decision-making power and political influence between the private commercial sector and other social actors Unequal access to legal instruments and public policies Support structures and local initiatives to encourage family food production	Political activity by economic elites and regional policies connected to national representation Asymmetries between dominant food systems and social movements Legal structures and regulatory policies that enhance healthy eating and local production	Political action aimed at weakening laws related to deforestation and the land rights of Indigenous people, Quilombolas and other traditional communities Transformations in local menus due to national processes and factors	Involvement of local social actors in designing transitions in food systems and their repercussions on access to and production of food at the local and territorial level
Cognitive and recognitive justice	Discrimination and practices that reproduce environmental racism and ethnic prejudice Displacement of populations whose rights are not recognized Erasure of local food crops Value hierarchization in relation to local or traditional products	Visibility or erasure of traditional peoples and communities in the face of ongoing transformations in the region	Nutritional and health approaches to components of local menus that devalue regionally-produced foods. Consideration of regional foods in defining a national standard food basket	Inequality of local foods compared with food for export Reduced variety of local production due to export demands

6. Discussion

Our characterization of a “Santarém food system” includes multi-scale trade flows, particularly those arising from national agri-food production that affect local production, marketing, and consumption. This national agri-food system has economic, political, cultural and social implications for food provisioning and public policies in the regions, territories, and localities. Furthermore, some factors extend beyond national borders and form important pillars of what is considered a global food system. This is especially relevant for the soy-meat complex and wheat commodities, which play an important role in the global organisation of agri-food and industrial production.

Access to food in localities and territories is increasingly dependent on the actions of large corporations, nation-states and country blocs, while the borders of national and global spheres have become muddled. Relevant topics in this regard concern (a) the composition and volume of aggregate demand and supply, (b) domestic trade flows that intersect with international trade, (c) connections between the formation of international and domestic prices, (d) management of domestic public food stocks in face of the international private stocks, (e) integration of markets within the country and between countries, (f) spatial distribution of land production and occupation, (g) dynamics of technical innovations through agri-food chains, (h) media impacts on eating habits, and (i) the formulation of national public policies in accordance with international agreements.

Another important aspect concerns the repercussions of seasonality on menu composition in agri-food production. Proximity between production and consumption is greater at the level of localities and territories. Therefore, it plays an important role in menu composition as it could allow for more diversified and locally rooted food. Khatounian [43] highlights the stronger connection between food cultures and crop regionality and seasonality prior to the green revolution and changes in transport. The growing uprooting of culturally-based agriculture and cheaper transportation made it possible for menus to be the same year-round and increasingly similar in much of the world. We can assume that the higher cost of transportation makes seasonality and regionality even more important in the Amazon, although this is sharply changing.

Food provisioning lies at the heart of current debates on access to food and food systems in different spheres. The perspective of “menus” as a concept and its connection to the interaction of food systems of different amplitudes is an unconventional understanding of food provisioning. Provisioning encompasses the diverse and complex set of activities within the sphere of circulation that mediate access to food and its production. It involves a variety of social actors, most notably private economic agents and government agencies [44]. In this way, provisioning is one of the main links between the urban centre and the rural environment and even distant rural areas connected by more far-reaching agri-food chains. These represent two-way streets that involve both the flow of goods and the formation of eating habits. The tendency to standardise habits, which results from the greater proximity between rural and urban areas, is countered by discourse highlighting the differences in food when it is “in the countryside” or “in the city.”

Food provisioning is also a multi-scale problem in which questions of provision differ in terms of how they relate to the international, national, or, in this case, territorial and local scales. It raises questions related to food distribution and resale, availability, and physical access to food, flows, or circuits of goods and production systems.

The way in which wealth generation has been established in the region of Santarém is directly related to the production of agri-food commodities for export that is associated with land concentration, deforestation, and property speculation. The expansion of agro-industrial chains and exploitation of natural resources drive environmental degradation and the deterioration of living and health conditions. The various socio-spatial units characterised as territories of different peoples and segments of producers within a context of weak land regularisation suffer most from this development.

The alliances between some government sectors and private commercial sectors linked to agribusiness and the soy-meat complex support weak government regulations and disrespect land regularisation and land use, demarcation of Indigenous and Quilombola lands, and control of deforestation in the Brazilian Amazon. Global disputes around climate change, which are driven by the European Union and other hegemonic Western countries in the world economic order, put food systems at the centre of discussions. This results in greater restrictions for those purchasing food and non-food commodities, moratoria, embargoes on soy and meat from deforested areas, and the withdrawal of international funds from the Amazon [45].

The support or hindrance of national public policies and programs for small-scale diverse systems and practices favouring social justice and equity oscillates over time. On the one hand, the Brazilian government has given decisive support for the expansion of soybean monoculture across large areas of the Central-West and even in the Amazon. This can be seen in the construction of infrastructure for exports, such as the port complexes in Santarém and the BR-163 highway [12,13]. On the other hand, programs between 2003 and 2016, such as the National Food and Nutrition Security Policy and the National Plan on Agroecology and Organic Production, increased access to food and nutrition among the population. This was mainly achieved through school meals, valuation of the minimum wage, income transfer, social security, and support for family-based agriculture. Both urban and rural populations in territories and localities profited from these programs even if, in

some cases, they may discourage production for self-consumption and boost consumption of ultra-processed products.

Since 2003, national policies and support from international funds for environmental preservation and “sustainable progress” have increased. They aim to ensure the traditional ways of life of traditional peoples; protecting natural resources and forests by recognizing the different types of gains from keeping the forest intact; ensuring traditional extractive practices; and promoting land regulation, environmental surveillance, and mining regulation. At the same time, the intense and rapid expansion of agro-industrial production modes, especially the soy-meat complex, has led to land concentration, deforestation, and environmental degradation, reinforced by the presence of small-scale illegal mining, logging, and large mining projects. National and international support was also linked to the economic dynamics that strengthened financial gains and transnational food and beverage corporations.

This process has a swift and intense effect on the territories in the Amazon region, although it is delayed in comparison with other regions of Brazil. Despite the intensity and speed, it is important to understand the equally important ambiguities in these dynamics of transformation in the region’s traditional food systems. Destruction and survival coexist with distinct weights and strong asymmetries of power. The responses and reactions to processes of expansion of the agro-industrial food systems financed by a network of actors at local, regional, national, and international scales reveal that food policy at the local level is strongly influenced by movements of resistance to the narratives of sustainable progress.

The ambiguities involved in the processes of transforming food systems may have permitted an ‘asymmetric coexistence’ of traditional modes of living and agro-industrial food systems dominated by the soy-meat complex. A subordination of traditional modes of production and extractivism in the localities around Santarém based on the labour of family farmers, Indigenous peoples, and other traditional communities can also be seen in the changing menu composed mainly of fish, cassava flour, beans, rice, and fruit. The main factors affecting the subordination of traditional production modes are territorial conflicts and environmental degradation that practically impede the continuity of traditional extractivism, artisanal fishing, and family-based agriculture. Conservation areas were fundamental to ensuring that traditional peoples and communities could maintain their ways of life. However, the intensification of disputes further undermines these modes of production and consumption.

Connections between regional, urban, and rural circuits were affected by national public policies (e.g., the establishment of conservation units) as well as by international trade restrictions related to exports of agri-food and mineral commodities. National and international civil society organisations supporting Indigenous people, family farmers, and traditional communities also play important roles under food sovereignty and agroecology flags. Asymmetrical effects of political and economic power become visible when civil society organisations and transnational corporations cross paths. This political inequality that favours economic concentration is accentuated within the contexts of extreme right-wing governments strongly aligned with the interests of these corporations and the processes of social participation, as seen in Brazil between 2019 and 2022.

The results of the study highlighted the commercial pressures, the power and the capacity of transnational food corporations to influence the political process. The place they occupy in the economic structure underpins contemporary globalised capitalism. Therefore, addressing power asymmetries requires building up global alliances and new mechanisms of global governance that prevent conflict of interest, regulate the intervention of these corporations in national governments and promote governmental autonomy.

The recent context of growing food insecurity and hunger in Brazil brings us back to restricted access to adequate food and confirms the understanding of food justice as promoting social justice through food. One should take note of the (few) statements that referred to hunger in the SMR, at least because it is surprising and shocking to hear about hunger in the Amazonian context so commonly associated with the image of abundance.

This shock does not result from ignorance of the socio-political and economic causes of hunger and all forms of food insecurity, but it does require more discussion around the fact that nature's generosity should make solutions more viable.

7. Conclusions

This article aims at identifying how systemic, multi-scale dynamics influence access to food and how this access is impacted by different modes of food production and circulation. Our study showed that the expansion of the soy-meat complex in the context of the multi-scale dynamics of food systems in the SMR reinforces historical socio-economic and political dynamics. They reproduce inequities in social structure and power appropriation that determine social inequalities and injustices and affect access to healthy food. Among the overall factors that provoke transformations in menus, we identified occupation and income levels, relative food prices, changes in the retail structure, production profiles and composition of available goods, transformations in the production sphere, and factors that affect consumption behaviours (information, principles and values, media/advertising, mimicry, etc.). Considering the wide concept of sustainability, the main empirical data indicated that food systems reinforce the connections among socio-economic, human health, climate, cultural, and justice dimensions of sustainability through land speculation and concentration, deforestation, and environmental degradation, territorial conflicts, uneven urbanisation, agrochemicals, and ultra-processed foods.

Social inequalities and inequities have strong connections to access and modes of land use. Different social groups (agribusiness, smallholder farmers, and Indigenous people) are unequally affected by and involved in environmental problems, deforestation, use of pesticides, territorial conflicts, and uneven urbanisation in terms of the supply of public goods and services. On the one hand, smallholder farmers and Indigenous people are losing the ability to maintain their income from food production and even to maintain the ownership of their land. On the other hand, soybean and beef producers are increasingly concentrating economic and political power, including land ownership.

The locality and the territory chosen as the socio-spatial reference for our analysis have relevant specific characteristics, particularly the coexistence of multiple Indigenous peoples and traditional peoples and communities with existing conflicts and disputes (national as well as international) related to access to land, local biodiversity, and other natural resources. These peoples live in conflicting geopolitical and territorial contexts and are diverse in how they relate to the territories, the rains and dynamics of flooding, the rivers, and the forest. Territorial conflicts and disputes over the region's resources are not new, so it is worth questioning what has changed in the region and, more specifically, what characterises recent changes. Our results allow for the conclusion that impoverishment, in combination with the erosion of the base for food production, is among the main determinants restricting access to adequate and healthy food for smallholder farmers, Indigenous and traditional people and creating violence in rural areas.

The analysed multi-scale dynamics indicate that both access to and the consumption of food, as well as the ways in how food is produced and traded, are strongly affected by the international demand for soybeans, which is driven by transnational corporations' interests connected to local agribusinesses interest. The evident asymmetry in this coexistence of Indigenous people and traditional communities with the agribusiness sector (e.g., soybean growers, livestock farmers, and agroindustry) impacts the access to adequate and healthy food in at least two ways: (a) it expands food availability from other regions of the country (indicating the connections between international, national, regional, and local scale of the Food Systems), including fish and poultry from industrial factory farms, thereby reducing the consumption of fresh, locally produced food and (b) it expands access to ultra-processed foods traded by the same transnational corporations that operate in globalised agro-industrial food systems. Regional and national supermarket networks that promote long-range trade flows and change the retail structure in the localities are crucial contributors to this transformation.

The coexistence of traditional and agro-industrial modes of production, which simultaneously affects production and consumption practices, highlights the interconnected nature of access and consumption, and modes of production and circulation. In addition, the present context of intense urbanisation of everyday life significantly alters the time-space relationship itself, for example, reinforcing demands for practicality. The cost of food, not only in absolute terms but also with regard to practicality, satiety, and other characteristics, drives the consumption of ultra-processed foods. Access to advertising and mass media, as well as eating practices associated with “modernity” and “economic development”, are values that drive some local individuals and actors. The reduced consumption of fresh foods and an increase in ultra-processed ones are directly associated with a higher probability of chronic non-communicable diseases, especially in the most vulnerable groups. These segments experience the negative consequences of this process more intensely in terms of health and nutrition, reinforcing the injustices and inequities fuelled by the expansion of agro-industrial food systems.

Nonetheless, production in the soy-meat complex from areas involving deforestation or conflict is facing growing restrictions from international purchasers, especially in Europe. Nationally, the combined scenario of intense social conflicts, coexistences, subordinations, and divergent strategies in the Brazilian Amazon poses huge challenges for the new centre-left federal government’s plans, which aim to gain back control over deforestation, illegal land occupation and illegal small-scale mining. To do so, the government plans bioeconomy-driven strategies to promote sustainable use of the country’s enormous biodiversity, especially in the Amazon, as a competitive unique selling point for the country. If these strategies are successful, it could represent an important shift in the socio-economic dynamics of the Amazon region. Furthermore, the ecological transition has been highlighted in the recent official narratives as a central reference to Brazil’s intended resumption of development strategies.

Our research provides elements for future studies through intersectional approaches to inequalities and injustices, which have received increasing attention these days, particularly with regards to the role of social movements [46]. The same applies for food democracy as a counter-pressure to corporate control [47]. Research based on integrated and multi-scale analysis of food access and production will contribute to targeting inequalities and injustices, sustainability, social equity, human health, and climate change in food system transitions. These factors must be taken into account when integrating food, environmental and climate justice into the design and implementation of alternative strategies and policies for shaping local and territorial food systems.

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